Community understanding of malaria, and treatment-seeking behaviour, in a holoendemic area of southeastern Tanzania

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Professor Dr. A. Zuberbühler

Dekan

To Johani, Flörli and Anne-Käthi

"Without our realizing it, medicine has carried us into the social sphere, there to meet up with the great problems of our time. Let us be well aware that we are not concerned here with the treatment of a patient by means of medicinal remedies and the adjustment of his home environment. No, we are dealing with the entire culture of a million and a half of our fellow citizens who have been physically and morally degraded."

Rudolf Virchow, 1848

(quoted by Nuland, 1988)

TABLE OF CONTENTS

Acknowledgements

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Summary

One of the main components of WHO's current malaria control strategy centres on early recognition and prompt treatment. Rapid identification of malaria and adequate treatment are essential for preventing irreversible complications and most deaths can be avoided. But even in areas with good access to health care, it is common for malaria patients to present at the health facility late or not at all.

The overall goal of the study was to investigate community understanding of malaria, and treatment-seeking, and the way in which this can contribute to delay in attending a health facility in order to formulate recommendations for tackling this problem.

The study was set in Ifakara (Kilombero District) in southeastern Tanzania, a semi-rural town with a large and well equipped District Hospital and other, private and public health facilities and pharmacies. Antimalarials, mainly chloroquine and other drugs are also widely available over-the-counter in the numerous small shops throughout the community. Beside the biomedical resources, traditional medicine is well represented in the community. Many different types of traditional healers offer their services to the public.

Malaria in the study area is holoendemic and perennial, which presents a huge health burden for the population, in particular to children under the age of five years. Resistance to chloroquine was found to be high.

The ethnographic fieldwork was conducted in a two year field study carried out between April 1995 and March 1997. Additional information has been recorded in a second, short field visit of one month in September 1997 in the context of a study on the impact of cost-sharing on the community, requested by the St. Francis Designated District Hospital. The investigation strategy was that of triangulation, using a combination of qualitative and quantitative methods.

The population was found to be very well informed about malaria as it is biomedically defined. However, one of the major findings was that the local knowledge is the result of an interplay between biomedical and traditional concepts and logics, a process which is referred to as *'medical syncretism'*. Analysing the amalgamation of the two types of knowledge contributed to the understanding of cultural logics underlying treatment-seeking behaviour for malaria.

Summary

The study of medical syncretism reveals most clearly that even if health messages are well understood by the population, the meaning given to them may considerably differ from what health promoters intended to convey.

This amalgamation and its consequences for treatment and delay was seen as relevant for all three forms of malaria (uncomplicated, severe, and recurrent malaria). For example, in the case of uncomplicated malaria, it was found that cultural logics derived from notions on witchcraft could lead people to misinterpret repeated vomiting as a sign of relief, rather than as a manifestation indicating an evolution from uncomplicated to severe malaria.

For severe malaria, the local illness term *degedege* was identified to come closest to biomedically defined cerebral malaria. However, while informants clearly recognised the link between *degedege* and malaria, they did not treat the two forms in the same way; for *degedege*, people used primarily traditional practices, including assistance by 'knowledgeable women, while for malaria, they preferred biomedical treatments by far. Based on this finding, the role of knowledge about aetiology for treatment-seeking is discussed. It is argued that knowledge which is present in the cultural repertoire ('*recipe knowledge*') and is automatically evoked for action (*non-reasoned action*) plays an important role in treatment-seeking, especially for treatments in an early phase of illness.

Reasoned action was found to set in when something unexpected occurs, for example when symptoms inexplicably aggravate or persist despite treatment. The study showed how in the local illness model, biomedical ideas about malaria are complemented with the logics of witchcraft. The analysis of the resulting knowledge permitted us to explain the logics which guide people in their labyrinthic treatment-seeking paths, including biomedical and traditional health services for the same illness episode.

In a second focus, the study emphasised the relevance of economic constraints for treatment-seeking. Cognitive aspects were linked with social and economic aspects. It was observed that perception about illness aetiology determined the implication of the social network for illness management and the social pressure on covering treatment costs of the sick individual. In contrast to illnesses attributed to witchcraft or spirits, for illnesses which belonged to the 'natural' order, such as malaria, and required hospital intervention, support networks for coping

with treatment costs, if any, were found to be small. Women who could not count on male support were identified to be at a particular risk for delaying treatment for their children because of economic reasons. It was found that women had adopted different coping strategies for covering treatment costs, but besides delay, they frequently had negative long-term implications for their and their children's well-being. A particular high risk for delay was found to result from a negative interaction of gender, seasonality and illness factors.

The findings from this study contributed to a rethinking of the traditional - modern dichotomy in socio-cultural malaria research. They further challenged the common view that traditional treatments are an important source of delay for malaria treatments and called for the need to increasingly focus research on delay and application on socio-economic perspectives. Direct implications of the study for further research and recommendations for action were extensively discussed.

Zusammenfassung

Ein Hauptbestandteil der üblichen Strategien der WHO zur Malariakontrolle konzentriert sich auf Früherkennung und sofortige Behandlung. Schnelle Identifizierung von Malaria und adäquate Behandlung sind grundlegend um unumkehrbaren Komplikationen vorbeugen und die Mehrzahl der Todesfälle verhindern zu können. Aber selbst in Gebieten mit einem gutem Zugang zur medizinischen Versorgung wenden sich Malariapatienten und -patientinnen gemeinhin erst sehr spät oder überhaupt nicht an die zur Verfügung stehenden Gesundheitseinrichtungen.

Allgemeines Ziel dieser Studie war es, herauszufinden, welche Vorstellungen von Malaria in der Bevölkerung bestehen und den Prozess der Suche nach einer Behandlung der Krankheit zu untersuchen, und inwiefern diese Vorstellungen zur Verzögerung der Inanspruchnahme der Gesundheitseinrichtungen beitragen können, um daraufhin Empfehlungen zur Lösung des Problems formulieren zu können.

Die Studie wurde in Ifakara (Kilomberodistrikt) angesetzt, eine Kleinstadt im Südosten von Tansania, die über ein grosses und gutausgerüstetes Distriktspital verfügt und wo zusätzlich private und öffentliche Gesundheitseinrichtungen und Apotheken vorhanden sind. Heilmittel gegen Malaria, hautsächlich Chlorquine, sind überall in den zahlreichen kleinen Läden der Gemeinde erhältlich. Neben dem biomedizinischen Angebot ist auch die traditionelle Medizin in der Gemeinde gut vertreten. Eine Vielfalt verschiedener traditioneller Heiler und Heilerinnen bieten ihre Dienste der Öffentlichkeit an.

Malaria ist im Studiengebiet holoendemisch und tritt ganzjährig auf, was eine sehr grosse gesundheitliche Belastung für die Bevölkerung darstellt, dies vor allem für Kinder unter fünf Jahren. Die Chloroquineresistenz wird als sehr hoch eingestuft.

Die ethnografische Feldarbeit wurde in einer zweijährigen Feldstudie von April 1995 bis März 1997 durchgeführt. Zusätzliche Information wurde während eines zweiten kurzen Feldbesuchs im September 1997 beschafft, in Zusammenhang mit einer vom St. Francis Designated District Hospital unternommenen Studie über die Auswirkungen von Kostenbeteiligungen auf die Bevölkerung. Die Forschungsstrategie bestand in der triangularen Kombination von qualitativen und quantitativen Methoden.

Der Informierungsgrad der Bevölkerung bezüglich der Malariakrankheit im biomedizinischen Verständnis wurde als sehr hoch eingestuft. Jedoch bestand eine der wichtigen Erkenntnisse in der Tatsache, dass das lokale Wissen aus dem Zusammenspiel von biomedizinischen und traditionellen Konzepten und Logiken resultiert, ein Prozess der hier als "*Medizinischer Synkretismus*" bezeichnet wird. Die Analyse der Verschmelzung dieser zwei Wissensarten trug wesentlich zum Verstehen der kulturellen Logiken bei, auf denen das Verhalten bezüglich der Suche nach Malariabehandlung basiert.

Die Untersuchung des Medizinischen Synkretismus lässt klar erkennen, dass selbst in den Fällen, in denen die Inhalte medizinischer Aufklärung von der Bevölkerung gut verstanden werden, die Bedeutungen, die ihnen gegeben werden, beträchtlich von dem abweichen können, was zu vermitteln beabsichtigt war.

Diese Verschmelzung und die daraus folgenden Konsequenzen für die Behandlung und die Verzögerung der Behandlung wurde als relevant für alle drei Malariaarten (unkomplizierte, schwerwiegende und rückfällige Erkrankung) betrachtet. So wurde beispielsweise bezüglich der unkomplizierten Malariaerkrankung herausgefunden, dass kulturelle Logiken, die auf Kenntnissen der Hexerei basieren, dazu führen können, dass wiederholtes Erbrechen als Zeichen der Besserung fehlinterpretiert wird, anstelle darin ein Symptom zu erkennen für die Entwicklung von einer unkomplizierten hin zur schwerwiegenden Malariaerkrankung.

Für schwerwiegende Malaria wurde die lokale Bezeichnung *degedege* als der Terminus identifiziert, welcher dem der biomedizinisch definierten zerebralen Malaria am nächsten kommt. Obwohl die Befragten zwar klar die Verbindung zwischen *degedege* und Malaria erkannten, behandelten sie doch auf unterschiedliche Art und Weise diese beiden Formen; im Falle von *degedege* wurden hauptsächlich traditionelle Praktiken, einschliesslich der Hilfe von 'weisen Frauen', in Anspruch genommen, während im Falle der Malaria weitestgehend biomedizinische Behandlung vorgezogen wurde. Von diesen Erkenntnissen ausgehend wird erörtert, welche Rolle das Wissen über die Krankheitsursachen im Prozess der Suche nach Malariabehandlung spielt. Es wird argumentiert, dass Wissen, welches im kulturellen Repertoire verankert ist (*Rezeptwissen*) und im Handeln (*nicht planentworfenes Verhalten*) automatisch hervorgerufen wird, eine wichtige Rolle spielt im Prozess der Suche nach Krankheitsbehandlung,

besonders für die Behandlung in einer frühen Phase der Krankheit.

Es zeigte sich, dass planentworfenes Verhalten erst dann einsetzt, wenn etwas unerwartetes passiert, wenn beispielsweise Symptome sich unerklärlicherweise verschlimmern oder trotz Behandlung nicht abklingen. Die Studie zeigt, wie in dem lokalen Krankheitsmodell biomedizinisch definierte Malaria von Logiken, die auf Hexenkenntnissen basieren, ergänzt werden. Die Analyse des daraus resultierenden Wissens erlaubte uns, die Logiken zu erklären, welchen die Leute in ihrem Labyrinth auf der Suche nach Krankheitsbehandlung folgen, in dem sie biomedizinische und traditionelle Gesundheitsdienste in ein- und derselben Krankheitsepisode kombinieren.

Einen zweiten Schwerpunkt der Studie stellt die Frage nach der Relevanz ökonomischer Beschränkungen bezüglich der Bemühungen um Malariabehandlung dar. Kognitive Aspekte werden mit sozialen und ökonomischen Aspekten in Beziehung gesetzt. Es wurde beobachtet, dass die Vorstellungen von den Krankheitsursachen bestimmend sind einerseits für die Miteinbeziehung des sozialen Netzwerkes in die Handhabung der Krankheit, und anderseits für den bestehenden sozialen Druck bezüglich der Deckung der Behandlungskosten des erkrankten Individuums. Im Gegensatz zu Krankheiten, deren Ursachen Hexerei oder Geistern zugeschrieben werden, erwies sich im Falle der Krankheiten, die, so wie Malaria, der "natürlichen Ordnung" angehören und die Einbeziehung des Krankenhauses erforderten, die finanzielle Unterstützung seitens sozialer Netzwerke für die Deckung der Behandlungskosten als gering. Aus ökonomischen Gründen erwiesen sich Frauen, die nicht mit männlicher Unterstützung rechnen konnten, als besonders anfällig für die verspätete Behandlung ihrer Kinder. Es zeigte sich, dass Frauen verschiedene Strategien zur Deckung der Behandlungskosten entwickelt hatten, wobei sie, neben der Verzögerung auch häufig negative langfristige Folgen für ihr eigenes Wohlergehen und das ihrer Kinder zu tragen hatten. Ein besonders hohes Risiko für die Verzögerung ergibt sich aus dem negativen Zusammenspiel von gender-, saison- und krankheitsbedingten Faktoren.

Die Erkenntnisse dieser Studie trugen dazu bei, die Dichotomie "traditionell-modern" in der soziokulturell ausgerichteten Malariaforschung zu überdenken. Weiterhin widersprachen sie den bisherigen Standpunkt, dass traditionelle Behandlungen eine wichtige Ursache der

Verzögerung der Malariabehandlung seien und wiesen auf die Notwendigkeit hin, in der Ursachenforschung zur Verzögerung einen sozial-ökonomischen Ansatz zu verwenden. Direkte Auswirkungen der Studie für weitere Forschungen und Handlungsempfehlungen werden ausführlich erörtert.

Glossary

Biomedicine	or western medicine, scientific medicine, cosmopolitan medicine. Refers to the medicine developed in the western world since the Enlightenment. Departs from the Cartesian dichotomy of body and mind and is characterised by understanding disease as a fundamentally biological process.
Folk illness	refers to an illness entity, i.e. to a locally recognised illness with its own cause, symptoms and treatment which does not correspond to biomedical nosology.
Gender	refers to the social construction of sex. Gender as a social construct determines roles and social differences between men and women.
Gender and Development (GAD)	focuses on the social, economic, political and cultural forces that determine how women and men benefit from and control resources, and participate in activities differently. The situation of women is not considered independently of, but in relation to, that of men (WHO, 1999d).
Health care system	is a term developed by Kleinman (1980) which refers to the cultural system that interlinks concepts, values, roles, status, practices and institutions related to health, illness and therapies. Health care systems are local systems.
Illness / disease	are terms which refer to different aspects/perspectives of illness. Illness is understood as (1) individual experience of disease; and (2) the 'lay model' which permits people to give meaning to and express this experience. Disease is defined as (1) a biopathological process which affects the organism; and (2) a medical model, particularly biomedical model, which permits people to understand these processes.
Logic	in its broadest sense (as used by Olivier de Sardan, 1995) simply refers to the principles (theoretical, metaphorical, metonymical etc.) which confer coherence, or give meaning, to the sequences of ideas and actions in the eyes of the social actors and or the investigator.

Medical pluraslism	refers to the co-existence in a given area of different medical systems. The nature of the relations between different medical systems is marked by the socio-political position which they occupy in a given area.
Medical syncretism	refers to a blending, varying in degree and form, of elements stemming from different medical systems.
Medical system	refers, according to Press (1980), to a patterned, interrelated body of values and deliberate practices, governed by a single paradigm of the meaning, identification, prevention, and treatment of sickness.
Recipe knowledge	is a term adopted by Alfred Schütz (1964) which refers to the repertoire of knowledge for action which individuals automatically have at hand for coping with the confrontations and problems of daily life.
Resource-seeking	refers to the process which individuals follow in order obtain cash for covering direct and indirect costs of treatment. It includes social relations with individuals from whom support is expected as well as individuals' economic strategies for coping.
Traditional	is used to refer strictly to what people themselves regard as 'their own traditions'. In this sense, it does not follow historic, but cultural and political criteria.
Treatment-seeking	refers to a process followed by individuals and/or social groups for restoring health by using medical resources of all kinds.

List of tables

List of figures

PART I

INTRODUCTION

Malaria: a top priority

Despite major advancements in the understanding of the disease and great efforts to control it, the malaria situation at the end of the 20th century showed a daunting picture: In 1997, over 40% of the world population lived in areas with malaria risk. More than 100 countries were affected by the disease (see fig. 1). Malaria, once triumphantly held to be eradicable, is globally on the rise. While endemic malaria no longer occurs in many temperate zone regions, it remains a leading health problem in the tropics and subtropics. In the past decades, resurgence of malaria transmission has been observed throughout southern Asia and the Western Pacific. Malaria has re-invaded zones of Azerbaijan, Tajikistan, Iraq, and Turkey, where it had previously been under control (Trigg and Kondrachine, 1998).

In Africa, childhood deaths from malaria are continually increasing. In some regions, as for example in parts of eastern and southern Africa, malaria has spread into previously non-endemic or low-transmission areas (WHO, 1999a). In Kenya, an increase in epidemics was recorded in the 1980s. In some regions, they may be related to climatic changes; for example the new outbreaks in malaria-free semi-arid zones after the 1997 El Niño rains (WHO, 1999b). In some regions, re-establishment and epidemics of malaria are a direct consequence of civil wars, massive population movements and changes in agriculture, e.g. irrigation schemes (WHO, 1997). But also other 'man-made' changes can contribute to a worsening of the malaria situation. In Rajasthan, India, the construction of the Indira Gandhi canal was largely responsible for an outbreak of malaria (Mankodi, 1996). The resurgence of malaria has recently also been associated with Structural Adjustment Programmes, particularly affecting Africa. (Manfredi, 1999).

The estimations of the malaria health burden for 1998 by WHO are devastating (WHO, 1999c): Each year, almost 300 million cases of malaria occur worldwide and more than one million people die. A particularly heavy toll is experienced in Africa where almost 90% of incidence and 90% of deaths occur. The extremely high disease burden which strikes Africa is the result of a doubly adverse situation. On the one hand, because in most climatic zones of

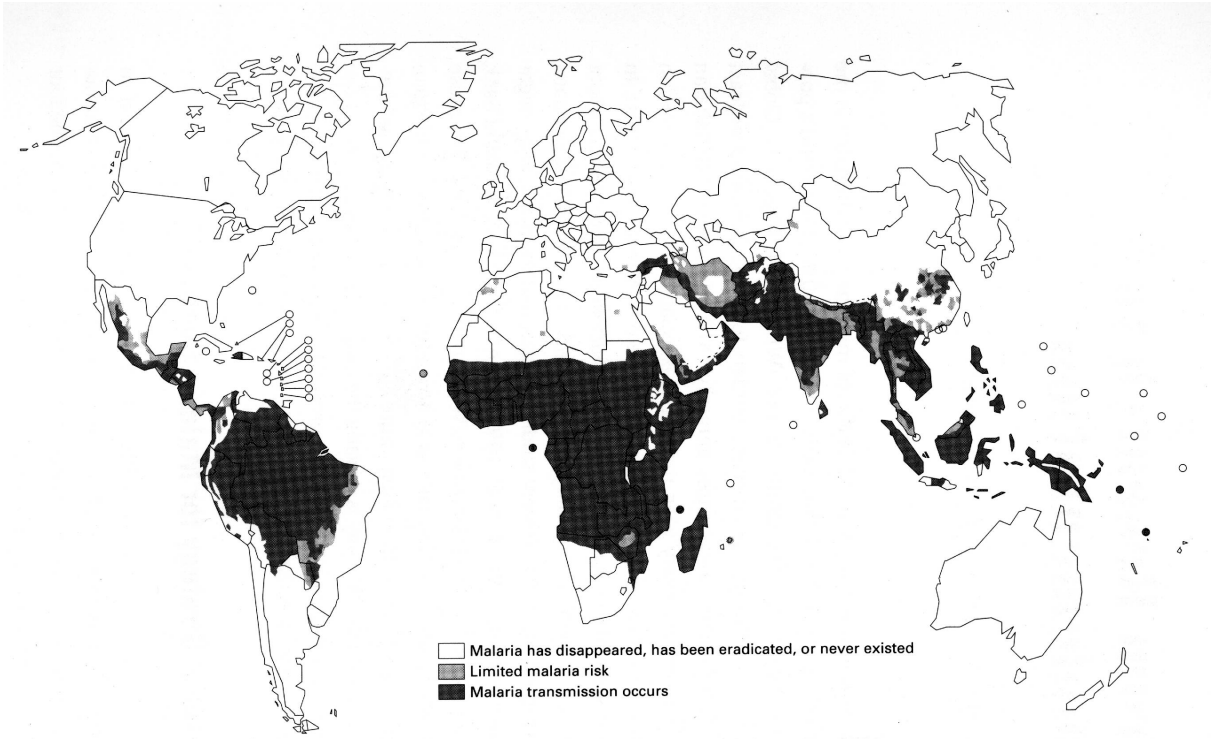


Fig. 1 Epidemiological assessment of the status of malaria, 1994 (WHO, 1997)

Africa the most severe type, the malignant tertian (*falciparum*) malaria, is predominant, with high transmission rates in vast areas. On the other hand, malaria is closey linked to areas of poor development, where control tools do not successfully reach the people (WHO, 1999a).

Malaria has a tremendous impact on premature death and disability which on an individual level causes economic and emotional hardship, and on a population or national level poses barriers to economic growth and development. The DALY (Disability-Adjusted Life Year) is a measurement which attempts to quantify the burden of disease. DALYs combine years of life lost to premature death with years lost to healthy life due to disability or handicap, adjusted for the severity of the disability (World Bank, 1993). Although figures are highly speculative, it is clear that malaria contributes to an extremely high burden of disease especially in Sub-Saharan Africa. The recent estimates for the year 1998 give a worldwide figure of more than 39

million DALYs lost due to malaria, of which 34 million are in Africa alone (WHO, 1999a). There is evidence that mortality risks have increased significantly over the past decades, coinciding with the rise in failures with chloroquine (Snow *et al.*, 1999).

Approximate figures for the magnitude of the malaria problem by age show that young children are the most affected. Worldwide, 38% of incidence, 67% of deaths and 72% of DALY loss concern children under the age of five. For Africa, it has been estimated that every 20th child is likely to die of malaria-related illness before he/she reaches the age of five (WHO, 1999a).

The scope of the malaria problem is broad. With the continuing rapid spread of parasite and vector resistance against long-established but also new drugs and insecticides, no striking improvement of the situation is foreseen in the near future. Moreover, the resurgence of malaria that is linked to civil conflict and human migrations, climatic and environmental change, and inadequate or deteriorating health systems (Trigg and Kondrachine, 1998; WHO, 1999a) is likely to increase further, and no quick solutions are to be expected. There is no doubt that malaria will remain a major disease burden and a priority as a public health issue also in the coming decades.

While the development of new control tools is urgently needed, it is widely accepted that much of the incidence and mortality could be reduced with the available means, provided they reach the people and the people reach them. Whatever current and new intervention tools are available or become available in the future - whether preventive measures, new drugs or even vaccines - their implementation will only be successful if they are locally understood and accepted. It is clear that for interventions to be effective, a comprehensive understanding of community perspectives related to malaria is required.

A brief history of malaria

Early descriptions and treatments

The pattern of symptoms of the disease now known to be due to the malaria parasite have been known since ancient times. In ancient China, an association was described between fever and splenomegaly. Intermittent fevers were described by Hippocrates in the fifth century B.C. and Galen in the second century B.C. in his detailed treatise on fevers (*de differentiis febrium*) (Jarcho, 1993). As a treatment, the plant quinghao (*Artemisia annua*) has been used in Chinese herbal medicine for 2000 years. Its recently isolated active component artemisinin and some derivatives are among the most promising drugs nowadays. The Peruvian bark (*Cinchona ledgeriana*), used in South America against fever episodes by local populations, was introduced in Europe in the 17th century. The use of cinchona, and later of the active compound quinine, isolated from it in 1820 by Pelletier and Caventou, raised a passionate controversy in medical circles. While the staunch advocates of the drug saw in it a triumph over the disease and administered it in great quantities - like the French physician Bazire who poisoned many of his patients, himself and almost his wife with exceedingly high dosages - adversaries damned its use with fervour (Destouches, 1929). The controversy continued until the early 20th century, as illustrated in the following sentence, quoted by Destouches (1929:12) from a Therapeutic Treatise published in 1902: “The quinine sulfate results in a most terrible venom in little skilful and little tempered hands. One can say of it that it has provoked as much harm as malaria.”

The discovery of the host-vector-parasite triangle

The era of modern malariology began with the detection of the malaria host-vector-parasite triangle in the late 19th century. At the time, the most accepted theory of both allopaths and homeopaths was the understanding of malaria as a non-contagious, non-infectious miasmatic illness (Allen, 1995). The French army surgeon Charles Louis Alphonse Laveran (1845-1922), who worked as colonial officer in Algeria, classified malaria as a telluric illness which, unlike the typhoid illnesses, was not related to the precarious hygienic conditions of densely populated

areas, but whose cradle was in uninhabited areas of marshes and swamps. From his observations and experiments, he concluded that the palludic miasma contained particles of vegetal origin which the winds had blown over the pathogenous marshes and transported over long distances to human settlements (Laveran and Teissier, 1880).

Owing to the dominant paradigm of germ theory in scientific medical research and recent achievements in microbiology, the theory of malaria as a parasitic disease gained strength. The key step in the discovery of malaria as an infectious disease dates back to 1880, when the same Laveran identified living parasites, which he termed *Oscillaria malariae*, in the blood of a malarial patient. In the beginning, his theory was received with scepticism by the scientific community, but later on it gained increasing acceptance. Laveran showed his findings to the Italian scientists Ettore Marchiafava (1847-1935) and Angelo Celli (1857-1914) who with their powerful oil immersion microscopes could finally confirm Laveran's theory of an animal parasite to which they gave the name *Plasmodium* (Dobson, 1999). In 1907, Laveran was awarded the Nobel price.

In the first years after Laveran's great discovery, it still remained unclear how the parasites entered the human organism as they could neither be detected in the air, nor in water or the soil of 'palludic areas'. In analogy to the transmission of filariasis, Laveran himself put forward the hypothesis in 1884 that the parasite might stay in a plant or animal and that mosquitoes might play an important role in malaria transmission (Dopter, 1925).

The mosquito theory was also suggested by Sir Patrick Manson (1844-1922), a Scottish physician working in China, who discovered mosquitoes as the vector of filariasis. He encouraged his student Sir Ronald Ross (1857-1932), who he met in 1894, to investigate the role of mosquitoes in malaria transmission.

17 years after the discovery of the parasite, in 1897, Sir Ronald Ross, a British Major in the Indian Medical Service, demonstrated the transmission of malaria by mosquitoes in an avian model (Bynum, 1999). His experiments confirmed the 'mosquito theory' of malaria for which Ross was awarded the Nobel Prize in Medicine in 1902. The theory that mosquitoes of the genus *Anopheles* are the vector for human malaria was later proved by an Italian group - the

investigators Battista Grassi (1854-1925), Amico Bignami (1862-1929), Giuseppe Bastianelli (1862-1959) - who found the half-moon shaped parasites (gametocytes) of malarious blood in the digestive tract of mosquitoes previously fed on infected humans. This contributed much to the understanding of the transmission of the malaria-mosquito cycle (Dopter, 1925; Fantini, 1999).

All these findings from the last 20 years of the 19th century led to the understanding that malaria should no longer be considered as a miasmatic illness, but as a vector-borne parasitic disease transmitted from person to person through the bites of mosquitoes which bred abundantly along rivers and in swampy regions.

Malaria history and community knowledge

While the issue of the malaria host-vector-parasite triangle was highly debated among the scientific community of the time, it can usually be assumed that the knowledge divulged to the general public lags years behind the frontline discoveries in research. When Dr Kellogg, a passionate advocate of the popularisation of scientific knowledge, published his work on popular hygiene and health monitoring (1897), he proposed practical malaria prevention measures that were strongly based on the miasma theory. He advised people who were obliged to live in malaria endemic areas to avoid building houses near marshes, particularly on the leeward side of prevailing winds, or at least to have a belt of dense forest between the houses and the swampy areas which would ward off and destroy the 'germs'. Kellogg also suspected water as an important source of malaria, and recommended boiling it for drinking in order to kill the germs. His book and similar writings of contemporary authors directed at a broad public, are likely to have contributed to the misunderstanding of malaria among people interested in tropical health in the first decades of the 20th century. As this is also the period in African colonialism when missionaries and colonial medical officers began to teach local people on a large scale about issues of health and hygiene, it is most probable that information derived from the miasma theory was still being transmitted even though the theory had already been scientifically outdated. The French physician Dobter (1925), for example, writes in 1920 that colonialists have much insisted

on winds as accidental vectors of malaria, but at short distances.

What local people have learned about malaria is what they heard from missionaries, educators and health professionals when they first came into contact with western culture. During the 20th century, the content of knowledge in the community and people's access to information have undergone major changes. Local and national health campaigns, mainly in the post-colonial era, have imparted simplified versions of scientific knowledge about malaria on a large scale. The understanding of malaria among contemporary Africans is the result of their interpretations of this long-standing exposure to biomedical perspectives transmitted by Europeans and later by western-trained African health professionals.

Malaria: a biomedical perspective

Malaria is an infectious disease caused by protozoa of the phylum *Apicomplexa* (or *Sporozoa*). The family *Plasmodiidae* consists of many species, which have a wide range of vertebrate hosts: reptiles, birds, rodents, bats and primates (Kreier, 1987). Human malaria parasites belong to the genus *Plasmodium*. The four epidemiologically relevant species infectious to man are *P. falciparum, P. malariae, P. ovale, and P. vivax*. The two most common species are *P. falciparum* and *P. vivax* which are found in most malarious areas. The most serious falciparum malaria is widespread throughout the tropical and subtropical belt, mainly in Africa, central America, parts of Asia and Papua New Guinea. *P. vivax* is predominant in Latin America, Turkey, the Indian subcontinent and China, but absent from West Africa. *P. malariae* is widely distributed but with lower prevalences than *P. falciparum* and *P. vivax*. *P. ovale* occurs mainly in Africa (Spencer, 1986). All four human malaria species are transmitted from person to person by infectious bites of female mosquitoes of the genus *Anopheles*. The parasite life cycle including the phase in the human host and the mosquito host can be found in textbooks in malaria parasitology (e.g. Gilles and Warrell, 1993; Wernsdorfer and McGregor, 1988; for illustration: Knell, 1991).

Clinical presentation

In their early symptomatology, the four malaria types can be very similar, making a differentiation difficult without laboratory examinations. *Plasmodium falciparum* causes the most serious 'malignant tertian' malaria with potentially lethal consequences whereas vivax ('benign tertian'), malariae ('quartan') and ovale malaria are generally not life-threatening.

The incubation period (time between the infective bite and the appearance of clinical symptoms) ranges from 7 to 30 days, depending on the malaria parasite. The clinical manifestations are extremely diverse and pathogenesis is still incompletely understood (Marsh and Snow, 1999). An illness episode may start with an unspecific symptomatology, usually with an irregularly intermittent fever, accompanied by general malaise, nausea and headache. Characteristic for almost all episodes are the alternations between fever and fever-free phases. Typically, a fever phase begins with shaking chills and a rapid rise of temperature to 40˚ or 41˚C which is maintained for several hours, followed by profuse sweating and temperature fall. After a fever-free interval, the cycle of chills, fever and sweating is repeated. Between the fever attacks, the patient is normally asymptomatic and feels better, albeit exhausted. In severe cases, circulatory failure and delirium can occur.

In *vivax*, *malariae* and *ovale* malaria, the cycles of chills, fever and sweating are most evident. After a period of irregular fever, the fever typically presents itself in its classical 'intermittent' form. In all three forms, the illness develops but rarely has severe or fatal consequences; duration of an untreated attack ranges from around one week to one month. Malaria tertiana (*P. vivax* and *P. ovale*) is characterised by fever phases of around 3 to 4 hours which repeat every 48 hours. Early and late reactivations of liver stage parasites are relatively common and may occur at irregular intervals up to 2 years for *P. vivax* and 5 years for *P. ovale*, respectively. The least virulent is malaria quartana (*P. malariae*) which shows up at a 72 hours periodicity with fever phases of 4 to 5 hours. Late recrudescence of persistent blood stage parasites is possible after 3 to 10, in extreme cases up to 50 years, and causes recurrent febrile episodes. In partially immune patients and people who have been taking prophylactic drugs, the clinical picture may be very atypical and a malaria episode may easily be confused with other

febrile illnesses. Diffuse presentations of fever cycles may also result from mixed or double infections. Occasionally, malaria tertiana presents with fever intervals of 24 hours because the population of parasites splits into two, which are out of phase (*malaria duplicata* or *malaria quotidiana*).

The most pathogenic and dangerous malaria is provoked by *P. falciparum*, often with irreversible or fatal consequences. Its symptomatology is extremely diverse and inherently ambiguous, making a differential diagnosis based on the clinical presentation difficult. Frequent signs and symptoms are fever, headache, joint pain, dizziness, nausea, vomiting and diarrhea. Illness sets in abruptly and with quite severely. Fever can appear in a 48-hour rhythm, but often there is no clear cyclic pattern as is typical of the other malaria types. Irregular or continuous fevers are most usual, but occasionally fever might be absent, even in acute phases. The diffuse and varied clinical picture often does not remind one of malaria and misdiagnosis or late recognition are frequent. The sudden and rapid progress from uncomplicated to complicated malaria with potential irreversible and fatal outcomes makes prompt treatment absolutely essential also in an early phase of clinical manifestations.
(Sources: Dönges, 1988; Piekarski, 1987; Warrell, 1993; Wiesman, 1986)

Severe and fatal malaria

'Severe malaria' refers to manifestations and complications of malaria that have a potentially fatal outcome (Warrell, 1999). *Falciparum* malaria has a variety of severe consequences, which are mainly due to the destruction of (parasitised and non-parasitised) red blood cells and the obstruction of capillaries through adherence of parasitised erythrocytes to endothelial cells with consequent insufficient blood supply to internal organs. The two dominant complications are cerebral malaria and severe anaemia, which account for most deaths in severe malaria in children (Brewster and Greenwood, 1993).

Cerebral malaria has been defined as occurring when a patient who has *P. falciparum* in the blood suffers from altered consciousness for which no other cause can be found (WHO, 1990). Most frequently, cerebral malaria occurs in children between the age of 1 and 4 years

(Greenwood 1991; Snow *et al.*, 1994). Cerebral malaria is not a well defined term and usually encompasses different clinical manifestations (Marsh and Snow, 1999). The condition can present itself as a mild confusion, which develops over days, but can suddenly deteriorate and result in a profound coma, irreversible brain damage and death. In up to 50% of patients, cerebral malaria has a lethal outcome (Philips and Solomon, 1990). The main cause of cerebral malaria is a mechanical obstruction of capillaries in the central nervous system due to adherence of sticky parasitised red blood cells to capillary endothelium (sequestration). The resulting ischaemia, hypoxia and anoxia may provoke a variety of encephalopathic signs and symptoms such as stiff neck, headache, increased muscle tone, ataxia, aphasia, convulsions, local paralysis, and delirium (Warrell, 1993). High parasitaemia levels are to a certain extent indicative of the development of neurological sequelae (Molyneux *et al.*, 1989). In many patients with cerebral malaria, however, only low parasite levels are detected, and many children with high parasitaemia present a surprisingly mild symptomatology (Oaks *et al.*, 1991).

Malaria infection is a major cause of *anaemia* in endemic areas. Severe malarial anaemia, defined as a haemoglobin of less than 5 g/dl in association with malaria parasites (WHO, 1990) is the most frequent consequence in areas of high transmission. High levels of parasitaemia can produce acute and life-threatening anaemia; chronic anaemia may be a result of continued haemolysis (and other processes which contribute to anaemia) due to chronic malaria infection (McGregor *et al.*, 1966; White, 1999a). Malarial anaemia is induced by the direct destruction of parasitised red blood cells, but also by immune mechanisms leading to a destruction of non-parasitised red blood cells and abnormalities in erythrocyte production in the bone marrow (dyserythropoesis). Malaria-induced iron deficiency further contributes to anaemia (Menendez *et al.*, 1997).

A typical symptom of *P.falciparum* malaria is *splenomegaly*. Clearance of infected and altered uninfected red blood cells from the circulation may provoke enlargement of the spleen (White, 1999a). A chronic complication of malaria is the hyperreactive malarial splenomegaly

(HMS), with its clinical presentation of persistent and progressive splenic enlargement (Bryceson *et al.*, 1983). In endemic area, high frequencies of enlarged spleen were found in children (Metseelaar and Van Thile 1959). Spleen rates, in combination with parasite prevalence, have been used as an indicator for endemicity levels (Molineaux, 1988).

Hypoglycaemia is a common complication that may lead to irreversible brain damage or a lethal outcome if not immediately treated. Particularly affected are children. Almost every third African child admitted with severe malaria was hypoglycaemic (Taylor *et al.*, 1988; White *et al.*, 1987). The consequences are often serious. In a hospital-based study in Malawi, 37% of children admitted with hypoglycaemia died and 26% suffered from irreversible neurological sequalae (Taylor *et al.*, 1988).

While in children cerebral malaria is often the only manifestation of a severe *P.falciparum* infection (Molyneux *et al.*, 1989), in adults who have not acquired significant immunity other organ systems are commonly severely affected. The two most serious non-cerebral complications are *pulmonary oedema*, probably caused by increased capillary membrane permeability, and *renal failure* (WHO, 1990; WHO, 1999d).

Further severe and fatal complications include *dehydration* as a result of decreased fluid intake and loss of fluids due to high fever, sweating, vomiting and diarrhoea, *metabolic acidosis, impaired liver function, jaundice, spontaneous bleeding* and others (for a concise list see WHO, 1990; WHO, 1999d).

Diagnosis

Since differential diagnosis primarily of *falciparum* malaria is unreliable, aetiological confirmation by demonstration of malaria parasites in the blood is essential. The most widely used diagnostic technique is the microscopic screening of blood slides for parasites. Usually a thick drop and thin film of finger-prick blood are prepared on a glass slide, chemically fixed, stained with Giemsa solution (or other formulations) and screened under oil immersion

microscopy (magnification of 400 to 1'000 times). While the thick drop provides results with an increased sensitivity due to the relatively large volume of blood, the thin film permits one to quantify the blood infection rate and to determine the malaria species. While it is certainly a very useful test, microscopy has several drawbacks. One concerns the technical requirements, i.e. the acquisition and maintenance of a high-power microscope. Although the costs of the test materials are relatively low, the investment costs for an oil immersion microscope are considerable and thus beyond the means of practically all peripheral health services. Maintenance of the technical equipment can often not be guaranteed, so there may be few accurate test results. In addition, microscopy requires skilled technicians who are able to read the slides correctly, but trained staff is often not available (Oaks *et al*., 1991).

Important drawbacks can also result from depending on the detection of parasites in the blood. In high transmission areas, where the development of semi-immunity among the population is significant, there is no direct association between infection and disease. Great parts of the population can carry parasites in their blood but do not present clinical manifestations of malaria (McGregor, 1986; Trape, *et al.*, 1985). A serious problem for diagnosis is that the intake of antimalarials prior to the blood test, which in many areas occurs as a consequence of the widely practised self-administration of drugs (Foster, 1991) may lead to temporary or partial parasite clearance, so the infection is microscopically undetectable (Benenson, 1985). Repeated examinations would therefore be required, but in most clinical settings they are not feasible or too costly. Antigen-based diagnostic assays which offer alternatives to microscopy are being developed, but currently none are available as cost-effective as microscopy, and are simple enough for use in field settings and regional hospitals. Rapid diagnostic tests (RDTs), which are highly sensitive but do not indicate the severity of infection, might be useful in areas of low or moderate transmission, for epidemic outbreaks and for detection of malaria in non-immunes like travellers or short-term visitors to endemic areas (UNDP/World Bank/WHO, 2000a). But for most settings, the ‘gold standard’ for diagnosis remains the relatively cheap microscopic blood examination. In rural areas, where high-quality microscopy is not feasible, drug administration will continue to rely on presumptive treatments of clinical presentations.

Prevention and treatment

Preventive measures

A variety of preventive measures against malaria can be recommended, but none of them can guarantee full protection. While visitors from abroad usually have the means and possibilities to apply a combination of different preventive measures, and thus, if they are correctly used, to achieve high protection, possibilities for inhabitants of endemic areas are more limited, because the measures are not feasible, not available or too expensive. Preventive measures are either directed against the mosquito vector (avoiding infection) or against the development of the parasite within the human host. Recommended measures against mosquitoes include, for example, protective clothing, use of skin repellents, mosquito coils and residual insecticides (applied on house walls and anopheline resting places), nightly spraying with insecticides of windows and walls inside the house, and sleeping in air-conditioned rooms (Benenson, 1985; Wiesmann, 1986). For people living in an endemic area, adapted house construction, zooprophylaxis and traditional mosquito deterrents are further measures against mosquitoes (Greenwood, 1999). Environmental measures, such as drainage of ponds and use of mosquito larvicide, contribute to reducing anopheline breeding sites. Certainly the most cost-effective and simple measure for long-term use is to sleep under a mosquito net. Currently, the large scale use of insecticide treated bednets (ITN) in endemic areas is being strongly promoted with promising results (reviewed by Lengeler, 1998).

Chemoprophylaxis is widely applied. It does protect against infection, but prevents or inhibits parasite proliferation within the human body. The use of prophylactic antimalarials is highly recommended for non-immune people visiting a malarious area. For residents of endemic areas, chemoprophylaxis is recommended primarily for women during their first pregnancy in order to reduce the risk of malaria-related maternal death, anaemia, low birth weight and stillbirth (Brabin, 1983; Greenwood *et al.*, 1989 McGregor, 1984).

Chemotherapy

For curative purposes, a variety of antimalarial drugs, attacking the parasite at different stages of the life-cycle in the human host, are available. An extensive list of international non-proprietary names of synthetic antimalarials and common proprietary names, can be found in the WHO report on Advances in Malaria Chemotherapy (1984) and in Gilles and Warrell's (1993) book on Essential Malariology. Most antimalarials are blood schizontocides (acting primarily on the asexual intra-erythrocytic stages). Preferably, the rapidly acting drugs such as quinine, 4-aminoquinolines (mainly chloroquine), mefloquine, halofantrine and new artemisinin derivatives are indicated. As a relatively safe, inexpensive and widely available drug with no or mild side-effects, chloroquine is still the most used antimalarial worldwide. Blood schizontocides are, however, not active against sporozoites, pre-erythrocytic schizonts and hypnozoites ('dormant liver forms'). In *P.vivax* and *P. ovale* infections, administration of hypnozoitocidal 8-aminoquinolines (primaquine) is indicated in order to prevent from relapses. Primaquine is not required in *P.falciparum* and *P.malariae* infections as no latent liver forms persist (Source: Wiesmann, 1986).

Parasite resistance

Prompt and adequate treatment is essential for reducing malaria morbidity and mortality. With the great advances in chemotherapy and the wide distribution of cheap antimalarials all over the world, malaria could be held in check to a large extent. But with the emergence and rapid spread of parasite resistance the effectiveness of these drugs has dwindled. This now poses a serious problem for therapeutic use of antimalarials. Chloroquine, massively administered since World War II, is now nearly ineffective in many regions. Chloroquine-resistant parasite strains spread rapidly during the 1960s and 70s in South-East Asia and South America, and during the 1980s in Africa (Björkman, 1991). For the year 1994, WHO reported that chloroquine resistance is common in almost all endemic countries in Africa, especially in eastern Africa (WHO, 1997). Recently, five African countries (Botswana, Kenya, Malawi, South Africa and Swaziland) have changed their national guidelines for first-line treatment from chloroquine to a combination of

sulphonamide and pyrimethamine (SP) (Trigg and Kondrachine, 1998). But the increasing development of resistance, already widespread in South-East Asia and South America, indicate that the effectiveness of SP is likely to decline rapidly. Resistance to almost all other drugs has now emerged, and extensive administration of any of them can only be expected to be a temporary solution. Moreover, many drugs are either too toxic, or too expensive, or both for large-scale use in endemic areas.

Artemisinin and drug combinations: Increasing the lifespan of antimalarials

Promising results are reported for the newly developed drug artemisinin, isolated from the herbal remedy quinghao (*Artemisia annua*) which has been used against fevers in Chinese medicine for centuries, and its derivatives artemether, arteether and sodium artesunate. The mode of action seems to differ considerably from that of other antimalarials, lowering the probability of cross-resistance. Artemisinin and its derivatives and have been shown to be effective against all human malaria parasites, notably multidrug-resistant *Plasmodium falciparum* (White and Olliaro, 1999) The compounds reduce high parasite levels very quickly and apparently have low toxicities, although further investigation of their safety is required (Björkman, 1991). In a clinical trial in schoolchildren at the Ivory Coast, oral artemether has recently been shown to be safe and to have a prophylactic effect against *Schistosoma japonicum* (Xiao *et al.*, 2000) and *Schistosoma mansoni* (Utzinger *et al.*, 2000). A problem observed with artemisin is a high recrudescence rate, making complementation with other antimalarials recommendable (Wernsdorfer and Trigg, 1988). It has been emphasised that if resistance does indeed develop from spontaneous genetic mutations, combinations of drugs with different modes of action are likely to retard the emergence and spread of resistance, as the chance of parasites developing resistance against two drugs is much lower (White *et al.*, 1999). A combination of a short acting drug such as artemisinin with other drugs to ensure the eradication of all the parasites in an individual, can help to prevent the rapid development and spread of drug resistance (White, 1999b). A review of trials has shown good safety and high effectiveness of artemisinin for treating uncomplicated malaria (McIntosh and Olliaro, 1998). Clinical trials for treating children with acute *falciparum*

malaria with a combination of artemether and benflumetol have shown encouraging results in both efficacy and safety (Hatz *et al.*, 1998). Currently, large-scale trials in Africa and Asia are being carried out, with the aim of quantifying the efficacy of early treatment with rectal artesunate for inhibiting the evolution of malaria to severe and fatal outcomes (UNDP/World Bank/WHO, 2000b). The positive results from trials using a combination of artesunate and pyrimethamine/sulphadoxine indicate that combining first-line drugs with artemisinin derivatives is highly effective and can retard the emergence of drug resistance, thus increasing the lifespan of antimalarial compounds (White *et al.*, 1999).

The development of new drugs and drug combinations is urgently required in order to keep pace with the rapid evolution of parasite resistance. In past decades, the pharmaceutical industry has gradually curbed its research activities on malaria. A new public/private not-for-profit foundation, the Medicines for Malaria Venture (MMV) (see section on 'current global malaria control strategy' below) where the pharmaceutical industry will provide technical know-how and access to available research results, has set itself the goal of producing one new antimalarial drug every five years UNDP/World Bank/WHO, 2000c).

Vaccine development

With the panorama of newly emerging and spreading drug resistance, the development of an effective vaccine against malaria would be a valuable and cost-effective intervention instrument to complement other control tools. Several types of malaria vaccines are being developed which can be classified according to the parasite stage that is their target. (i) Pre-erythrocytic vaccines are directed against infective sporozoites injected by the mosquito vector, and liver stages. An anti-sporozoite vaccine would prevent infection, thus avoiding clinical manifestations of malaria. (ii) Merozoite vaccines are vaccines against asexual erythrocytic stages. Merozoites cause most of the clinical symptoms of malaria. An anti-merozoite vaccine would therefore, not prevent infection, but it would reduce malaria morbidity and mortality. (iii) Transmission-blocking vaccines (TBVs) are directed against sexual blood stages and aim to

prevent the development of parasites in the mosquito vector. A TBV would not prevent disease in people who were infected, but would reduce transmission in endemic areas.

Several potential candidate vaccines of all three types are currently in clinical trials (for review see Tanner, 2000). The complexity of the parasite and the immune response of the human host, as well as the enormous costs, hinder rapid progress in the development of a malaria vaccine. Up to now, the only candidate to have progressed to phase III of clinical trials is the multi-stage (sporozoite and merozoite) vaccine SPf66. The synthetic peptide vaccine SPf66, developed in Colombia (Patarroyo *et al.,* 1988), has shown mixed results in different trials in South America, South-East Asia and Africa. The overall efficacy, calculated from 6 Phase III clinical trials, has been estimated at 23% (Graves, 1997, cited by Tanner, 2000). In a recent trial in infants under 7 months old, SPf66 was not found to reduce the risk of clinical malaria (Acosta *et al.,* 1999). The efficacy of SPf66 vaccine in its present form is thus much below the standard of other vaccines currently in use against other diseases, which can reach efficacy levels of 90% or more. It is also below the goal set by the Vaccine Discovery Research group of TDR, to find a vaccine which reduces the incidence of clinical attacks in children under the age of five by at least 30% (UNDP/World Bank/WHO, 2000d). A new formulation of SPf66 with a novel adjuvant is now undergoing phase I testing (UNDP/World Bank/WHO, 2000e). Currently, there are further promising vaccine candidates under development, the recombinant pre-erythrocytic vaccine RTS,S/SBAS2, the recombinant three-component blood -stage vaccine (MSP1+MSP2+RESA) and the DNA vaccines (for review see Tanner, 2000).

The current status of research assumes that no effective vaccine will be available in the near future, but that successful malaria vaccine development remains a highly desirable and realistic goal.

Malaria in highly endemic areas

Malaria is endemic when there is significant annual transmission over several, successive years. Endemicity of malaria ranges from areas of high, perennial transmission to regions of sporadic or limited transmission. Accounting for the variations in the intensity of transmission, regions are usually categorised as holoendemic, hyperendemic, mesoendemic, and hypoendemic. Often used indices for quantifying the level of endemicity are frequencies of splenomegaly, and parasite densities in the blood of children. According to this classification, an area is holoendemic when more than 75% of children between the age of 2 and 9 years show an enlargement of the spleen and more than 75% of infants have parasites in their blood (Molineaux, 1988).

Acquired immunity

The epidemiology of malaria in different transmission settings can only be understood in the light of the presence of (partial) immunity to the parasite in the human host. Although immunity does not prevent infection or disease, it does reduce parasitaemia, the production of gametocytes and the severity of clinical manifestations. Thus an individual with a significant level of immunity may present uncomplicated malaria, but is much less likely to develop severe manifestations or to die from malaria.

The acquisition of immunity is a continuous process which depends on the exposure of the human host to blood-stage parasites. The immune response seems to be based to a great degree on humoral immunity, and the role of cell-mediated immunity which is less clear (Marsh, 1993). Repeated exposure is essential for perpetuation of immunity; temporary long-term absence from endemic areas results in loss of immunity in previously immune individuals.

Within a population, patterns of clinical immunity and, related to this, morbidity, are largely determined by the level of exposure, usually expressed by estimations of the entomological inoculation rate (EIR) (the frequency of infectious mosquito bites). In areas of low endemicity (hypo- and mesoendemic areas), where annual EIRs are low and malaria transmission

is unstable, the incidence of infection and clinical disease is relatively low, but occasional epidemics with serious outcomes can occur. In hyperendemic areas, where transmission is seasonal, a pattern of periodic malaria epidemics is common. Since in all these areas the entire population lacks adequate immunity to the parasite, severe malaria with high incidences of cerebral and fatal malaria occurs in all age groups (Marsh and Snow, 1999).

In the epidemiology of areas of high, all-year-round transmission (holoendemic areas), the clinical pattern of malaria disease shows a markedly different picture. The intense yearly EIR leads to high incidences throughout the year. Almost everyone is repeatedly infected and parasite prevalence is persistently high (Charlwood *et al.*, 1998, Smith *et al.*, 1998). Consequently, populations living in holoendemic areas develop high levels of immunity. Since immunity is progressively acquired with repeated exposure to malaria, the group most at risk of suffering from clinical and severe malaria are children who have not yet contracted many infections and therefore have not yet reached a sufficient level of immunity (Marsh, 1993). With increasing age, children who survive gradually develop partial immunity as a result of repeated infections. But only from the age of approximately five years onwards are children significantly immuno-protected against severe malaria attacks (Trape and Rogier, 1996). Illness episodes are not only less frequent, but they also tend to be milder, and rarely progress to complicated or life-threatening forms.

Malaria in children under five years of age

Immunoprotection

In holoendemic areas, infants are to a certain degree protected for the first few months of life. The protective immunity in neonates is most probably due to malaria-specific IgG antibodies prenatally transferred through the placenta. The level of immunity in the mother, which varies with different transmission settings, is directly correlated with the duration of the protection. While protective immunity does not prevent infection, it reduces parasite densities and shortens the duration of infections, thus lowering the risk of infections developing into severe malaria. In a study area where transmission is very high, in the Kilombero Valley in

Tanzania, it has been found that parasite densities and recovery rates of very young infants were similar to those of semi-immune adults (Kitua *et al.*, 1996). During the period of exclusive lactation, further protection is likely to result from the lack of *p*-aminobenzoic acid (Maegraith,*et al.*, 1952). This is an essential growth stimulator for *Plasmodium,* which is found in almost all vegetal foodstuffs but is absent from breast milk.

Protection through maternally acquired antibodies declines within the first months of life, resulting in gradual increase of parasite densities and high rates of severe and fatal outcomes. In highly endemic areas, already infants at the age of 4 months were found to be at a high risk of clinical attacks (Kitua, 1996).

Clinical patterns and transmission intensity

Clinical patterns among the age group of the under fives have been described as varying considerably with different levels of transmission intensity (Snow *et al.*, 1994; Snow *et al.*, 1997). It was found that where transmission was intense, the highest rates of hospital attendances were in the under 1 year-old group with. The main life-threatening complication was severe anaemia, though there were rare cases of cerebral malaria. Where transmission was lower, severe malaria was more evenly distributed among children of older age groups. While the main complication in infants was also severe anaemia, older children, with a peak between the ages of 1 and 4 years (Greenwood *et al.*, 1991), mainly suffered from cerebral malaria (Snow *et al.*, 1994). The higher incidence of cerebral malaria in areas of lower transmission intensity raise important concerns about the use of protective measures, e.g. large-scale use of insecticide-treated mosquito nets. The data suggest that although a significant reduction in transmission might decrease the incidences of severe or fatal malaria in infants, it might not necessarily result in increased survival, as the risk of developing life-threatening malaria might only be shifted to older ages (Snow *et al.,* 1994). A recent study comparing the same sites (Schellenberg *et al.*, 1999) however, could not confirm a clear relationship between severe clinical presentation and intensity of transmission. More research addressing the issue is needed to obtain information on long-term effects of large-scale use of preventive measures.

Clinical attacks and recurrences

In highly endemic areas, children who have lost the protective immunity acquired from the mother and who have not yet developed their own significant levels of immunity, i.e. children between the age of around four months and five years, certainly bear the highest burden of malaria. The high death toll malaria takes in children under five years of age is the most serious result. But non-fatal attacks can also cause irreversible disabilities and, especially as a result of repeated episodes, impairment of physical and intellectual development.

In the highly endemic Rufiji Delta of Tanzania, a study survey found that 75% of infants had experienced at least one clinical malaria episode by the end of their first year of life (Rooth and Björkman, 1992). Estimations suggested as many as 4-9 clinical episodes *per annuum* for children under the age of five living in endemic areas of Africa (Breman and Campbell, 1988).

Repeated clinical attacks are not only a result of high transmission and hence reinfection rates. A significant proportion of new episodes are provoked by the parasite's response to treatment. Parasite resistance against antimalarials limits treatment effectiveness. Partial clearance of infection is likely to provide temporary relief, but surviving drug-resistant strains can re-establish and lead to new bouts of malaria. Similarly, antimalarials administered in subtherapeutic dosages have the power to reduce the number of parasites but not to completely clear them, provoking new episodes after a largely symptom-less period. The frequency of recurrences is particularly high where parasite resistance has reached high levels, especially against antimalarials used for first-line treatments. Recurrence is also frequent where self-medication is widely practised, but, as is common, dosage is incorrect or treatment is interrupted early (Snow *et al.*, 1992; Foster, 1991).

Efforts to control malaria

Current trends in malaria control are the result of changing efforts to combat the disease since the discovery of the host-vector parasite triangle in the late 19th century. New achievements in research, and shifting paradigms in disease control, have shaped malaria control strategies throughout the 20th century. To understand where we are today, it is useful to take a glance at some historical key events.

100 years of combatting malaria

With the rise of tropical medicine and the great advances in malaria research in the late 19th century, systematic malaria control began. The discovery of the parasite in the human host and the anopheline vector in the last two decades of the 19th century largely determined the orientations of control strategies at the beginning of the 20th century. One approach was to fight malaria parasites in the human host, and was therefore centred on chemoprophylaxis and chemotherapy. A second approach aimed at reducing malaria transmission through environmental vector control (Bradley, 1991). Control strategies were based on substantial reductions of anopheline populations by larvicides and insecticides, and by diminishing breeding sites through drainage projects. Early successes of transmission regulation through massive attacks against mosquitoes gave support to the approach of environmental vector control. But there was also criticism of the vector centred approach. It was objected that vector control could only show an impact where intensive and large-scale campaigns were launched, i.e. where organizational control of the environment was feasible (Bradley, 1991) and state or private capital for the costly technologies could be raised (Packard and Gadhela, 1997). It is not by chance that the first victorious results of vector control were reported from regions of high commercial interest, like e.g. the Panama canal, the Zambian copper belt or South Asian tea plantations (Bradley, 1991).

In the 1920s, the League of Nations Malaria Commission invited leading experts in malariolgy to a meeting to discuss the different approaches and to recommend the most effective

strategies for malaria control. A lively debate was held between the advocates of the vector centred approach, defended mostly by British and American scientists, and the approach focussed on the human host, led by Italian malariologists (Packard and Gadhela, 1997). The first group understood malaria as a purely biological problem and its control as a technological challenge aimed at interrupting transmission by reducing the vector. Departing from the social medicine paradigm, strongly inspired by Virchow's ideas and Angelo Celli's plea for social justice, the Italian group saw malaria as closely linked to underdevelopment and emphasised the long-term need of improving populations' living standards (Packard and Brown, 1997). Celli's major call was to link malaria control to an urgently required agrarian reform (Litsios, 1997). In the meantime, the control of malaria in the short run could be achieved by chemoprophylaxis and chemotherapy, a strategy encouraged also by Robert Koch (Packard and Gadhela, 1997). Convinced by the Italian group, the Commission's recommendations finally came down in favour of an integrated approach of rural development and mass administration of quinine.

But soon after the publication of the Commission's reports, the Rockefeller Foundation achieved great successes against malaria by environmental vector control - first in Brazil, where an invasion of *Anopheles gambiae* mosquitoes caused devastating epidemics, and subsequently in Egypt. Described by the Foundation as great triumphs of mosquito eradication campaigns - a claim which Packard and Gadehla (1997) criticised as a blunt oversimplification of the local malaria situation - the vector control approach again gained increasing strength.

With the discovery of the insecticide DDT by Paul Müller in 1939 (Simon, 1999) and its extensive use during the Second World War, the focus on malaria as a narrowly defined biomedical disease and the shift towards vector control became total. DDT, a inexpensive, highly effective and easily applicable insecticide, promised victory at last for cost- effective mosquito control, liberating entire populations from the burden of malaria. In the 1940s and 1950s, large-scale campaigns were launched with the goal of eradicating malaria from wide zones in different parts of the world. Well-organised, centrally administered area-wide strategies of powerful attacks against the mosquito vector were required for control to be effective. Armies of workers were recruited for DDT spraying of marshlands and houses, turning malaria control into a kind

of 'military campaign' rather than a public health programme (Bradley, 1991). The triumphs of DDT application gave rise to growing optimism, most remarkably in Sri Lanka where an ambitious vector control campaign led to the near eradication of malaria in the whole country (Silva, 1997).

WHO, established in 1946, soon identified malaria control as one of its priorities. Spectacular results of DDT use, leading to a rapid decline in malaria morbidity and mortality in wide areas of Europe and Latin America, but also concerns about emerging vector resistance against DDT and other insecticides, introduced a new stage in malaria control: the 'eradication era' (Packard, 1997). In 1955, the World Health Assembly proclaimed a shift from long-term control methods to a temporally restricted massive programme of parasite eradication. An important justification of the programme was based on economic considerations. A massive, but time limited intervention based on vector control was expected to reduce hospital attendances. This could make vector control cheaper than intervention programmes based on treatment, as had been clearly shown for British Guinea, where after only four years of implementing vector control measures antimalarial treatment costs per inhabitant decreased dramatically from $1.47 to $0.32 (Morichau-Beauchant, 1967).

The eradication programme advocated by WHO was based on the population dynamics of the malaria parasite and consisted of two phases. The *attack phase*, during a period of three years, had as its main goal the reduction of anopheline populations so drastically that the ratio of vectors to hosts would fall below the critical level required for a disease to spread (see Begon *et al.*, 1986). This was followed by a *consolidation phase*, aimed at eliminating the parasite from the human host population through active case detection and chemotherapy, during a further period of three to five years. Mass drug treatment with antimalarials, primarily chloroquine and pyrimethamine, was intensified from the 1950s onwards, with the aim of interrupting transmission by lowering parasite prevalence (Greenwood, 1991). The hope was that parasite prevalence would be reduced to levels below the transmission threshold, which would ultimately lead to the eradication of malaria. However, eradication within a population can only be maintained when reintroduction of malaria from neighbouring populations is prevented. Regional

efforts across countries and eventually global eradication were therefore seen as highly desirable, and this became the advocated goal of WHO's Global Malaria Eradication Programme.

The optimism about eradicating malaria by an effort over a limited time was soon damped. Eradication could be achieved in temperate regions where malaria was unstable, and highly developed infrastructures permitted well organised programmes of mosquito control and active case surveillance. But primarily because of technical and organisational constraints, most of the ambitious eradication plans in tropical regions were doomed to fail (Packard, 1997). In Sub-Saharan Africa, eradication had not even been attempted when growing resistance of mosquitoes against DDT shattered the hopes of eradication completely. Already in the early 1960s, the USAID and other external funding agencies gradually cut back their support for malaria eradication programmes (Packard, 1997). In many areas where DDT spraying was not maintained, malaria started to resurge rapidly. In Sri Lanka, where malaria was almost absent in 1964, the same morbidity (albeit not mortality) rates as in the pre-eradication period were already observed in the late 1960s (Silva, 1997). In the World Health Assembly of 1969, the goal of eradication on a global scale was critically reexamined and abandoned, at least in the short run. Instead, the Assembly reoriented the strategy towards a more modest control approach with a strong emphasis on the human host, using chemoprophylaxis and curative treatment.

The decades that followed were characterised by what David Bradley called 'resurgence' of malaria and 'chaos' (Bradley, 1991). While the emphasis was shifted from the 'big push' eradication programme to control, no clear policies were formulated (Bradley, 1991); subsequent programmes still inherited much of the eradication spirit and were not integrated into national and local health systems (WHO, 1999a). Chloroquine, first synthesised in Germany in 1934 and later promoted by the Americans during and shortly after World War II (Oaks *et al.*, 1991), became the most widely used antimalarial drug worldwide. Although drug treatments were initially effective, malaria reappeared within a short time after withdrawal of mass administration. With the emergence and rapid spread of chloroquine drug resistance during the 1960s and 1970s in Asia and South America and during the 1980s in Africa (Björkman, 1991), the malaria situation became increasingly critical. Established drugs were becoming increasingly

ineffective and new drugs were either unsafe or expensive (Bradley, 1991). At the same time, during the 1970s and 1980s, international funding for malaria investigation and control was drastically curbed (WHO, 1999a).

The consequences of resurgence and chaos were devastating: In the 1970s, malaria cases had more than doubled within a few years. Brazil, India and Turkey experienced major epidemics in the 1970s and 1980s (WHO, 1999a).

It became increasingly clear that no 'magic bullet' approach could halt malaria and that diversified programmes adapted to local conditions were required. Times had changed, and there was no longer any faith in easy biological solutions. Even the hope of finding a vaccine in the near future, which was dominant in the 1990s, did not lead to over-optimistic views for the future (Bradley, 1991).

The aftermath of the deep faith in technological solutions to malaria during the postwar and eradication era now became visible in the lack of findings from applied malaria research (Gomes and Litsios, 1993). In the past decades, much re-thinking had been taking place and research on various levels had been encouraged, ranging from base-line investigation on the molecular level, development of new drugs, to macro-epidemiological understanding and community involvement, with the main aim being to move towards feasible and realistic control strategies.

Current global malaria control strategy

The worsening global malaria situation occasioned the Ministerial Conference on Malaria, proposed by the WHO Executive Board in 1990 and held in Amsterdam in 1992, to adopt a World Declaration on the Control of Malaria and a Global Malaria Control Strategy, which was confirmed by the World Health Assembly in 1993 (WHO, 1993). The four fundamental technical elements of the Global Strategy are:

- to provide early diagnosis and prompt treatment
- to plan and implement selective and sustainable preventive measures, including vector control

- early detection, containment or prevention of epidemics
- to strengthen local capacities in basic/applied research to permit the regular assessment of a country's malaria situation, in particular the ecological, social and economic determinants of the disease

The 1992 Global Strategy marked a final shift in malaria control from "highly prescriptive and centralised control programmes to flexible, cost-effective, and sustainable programmes adapted to local conditions and responding to local needs" (Trigg and Kondrachine, 1998:18). After the many decades dominated by vertical vector control and eradication campaigns, malaria control has advanced towards disease-oriented, rather than vector-oriented approaches (Trigg and Kondrachine, 1998). Anchored deeply in the primary health care approach (PHC) of the late 1970s, the strategy calls for strengthening health systems, working closely together with local communities.

During the past decade, malaria control has re-awakened from disillusionment and disorientation. Enormous research and implementation efforts with local, national and international contributions and collaborations have led to new enthusiasm in malaria control. In 1997, the Multilateral Initiative on Malaria in Africa (MIM) was established with the overall aim of maximizing the impact of scientific research against malaria in Africa, through promoting capacity building and facilitating global collaboration and coordination (http:/mim.niv.gov/). MIM is a joint public-private sector initiative with the objective of mobilizing resources and action by bringing together scientists, public health professionals, policy makers and industry. One of the recognised needs is to strengthen links between research and control activities.

Another new public/private initiative is the Medicines for Malaria Venture (MMV), established in 1999 as a non-profit foundation (UNDP/World Bank/WHO 2000c). MMV is endeavouring to develop new, effective and affordable anti-malarial drugs through collaboration between global public health organizations, the pharmaceutical industry, government ministries, research institutions and foundations (http:/malariamedicines.org/). The aim of MMV is to develop one new antimalarial drug every five years.

The choice of control methods for a region depends on many factors of malaria epidemiology, including malaria distribution, seasonality, frequency and transmission intensity. Based on computerised information systems and modelling, the Mapping Malaria Risk in Africa (MARA) initiative, established in the mid-1990s, has established a continental database of spatial distribution of malaria in Africa. The overall aim is to develop detailed malaria endemicity and risk maps, and in particular maps identifying regions with epidemic malaria potential, in order to support better planning and programming of malaria control (MARA, 1998).

With the the Roll Back Malaria (RBM) initiative, established in 1998 at the instigation of the WHO Director-General-elect Dr Gro Harlem Brundtland, malaria control received a renewed and reinforced mainstay. The initiative promotes a massive attack on malaria with the goal of halving the world's malaria burden by the year 2010. RBM is a new approach to malaria control, emphasising commitment and global partnerships (Björkman, 1999). The RBM partnership includes governments, development agencies, commercial organisations, professional associations, civil society, research groups and the media (http://www.who.int/rbm). Action is steered by national authorities backed by a network of global partnerships. Backing is provided by the united efforts of the four international founding agencies WHO, UNICEF, UNDP and World Bank (Nabarro, 1999). RBM has a strong emphasis on developing endemic countries' health systems, including the public and private sectors, with a first focus on Africa (http://www.who.int/int-fs/en/fact203.html).

Almost a decade after Celli's plea, inspired by Virchow's social medicine of the 19th century, to tackle the malaria problem by improving the living standards populatins, current views on malaria again closely link the disease to underdevelopment (e.g. WHO 1999a) and recognise the fight against it in the context of sustainable health and human development. The centre of the RBM initiative is the local community. Dr David Nabarro, former Project Manager of the Roll Back Malaria Initiative, said: "The collective support by the partners of a common strategy will maximise the likelihood of increased opportunities for people at risk to avoid malaria, and for health sectors to respond to the wider health needs of all, particularly the poor

and marginalised." (Nabarro, 1999:503).

Health Resources for All: resources to reach people, people to reach resources

One lesson learnt from the eradication campaigns was the failure of the centrally organised and vertical approaches to include local populations in planning and implementing control programmes (Packard, 1997). The new emphasis of the post-eradication era on local populations and health systems in malaria control emerged in the context of a major paradigmatic shift in health approaches and disease control in the 1970s, culminating in the 1978 Alma Ata Declaration of Primary Health Care (PHC). The 'Health for All by the Year 2000' campaign marked a clear change in orientation away from medicine as the only tool to reach health towards a recognition of the impact of social, economic and cultural factors.

The 1992 Global Malaria Control Strategy and all subsequent initiatives are deeply rooted in the PHC approach. Reducing mortality and morbidity due to malaria through community-based programmes, and strengthening health systems, are among the most important elements of the strategy. New approaches in prevention of malaria transmission using insecticide-treated bednets (ITNs), which are independent of centralised control activities and do not require large programme infrastructures for implementation, are envisaged and promoted by important international agencies (e.g UNICEF, WHO, USAID) (Armstrong Schellenberg *et al.*, 1999; Lengeler *et al.*, 1996). ITNs have shown promising results in malaria control. All-cause child mortality was found to be reduced in The Gambia (D'Alessandro *et al.* 1995), Kenya (Nevill *et al.* 1996) and Ghana (Binka *et al.* 1996) by 25%, 33% and 17%, respectively through the introduction of ITNs. In Burkina Faso, a reduction by 15% was achieved by the use of insecticide-impregnated curtains (reviewed by Diallo *et al.* 1999). For a successful supply of ITNs at the micro- and the macro-level, different channels of both the private and the public sector have been proposed, tested and evaluated (reviewed in Feilden, 1996; Fraser-Hurt and Lyimo, 1998). A large-scale implementation programme for ITNs, using a social marketing approach has achieved good coverage of the population in the highly malarious Kilombero Valley of Tanzania (Armstrong Schellenberg *et al.*, 1999).

Early diagnosis and prompt treatment, available to everybody in the community, is still the cornerstone of the current malaria control strategy. To reduce malaria-related death and suffering, the RBM initiative, for example, sees as one aim that "household members will know what to do when children and adults have fever; there will be effective therapy for mild cases of suspected malaria in or near the home, and easy access to treatment for severe cases within two hours' travelling time" (Nabarro, 1999:503). Successful case management of malaria thus depends on two major components: (i) that health care reaches people, i.e. that effective biomedical resources are available and accessible and (ii) that people reach these resources, i.e. that they are informed about how and when to use them. The first point requires the development of new tools to combat malaria and strengthening health systems at the peripheries - so to speak, the technical side of health care provision. The second point, however, is related to human behaviour - ensuring that people utilise the available tools adequately. To approach malaria control from the people's side requires knowing what they understand about malaria, what they do to cure it, and why they do what they do. In other words, in order to encourage early diagnosis and prompt treatment of malaria, one has to understand people's treatment-seeking behaviour.

Lay perspectives and treatment-seeking for malaria in Africa: Literature review

Lay perspectives on malaria

Field studies undertaken on lay understanding of malaria in different parts of Africa explore knowledge and gaps in knowledge about malaria and "folk illnesses" that overlap with the biomedical definition of malaria.

A number of investigators centred their work on eliciting important gaps in people's comprehension of malaria. One of their main objectives was to investigate whether people knew the cause of malaria and link it to malaria symptomatology.

Several authors reported that the malaria-mosquito link, and especially the details of the

mode of transmission, was not clear to a considerable number of persons in the communities studied (e.g. Agyepong, 1992; Aikins *et al.*, 1994; Mwenesi *et al.*, 1995). On the other hand, Winch *et al.* (1996), working on the Tanzanian coast, noted that a high proportion (92.9%) of respondents were aware of the malaria-mosquito link, and people in fact defined malaria as that type of 'fever' caused by mosquitoes. A study in Ghana (Ahorlu *et al.*, 1997) also found that the most people in the community knew mosquitoes to be the cause of malaria. Most studies also reported that malaria was attributed to various 'natural' causes, besides mosquitoes, including weather changes, hot sun, cold, rains, drinking or walking through dirty water and hard work (Brieger *et al.*, 1984-85; Gessler *et al.*, 1995b; Helizter-Allen and Kendall, 1992; Matthies, 1998; Munguti, 1998; Ongore *et al.*, 1989; Ramakrishna *et al.*, 1988-89).

On a different level, malaria was considered in a broader context of local illness terms referring to symptoms that overlap with the biomedical concept of malaria. In a community in Malawi (Helitzer-Allen and Kendall, 1992), the local term *malungo* was used for malaria. However, in the cultural concept, seven different types of *malungo* were distinguished, each of them with its own aetiology, symptomatology and treatment. Similar findings were reported from rural Ghana (Agyepong 1992; Ahorlu *et al.*, 1997), where the term referring to febrile illnesses, *asra*, overlapped with malaria. Local people grouped *asra* in several subcategories according to causes or the most salient symptoms. Kengeya-Kayondo *et al.* (1994) reported *omusujja* as a 'folk illness' in rural Uganda which referred to any kind of fever, including malaria, and feeling unwell.

In the Swahili speaking part of East Africa, the term *homa* was found to correspond to a certain extent to biomedically defined malaria. *Homa* can literally be translated as fever, but has a much broader sense. Mwenesi (1993) described *homa* as a 'folk illness' related with febrile conditions, of which malaria is one of its many manifestations. Similarly, Winch *et al.* (1996) reported for Tanzania that *homa* can be considered as cover term, and malaria (or *homa ya malaria*) was just one among many fevers (*homa*). They found that a variety of causes, including spirits, were related to other types of *homa.* Looking more at the dynamics of illness progression,

Beckerleg (1994: 305) described in her study in Kenya that *homa* is "conceived as following a natural course through the body, producing specific symptoms as the disease progresses".

Probably the finding that had most impact for application in control programmes was that in many communities severe manifestations of malaria were not related to malaria (or the term that most closely refers to malaria) by the population, and thus treatment with malaria control measures was not perceived to be efficacious. The best known example is that of cerebral malaria: convulsions were commonly attributed to other causes than complications of malaria and referred to as a 'folk illness', largely unrelated to malaria. Ramakrishna *et al.* (1988-89), for example, reported that the Yoruba in Nigeria see the condition as being caused by leaving a child on the cold ground. Studies in Burkina Faso (Bonnet, 1986; Schwab, 1998) Ghana (Aikins *et al.*, 1993) and Kenya (Mwenesi, 1993) showed that convulsions were commonly attributed to 'supernatural' agents. In Tanzania, the Swahili term *degedege* was frequently used in order to refer to a 'folk illness' whose symptoms most closely corresponded to those of cerebral malaria, but which was related to attacks by spirits (Gessler *et al.*, 1995b; Makema *et al.*, 1996; Winch *et al.* 1996). However, of the present study area, Matthies (1998) and for coastal Tanzania Tarimo *et al.* (2000) found that a high proportion of study respondents did perceive *degedege* as a form of severe malaria in children.

In several studies, it was found that other complications, namely severe anaemia and splenomegaly, were also not recognised as consequences of malaria and attributed to other, different but 'natural' causes (Mwenesi, 1993; Winch *et al.*, 1996).

Treatment-seeking for malaria in the context of medical pluralism

In most of Africa, the general availability and quality of biomedical resources is still highly deficient. Nevertheless, and even despite recent deterioration in some regions, the general situation of health care delivery has improved in the last decades. At the latest since the Alma Ata Declaration of Primary Health Care (PHC) in 1978, biomedicine has increasingly advanced into most rural and remote areas. Later policies of decentralization have substantially augmented

and reinforced biomedical services in the peripheral health care system. Parallel to the strengthening of health facilities, the general population has been increasingly exposed to health information, which is more and more transmitted by popular means like theatre, entertaining radio programmes and well designed health posters. For contemporary Africa, it is certainly no exaggeration to state that practically every person has come, to a greater or lesser extent, into contact with biomedical concepts. At the same time, it is well known that also in areas with a well-established biomedical presence, traditional medicine - adapted to new medical, economic and political contexts - still persists and may even increase (Comaroff, 1985; Geschiere, 1997; Good, 1987). In Africa, the existence of traditionally-based medical systems side by side with biomedicine is well documented (e.g. Feierman and Janzen, 1992; Good, 1987; Janzen, 1978).

Practically all studies on malaria have investigated treatment-seeking for malaria within the context of medical pluralism. A main focus was to see what therapy options people choose for malaria and related 'folk illnesses'. On the whole, the literature provides a uniform picture of health service use. In nearly all studies, the informants reported a clear preference for biomedical resources for uncomplicated malaria (Agyepong, 1992; Masendu *et al.*, 1997; Matthies, 1998; Molyneux *et al.*, 1999; Munguti, 1998; Mwenesi, *et al.*, 1995; Ongore *et al.*, 1989; Ongore and Nyabola, 1996; Ruebush *et al.*, 1995; Tarimo *et al.*, 2000; Winch *et al.*, 1996). Only a few studies report a small but significant (less than 25%) proportion of informants who used traditional (herbal) medicine (Ejezie *et al.*, 1991; Ramakrishna *et al.*, 1988-89).

The opposite is the case for 'folk illnesses' that involve convulsions. Although in some studies, a relevant number of the respondents stated that they would use biomedical resources, traditional medicine was reported to be clearly prefered (Makemba *et al.*, 1996; Mwenesi, *et al.*, 1995; Matthies, 1998; Molyneux *et al.*, 1999; Ramakrishna *et al.*, 1988-89; Tarimo *et al.*, 2000; Winch *et al.*, 1996).

Not much literature is available on multiple therapy use. Only four studies mentioned explicitly that in cases where biomedical treatment fails, patients shift from the biomedical to the traditional health care sector (Agyepong, 1992; Matthies, 1998; Molyneux *et al.*, 1999; Winch

et al., 1996).

Factors for delay in attending prompt and adequate treatment for malaria

In the light of the current malaria control priority on prompt and adequate treatment, an important research focus is to study factors for delay in attending a health facility. Delay can be observed, and referred to in numbers of days which pass from the onset of symptoms until appropriate health care is sought. But delay has an important qualitative aspect where the interest is on knowing *why* patients delay.

Based on 14 health behaviour models, Cummings *et al.* (1980, quoted in Connor and Nordman, 1995) derived six factors relevant for understanding health behaviour. Three of them are cognitive factors which are useful for the study of delay in seeking prompt and adequate care. (i) attitudes to health care; (ii) perception of the disease threat; and (iii) knowledge about disease.

All the three factors are to some extent treated in the literature on malaria. Studies on attitudes to health care include beliefs and perceptions about the quality of services and treatment benefits. Community satisfaction with health care services has been described as an important element of the quality of health care (e.g. Gilson *et al.* 1994) Tanner and Vlassoff (1998), in their review of gender-related factors, pointed to the problem that male health care providers often treat female clients in a negative way and for this reason, women attend services late.

The perception of disease threat has been mentioned by Mwenesi *et al.* (1995) and Winch *et al.* (1996). Since severe manifestations were not linked to malaria by the community, the informants understood it as a mild and self-limiting illness which does not require immediate treatment.

Certainly most studied is the third factor, knowledge about disease and consequences for treatment-seeking (see literature review on lay perspectives). Mainly the use of traditional medicine because of the perceived 'supernatural' aetiology of severe malaria manifestations was reported as problematic with regard to prompt health care utilisation. Makemba *et al.* (1996) and Tarimo *et al.*, (2000) explicitly mentioned traditional treatments as a source of delay for the 'folk illness' *degedege*.

Besides cognitive factors, delay can be a result of socio-economic factors. In the specific literature on malaria, these factors are much less studied. Most treated in the studies is decision-making for attending a health facility at the household level. The contradiction that women are responsible for the health of their children, but men control funds, has been emphasised (Kikwawila Study Group, 1995; Mwenesi, 1993; Traore *et al.* 1993, reviewed by Tanner and Vlassoff, 1998). Delay can result, for example, when partners (or other male decision-makers) are absent (Mwenesi, 1993) or when the health of their children is not one of the men's priorities in allocating resources (see also UNICEF, 1990; WHO, 1999).

Delay has also been related to direct costs (e.g. costs of medicines and treatment) or indirect costs (transport costs) (Asenso-Okyere, 1997; Mwenesi, 1993; review by McCombie, 1996). Masender *et al.* (1997), reporting from Zimbabwe, stressed the relation between availability of money and seasonality. In an area of general poverty, they found that money was 'freely spent' after the harvest, but was constrained for covering health care costs later in the year.

Several authors called attention to opportunity costs as a source of delay. Opportunity costs of the time for treatment-seeking (especially waiting time at the health facility) are especially high during periods when the work load is greatest. In Ghana, opportunity costs have been calculated at 64% of the total costs for a malaria episode (Asenso-Okyere and Dzator, 1997). The association between opportunity costs and gender aspects has been stressed by and Tanner and Vlassoff (1998). Reuben (1993) mentioned that mainly underprivileged women who are generally loaded with household chores and the care of young children are less likely than men to attend health facilities at a distance from their home.

Health system factors are a further potential cause of delay of prompt treatment. The availability of resources (health facilities, drugs) is often limited. A well known problem is the shortage of drugs in the formal sector. In countries which rely on a monthly distribution system this occurs especially during the second half of the month (Gilson *et al.*, 1993a). Lack of medicines in the formal sector has been considered problematic, as it may lead people to seek

treatment from the informal sector where quality of drugs is less well controlled and knowledge or information about correct use is often insufficient (van der Geest, 1991). Inadequate care might be related to poor staff performance and incorrect administrations of treatments and dosages (Gilson *et al.*, 1993b). Furthermore, the introduction of cost-sharing systems has been found to have a negative impact on the utilization of government health units (Adome *et al.*, 1996).

In all the socio-cultural studies of malaria which focussed on reasons for delaying prompt and adequate treatment, cognitive factors have been most extensively investigated. In particular, community understanding and related treatment-seeking behaviour have received most attention, and this knowledge has certainly had the greatest influence on the design of new health information campaigns. Most emphasis has been placed on assessing community 'knowledge' about malaria and opposing it to people's 'beliefs' (mostly represented in the identification of 'folk illnesses'). The discussions centre on descriptions of health service utilisation as a consequence of community understanding within medical pluralism.

There is, however, a clear lack of studies which analyse how different systems of knowledge are interlinked, and what implications the resulting local knowledge has on health resource utilisation. An exception is the study by Beckerleg (1994) who described that the term '*homa*' ('fever') was primarily understood in terms of the humoral theory, but the condition had also merged with the biomedical disease 'malaria', so that the two terms are sometimes interchangeably used. Her focus, however, not on what implications the result has for local health resource utilization and nor was it oriented towards an applied perspective.

Secondly, there is a lack of studies concerned with the sequential or parallel use of health care services. Most studies focus on one therapy option (traditional healer or biomedical health facility), but do not follow up therapy paths which include both health care sectors (McCombie, 1996). Exceptions are the studies by Matthies (1998) and Snow *et al.* (1992).

And thirdly, there is a lack of socio-economic studies, in particular those with a gender focus (Tanner and Vlassoff, 1998).

Accounting for these lacunae in the socio-cultural literature of malaria, the papers contained in this thesis aim at contributing insights into treatment-seeking for malaria, and into the problem of delay in obtaining prompt and adequate health care. The three main areas of concern are:

- The interplay of traditional and biomedical knowledge about malaria, and its implications for treatment-seeking and delay in obtaining adequate care.

- Sequential and parallel use of traditional and biomedical health care options for malaria, and the relevance of traditional treatment in causing delay.

- Relationships between illness cognition and social and economic factors, and their implications women's coping with the treatment costs of childhood malaria and for delay in obtaining treatment.

The study site Ifakara is optimal for investigating these topics. First, because it has a long history of medical pluralism, with a good availability of both biomedical and traditional health services. Second, because it is situated in a highly malarious region where people have extensive experience with the disease and its treatment. And third, because its inhabitants have good access to health information, in particular about malaria, through a variety of channels.

Ifakara is thus a setting where the local population is well informed about a disease of high priority, and people have easy access to a broad range of biomedical resources for treatment, rather than a remote and 'untouched' area where information campaigns and facilities first need to be established. This situation, with good health information, and a good offer of health services and drugs, is the aim of many current health policies and programmes. Therefore an investigation in this setting permits the exploration of problems of delays in obtaining prompt and adequate treatment for malaria that may still persist - even in an area where many of the goals of 'Health for All' have been achieved.

The goal of this study was:

> **To investigate community understanding of malaria and treatment-seeking behaviour, with a special focus on childhood malaria, and to study in what way this can contribute to delay in attending a health facility in order to formulate recommendations for interventions for tackling this problem.**

General objective 1

To investigate people's knowledge about recognition and treatment of malaria, particularly childhood malaria.

Specific objectives

1.1. To describe people's knowledge about cause, symptoms and treatment of biomedically defined malaria.

1.2. To identify locally recognised illnesses which are related to biomedically defined malaria.

1.3. To analyse the ways in which biomedical information about malaria is integrated with local understanding of health and illness.

1.4. To discuss the role of knowledge about aetiology for the selection of the health care sectors.

1.5. To investigate the cultural logic which underlies the different steps in the treatment-seeking path.

1.6. To understand whether local knowledge can result in delay in attending or re-attending a health facility.

General objective 2

To discuss the role of traditional medicine for the treatment of biomedically defined malaria.

2..1. To identify traditional healers who play a role in treating biomedically defined malaria, with a particular focus on childhood malaria.

2.2. To explore at what stage of the illness process patients attend a traditional healer.

2.3. To understand the local logic underlying the consultation of a traditional healer for treatment of biomedically defined malaria.

2.3. To discuss the role traditional treatment may have in delaying attendance or re-attendance at a health facility, with a particular focus on childhood malaria.

General objective 3

To investigate mothers' coping with treatment costs for childhood malaria at the hospital.

3.1. To study the role of mothers in covering treatment costs for childhood malaria at the hospital.

3.2. To investigate the implications of social networks for covering treatment costs for childhood malaria at the hospital.

3.3. To describe mothers' coping strategies for covering treatment costs for childhood malaria at the hospital.

3.4. To study the implications of seasonality for covering treatment costs for childhood malaria at the hospital.

3.5. To discuss the role of economic obstacles in causing delay in attendance at the hospital.

PART III

STUDY SETTING AND METHODS

Study Setting

The investigations reported in this thesis were undertaken in Ifakara, the capital of Kilombero District, Morogoro Region, in Southeastern Tanzania, around 320 km from the coast (see fig. 2). Ifakara is situated in the Kilombero river plain, 270 m above sea level, between the Udzungwa and Mahenge Highlands (for further details see Jätzold and Baum, 1968).

The climate of the Kilombero Valley is highly seasonal with periods of intensive rainfalls and floods alternating with droughts. As a an approximate rule, the rainy season starts in November and lasts until April, with small rains up to June, but fluctuations are common. The first rains are the small rains, from November and ceasing in January or February. They are followed by a short, but acute dry period which can last for several weeks. The period from February to April is the time of the long rains which entail periodic flooding of the fields.

The major cash crops produced in the wet plain of the Kilombero Valley are rice and to a lesser extent maize which are sold to private buyers (KVTC, 1993) for trading on the local market and exporting to other regions of Tanzania. However, despite the increasing trading activities, the majority of the population still lives in extreme poverty. A socio-economic survey of 1993 (KVTC, 1993) estimated that around 60% of the households of the Kilombero District produced rice and maize crops but below subsistence levels.

Ifakara with its estimated 40'000 inhabitants is a continuously growing provincial town of both rural and urban characteristics. As the biggest settlement in the Kilombero Valley , and as the Kilombero District town, Ifakara has been the main trading site of the region for many decades (Widmer, 1963). With the construction of the Tanzania Zambia Railway (TAZARA) between 1970 and 1975 by the Chinese (Coulson, 1988), Ifakara has become well communicated with Tanzania's biggest and economically most important seaport town of Dar es Salaam.

The main part of the study took place in Lipangalala, a subvillage of Ifakara. Ifakara itself is divided in areas of different status of wealth which to an outside observer is immediately visible from the type of housing and Lipangalala certainly belongs to the poorest areas of Ifakara with relatively few brick houses and iron-corrugated roofs. The majority of its estimated 3,000 dwellers are subsistence farmers. Both men and women, accompanied by their children, work

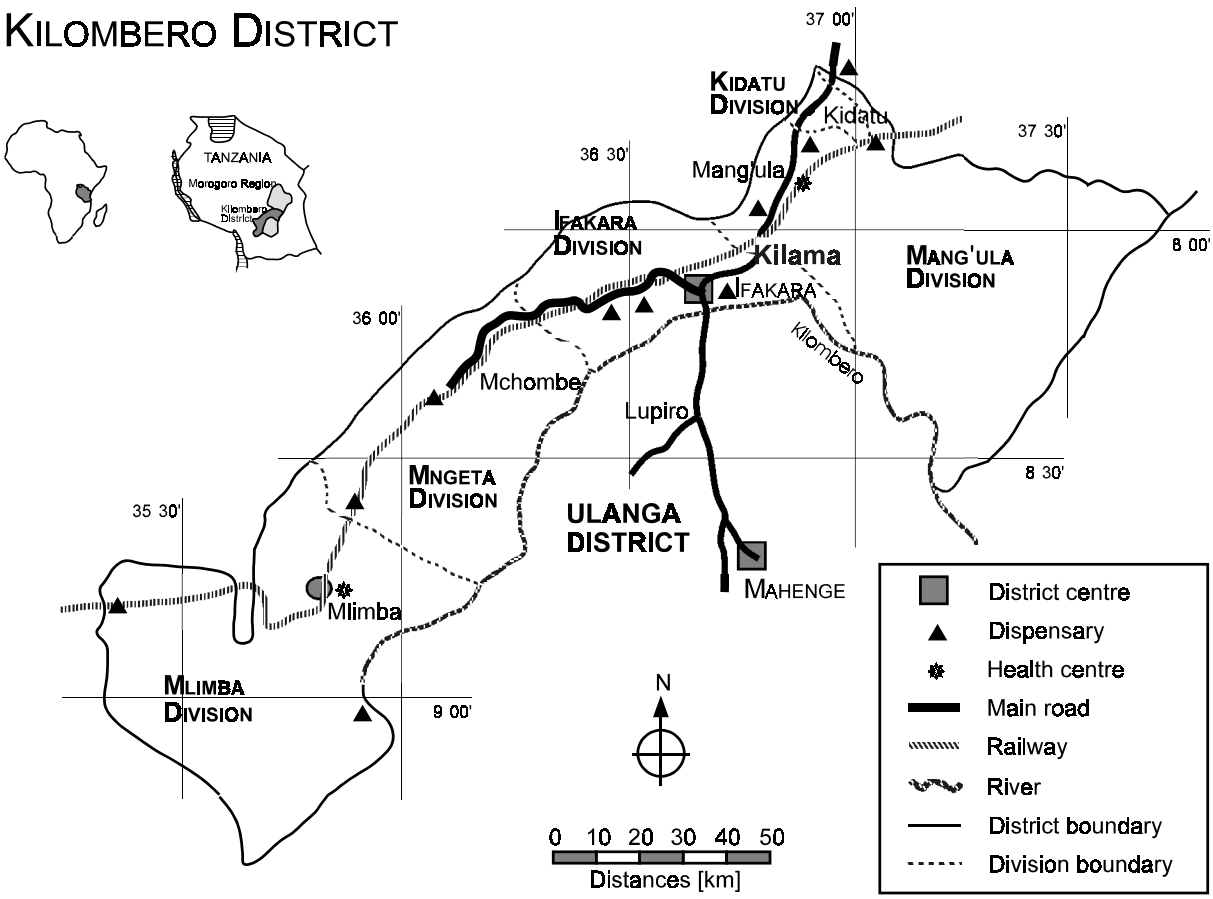


Fig. 2 The study site Ifakara in the Kilombero Valley, southeastern Tanzania (courtesy Jürg Utzinger).

in the rice and maize fields. It is usual that women own their own fields which were either allotted to them

by their family or allocated by the village authorities, following the laws of the 1960s that any Tanzanian citizen is allowed to cultivate 'unused' land. Good, fertile plots are increasingly scarce, causing people to cultivate fields far from home, to where they often move for several weeks or months during the planting and harvesting season. Men especially of the *Wandamba*, the most numerous ethnic group of Lipangalala, obtain additional earnings from fishing and sometimes hunting while women may be employed in brewing of local beer or selling home

made pastries and gardening products. More lucrative work - like shopkeeping, small scale trading, carpentry, bicycle repairing etc. - is almost exclusively men's business. Some people, who the community considers to be the fortunate ones, have found permanent employment in local institutions, e.g. as cleaners, guardians, gardeners, cooks, etc. Here again, men have better opportunities than women. Finally, there are the few men and women with higher education who have salaried occupations, like teachers, hospital personnel, secretaries etc.

Malaria in the study area

Malaria in the study area is holo- to hyperendemic and perennial (Tanner *et al.*, 1991). Transmission is intense with an estimated entomological inoculation rate (EIR) of 300 infectious bites per person per year (Smith *et al.*, 1993). Despite seasonal transmission patterns, prevalence of parasitaemia is stable all year round, with an overall prevalence of *P. falciparum* of around 70% (Smith *et al.*, 1993). In the health profile of 1983-85, malaria ranked as the first cause of morbidity and mortality (Tanner, *et al.* 1991). Most affected are children under the age of 5 years. More than 90% of children in the age between 1 and 5 years carried parasites in their blood (Smith *et al.*, 1993). The most common malaria complications in the area for children are severe anaemia (Menendez *et al.*, 1997; Snow *et al.*, 1994) and cerebral malaria (Schellenberg *et al.*, 1999). Hospital records list malaria as the leading cause of morbidity and mortality (Kahigwa *et al.*, 1993; St. Francis Designated District Hospital, annual report 1993) with 29% of hospital deaths in the under fives (Kitua, 1996).

Chloroquine resistance has been found *in vitro* (Huber *et al.*, 1993) and has been reported as an increasing problem in the area, with levels ranging from 20% to 64% (Hatz *et al.*, 1998; Koella *et al.*, 1990; Mshinda, 2000; Mshinda *et al.*, 1996;). Tanzanian official drug policy still recommends chloroquine as a first-line drug, but because of the increasing rates of resistance all over the country, a change in treatment guidelines is debated (Ministry of Health, 1999).

Medical pluralism in Ifakara

The population of Ifakara has access to a broad variety of health care options both of the biomedical and the traditional sector. The most important biomedical health care provider is

certainly the St. Francis Designated District Hospital (SFDDH), one of the biggest and best equipped hospitals in Tanzania. For preventive and primary health care, the hospital runs an MCH (Mother and Child Health) clinic and an outpatient department (OPD). In 1993, following the recommendations by the Bamako Initiative (BI) and within the process of the health sector reform, the hospital introduced a cost-sharing system (Frei, 1997). Although the government policy is to provide free care to children under the age of five years, the hospital charges for examinations, including routine blood, urine and stool tests (Mujinja *et al.*, 1997). In addition, even most basic drugs such as chloroquine and antipyretics have usually to be purchased from the private sector.

Most conveniently, prescribed drugs can be obtained from the private, non-profit oriented pharmacy located on the hospital ground. A broad selection of drugs can also be purchased without prescription from one of the several town pharmacies running on a profit-oriented basis. Different brands of antimalarials, antipyretics and to a certain extent antibiotics are available from the numerous small shops all over the community and even in remote field areas.

Besides the SFDDH, private dispensaries and health centres are operating, mainly supported by Catholic or Islamic missionary services, which charge higher fees compared to the public sector (e.g. Alilio and Tembele, 1994; Gilson, *et al.*, 1993a). A new, private clinic was being constructed near Lipangalala, but was not yet operating during the period of fieldwork.

Traditional medicine is well represented in the study area. Numerous traditional healers (locally called *waganga wa jadi, waganga wa kienyeji* or simply *waganga*) offer their services to the local population and, the most renowned ones, to people coming from as far as Dar-es-Salaam or farther (Matthies, 1998). The number of healers in Ifakara is difficult to estimate, since many work only occasionally and others practice secretly. There is an official list of traditional healers by the Cultural District Office, listing 63 registrations for the Ifakara Division (Matthies, 1998), but this only includes the few who have paid the annual license fee and is certainly much below the real figure. Alone in Lipangalala, we recorded more than 20 important *waganga*, besides the numerous small ones who only practice sporadically and who have very few clients. A classification of healers is difficult, since there is a broad variety of practices, specialisations, and level of skills. Some are highly specialised and have undergone several years

of training while others only know some few practices or herbal remedies and are not very different from the popular sector. Basically, three different types of healers can be distinguished, although internal variation is broad within each category: The diviners, the herbalists and the 'knowledgeable women'. The most renowned healers are certainly among the diviners. They can be either female or male, of all age groups, practise almost full-time and usually charge considerable to large amounts of money. Two types of divination (*kupiga ramli*) are common; the healers who use spirit mediumship (*waganga wa mashetani*) and Muslim men who use Islamic religious textbooks (*waganga wa kitabu*). Their specialisation are diagnoses and treatments of illnesses due to witchcraft and spirits. Treatments can range from simple administration of herbal remedies to long therapies including drumming rituals (*ngoma*) lasting for several days. Only few, usually elderly healers belong to the second type, the pure herbalists. They treat a variety of usually diffuse physical ailments, such as stomach ache, body weakness, general malaise, attributed to 'normal' causes. They normally charge low fees and have only a few clients. Their medicine is often seen complementary to biomedicine, for example in order to regain strength after strong hospital treatments. The third type, the 'knowledgeable women', are the most numerous but least known type of healers. Their specialisation is treatment of locally recognised childhood illnesses, such as *degedege* ('convulsions'), *bandama* ('splenomegaly combined with anaemia'), *moto* ('fever due to heat transferred by a parent after sexual intercourse'). They usually treat clients of the neighbourhood and only few are known outside the community. They normally charge no or small fees, but it is usual to give them a small gift if treatment was successful. 'Knowledgeable women', commonly referred to simply as 'grand-mothers' (*bibi*), are almost without exception elderly women in menopause and come most closely to the popular sector; sometimes they do not even consider themselves as healers.

Health information about malaria

People of Ifakara have intensively received information about malaria for many decades. Many national and local health education campaigns which had a strong focus on malaria were carried out mainly since independence. The most extensive one, reaching people all over the country, was the national 'Man is health' (Mtu ni Afya') campaign in the 1970s which gave

detailed explanations about malaria, its cause, symptoms, treatment and preventive measures. But also the numerous research activities focussing on malaria at the Ifakara Health Research and Development Centre (IHRDC), formerly Swiss Tropical Institute Field Laboratory (STIFL), contributed much to the transmission of scientific knowledge about malaria to the community in and around Ifakara since several decades. Certainly one of the most important sources of knowledge is through personal experience at the hospital. Nearly everybody in the community has already experienced malaria which was treated at the hospital and has therefore come into contact with biomedical approaches of diagnosing and treating the disease. Nowadays, in addition to these information channels by health institutions, people have also access to radio programmes and newspaper advertisements where malaria is a common topic. All in all, information about malaria is well transmitted and has reached all social classes and age groups in Ifakara.

Methods

The investigation strategy was that of triangulation. Triangulation, or the use of multiple methods, has been described as "a plan of action that will raise sociologists above the personalistic biases that stem from single methodologies" (Denzin, 1970: 300). A term derived from navigation for orientation and positioning, triangulation commonly refers to the complementary use of qualitative and quantitative methods in order to overcome the errors and limitations implicit in each type of method and to validate research findings through different approaches (Hammersley and Atkinson, 1994; Reichardt and Cook, 1986).

The ethnographic fieldwork for this study was conducted in a two-year field stay carried out between April 1995 and March 1997. Additional information has been recorded in a second, short field stay of one month in September 1997 in the frame of a study on the impact of cost-sharing on the community, requested by the St. Francis Designated District Hospital (Mujinja *et al.*, 1997).

The first phase was an inquiry phase in order to establish contact with the community. It included presentation of the work to the local community leader, 19 in-depth interviews focussed on very broad aspects of malaria and 5 focus group discussions (FGDs) with mothers in the community, mothers with a child admitted with malaria at the paediatric ward of the hospital, male and female teachers, female students of a nearby weaving school, and male and female adult malaria patients attending the out patient department (OPD) of the hospital. The FGDs were designed and undertaken following the manual of Dawson *et al.* (1993). The question-guide for the FGDs is shown in Appendix Ia. The interviews and FGDs were carried out in Kiswahili with the assistance of a temporarily employed female Tanzanian sociologist from Dar es Salaam University.

The second and subsequent phases were carried out with the close collaboration of a male local interpreter and a male Tanzanian sociologist from Dar es Salaam University. The interpreter was a respected, middle aged farmer of a family deeply rooted in the community who had higher education and a good knowledge about the study area. His work was not only to literally translate from Kiswahili to English, but also to facilitate contact to informants. He was furthermore a cultural broker and main key informant.

The second phase was an extensive collection of qualitative data in Lipangalala where we carried out 81 in-depth interviews mainly with mothers of children under five years old. The selection of informants, mediated by the local interpreter, was not random, but intended to cover as broad as possible different age groups, ethnic and religious origin, educational level, and state of wealth. Interviews were focussed on malaria recognition and management, but also included broad aspects of health and illness in general. The question-guide for the in-depth interviews is shown in Appendix IIa.

In a third phase, a prospective follow-up study with 10 mothers of children under five over a period of 7 weeks (total 70 interviews) was carried out. The repeated visits served to establish good contact to the informants who gained increasing confidence with the Tanzanian sociologist who interviewed them. This sub-study provided further in-depth data on understanding of malaria and related illnesses and on treatment-seeking for actual illness episodes. The question-guide for the in-depth interviews is shown in Appendix IIb.

In a final phase, we carried out in-depth interviews with 22 mothers of children under five who had recently attended the hospital with a child suffering from acute fever, considered to be malaria by the informant. The selection of mothers was a convenience sample, identified by information from other female study participants and acquaintances. The interviews were carried out with the assistance of the local interpreter. The objective of these interviews was to gather information about coping with treatment costs of a child treated at the hospital. We enquired about who usually pays for the child's health care, who had paid for the last fever episode and how money was obtained. We also recorded data about the marital status of the mother and the occupation of the person who paid for the child's treatment costs. In three focus group discussions - one with mothers, one with female and one with male ten-cell leaders (*balozi*) of the community and in two interviews with female key informants, we further enquired about gender-related issues and differences among women within the community. The question-guide for the FGDs is shown in Appendix Ib.

In 3 FGDs (2 with male and female teachers, 1 with mothers), we enquired about opinions about expectation and satisfaction with the hospital. In 3 more FGDs, the same participants were asked about opinions on traditional healers. The question-guides for both FGDs are shown in Appendix Ic and Id.

Furthermore, during 18 months living in the community much background information was gained through participant observation (for methodological details see Mayer and Ouellet, 1991). Informal conversations mainly with females from the household, neighbours and women who came to fetch water at the well in front of the house provided much information about daily life conditions and problems and various aspects about health and illness.

Based on the qualitative material, a structured questionnaire (see Appendix III) was designed in order to collect quantitative information about the same community of Lipangalala and the neighbouring community of Mlabani. A total of 220 mothers of children under five, 110 of each community, were randomly selected and interviewed in their homes by two trained, local female field workers. Questions included knowledge about malaria and related illnesses, details about treatments at home, choice of first health care options and, in case of perceived failure, second and third therapy options. Most questions were hypothetical, but also some questions

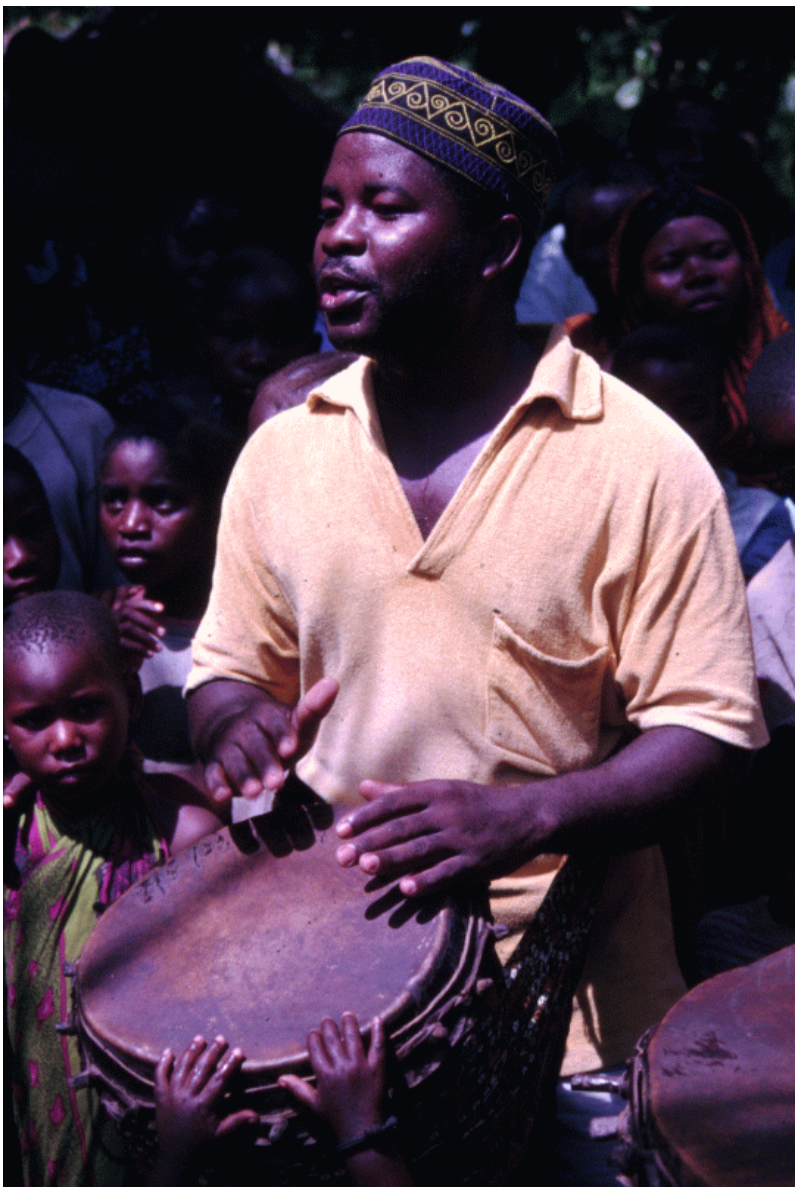
about the last malaria episode treated at the hospital were included.

Much information was collected on illness concepts and treatment practices of traditional healers. In the community of Lipangalala, we interviewed a total of 18 *waganga*: 10 diviners (3 men and 7 women), 2 herbalists (both men) and 6 'knowledgeable women' specialised in treating childhood illnesses. The question-guide for the in-depth interviews with the 'knowledgeable women' is shown in Appendix IIc. With most of them, continuing contact was established, enabling us to gain insights into their concepts of health, illness and healing. At the diviners' place, we also had the opportunity to interview clients and to participate as observers in divination and healing rituals. We attended three drumming rituals (*ngoma*) of three days each where between 10 and 20 clients were participating. We also followed up a treatment procedure by a Islamic book healer of a female client who suffered from a diffuse symptomatology of anxiety, sweating, fever, headache, and fast heartbeat over a period of one week.

All FGDs were tape recorded, transcribed and typed in English for analyis. For the in-depth interviews, notes were taken in English and typed for analysis.

PART IV

COMMUNITY UNDERSTANDING AND TREATMENT-SEEKING FOR MALARIA



Outline of papers

Based on the objectives outlined in Part II, one of the major interests was to investigate whether the local knowledge that results from the interplay between biomedical and traditional concepts could in any way contribute to delay in appropriate treatment for malaria. This issue is developed in the first three papers contained in this part, with an emphasis in each paper on uncomplicated malaria, cerebral malaria and recurrent malaria.

The first paper explores the interplay between biomedical and indigenous knowledge in community interpretations of malaria. Our analysis departs from the idea that new information, which in the case of malaria has been intensively transmitted to the population during decades, is integrated by local people on the basis of pre-existing concepts. The result is an amalgamation of biomedical and local concepts, or which we have called 'medical syncretism'. The term is derived from the concept of 'syncretism', defined as "the combination or blending of elements from different religious (or cultural) traditions" (Seymour-Smith 1993:274), which is mainly used in studies of religion. Notably, the 'local concepts' we try to identify in the local interpretations on malaria are not restricted to ideas about illness in a narrow sense, but include broad notions, for example the perception of the body and the logic of witchcraft. The key question will focus on whether this fusing of biomedical and indigenous views is likely to have implications for treatment-seeking, and ultimately for delay in prompt and adequate treatment of malaria. Although the analysis is based on malaria in the specific setting of Ifakara, our intention is to identify and describe different modes of interaction which might be useful for studying medical syncretisms for other diseases and/or in other settings.

While the first paper is an overview which discusses general interpretations of malaria and their implications for treatment behaviour, the second is focussed on a specific, locally recognised illness which in many respects relates to cerebral malaria. *Degedege*, also known from coastal Tanzania (Makemba *et al.*, 1996, Tarimo *et al.*, 2000; Winch *et al.*, 1996), is a feared 'folk illness' of children which is mainly characterised by convulsions. But what exactly

does *degedege* denote? Do people relate it to malaria or is it understood as a 'disease entity', with its own cause, symptoms and treatment, as has been reported from other areas.

The focus of the paper is on traditional home treatment. Here, we centre on questions like: What is the logic underlying the seemingly strange home practices which people report? And what do the people themselves know about this logic? But the discussion goes further than solely describing the cultural model of *degedege*. We observed that everybody in the community knows about *degedege* and how to treat it locally. But why do people who know about the link between *degedege* and malaria still use the traditional practices for *degedege*, even though they would never use these for malaria? In fact, the term *degedege* itself seems to evoke clear treatment schemes to be followed. This leads us to elaborate on the role of illness naming, and, linked to it, the role of perceived illness aetiology for treatment actions. One of our key questions is: how far does knowledge about the aetiology of illness influence actual treatment behaviour?

Whereas *degedege* is an originally traditional illness concept into which biomedical knowledge has been mixed, the opposite is the case for malaria. Malaria is a biomedical construction which is complemented with indigenous concepts. In the third paper, we show how the cultural model of malaria can be complemented with the logic of witchcraft. Complementation occurs first and foremost when (from a popular perspective) the biomedical model falls short of explanations of a person's illness experience. This may happen when there is no detectable disease or when symptoms persist or become inexplicably aggravated despite treatment. This paper thus focusses on the dynamics of illness interpretations and reinterpretations, particularly *after* the visit to a biomedical health facility. We will describe in detail how the two logics - malaria and witchcraft - interrelate and how these interpretations can explain complex treatment-seeking patterns, involving a continual movement between the biomedical and traditional health care sector.

All three papers have as a focus the interplay between biomedical and traditional elements and the effects the resulting local knowledge has on treatment-seeking. Cognitive factors are, however, only one aspect of treatment-seeking. They may determine what options

people would feel are appropriate for managing an illness episode, but this does not mean that they will have the means to actually use them. In the study area, biomedical facilities are well represented nearby. For malaria, the hospital even has a very good reputation among the community and antimalarial drugs are widely available and easy to purchase. Lack of availability and accessibility could therefore be mostly excluded as relevant factors for delay. An often cited factor is limited decision-making power for choosing health care options which could be a crucial obstacle for women in a male dominated society. Although we cannot exclude their importance - and a study investigating this topic in detail would certainly be worthwhile - we got the impression from our field observations that restrictions in permission to attend a biomedical health facility, for example by husbands, were rather the exception than the rule.

Economic obstacles are quite a different matter. Even though user fees at the hospital are relatively moderate, most of its services require cash, including most treatments of children. During the fieldwork, it became increasingly evident that economic factors played a most important role in delaying prompt and adequate care. In the interviews, lack of cash was the most frequently mentioned constraint for attending the hospital promptly. The fourth and the fifth papers therefore focus on economic constraints which limit access to health care options that people would actually like to use.

The fourth paper, unlike the three previous papers which centred solely on local knowledge and its use, goes a step further by linking cognitive aspects with social and economic aspects. The topic of this paper is on affordability of hospital services compared to that of the very expensive local traditional healers (diviners). Our analysis and discussion departed from an apparent paradox. To our surprise, informants who stated that they could not afford a hospital visit, for example with a child suffering from malaria, often said at the same time that they had spent many times the amount of money needed for the hospital on traditional treatment. Enquiring more into the meanings of illness for the affected person and his or her social group, we reached the conclusion that our informants were neither lying nor exaggerating their poor economic situation. Rather, we found that the aetiological interpretation of the health problem, which determines the selection of either biomedical or traditional health care, has completely

different implications for the questions of who is involved in therapy management, and who covers treatment costs. The paper not only draws attention to the need of a diversified view of concepts like affordability, but more importantly, it challenges the assumption so often taken for granted that in African societies any illness is managed by an extended social network.

The fact that the support group is particularly small for illnesses treated at the hospital leads us to look in more detail at how people do cope with treatment costs of malaria and other acute illnesses. In the fifth and last paper, we present 22 case studies of mothers who have taken a child to the hospital for treating an acute fever that they interpreted as a probably being a bout of malaria. First, we enquire in detail about who supported them in covering treatment costs. Not only was the social network support small, but the cash needed for the treatment costs at the hospital had to be obtained by the mothers themselves or with the help of female relatives. The paper includes an important gender perspective as we discuss the differences in access to income between men and women. How do women generate immediate cash for emergency use at the hospital? And how does seasonality affect the way women look for resources? In attempting to answer these questions, we describe coping strategies which women can adopt during different times of the year, and how these can contribute to the risk of delaying treatment and what their potential negative long-term implications are for the well-being of the mother and their children.

The five papers contained in this thesis present a shift in focus from cognitive to economic aspects in the study of delay in seeking prompt and adequate care for malaria. Although there are many other factors, these are certainly two of the most relevant ones in the studied area. As they are presented here - focussing on the interplay of biomedical and traditional concepts on the one hand and on economic constraints of risk groups on the other hand - they may serve as an example of what occurs in many African settings today. In many places health information is advanced, and health services and drugs are available, accessible and accepted but for certain groups of society they are not or are not always affordable. In this sense, all the five papers can be read as a contribution to the understanding of treatment-seeking and to the challenge of malaria control in contemporary Africa.

Medical Syncretism with Reference to Malaria in a Tanzanian Community

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Abstract

What happens when new health information is introduced into a community? We have explored this question in a semi-rural community of Southeastern Tanzania whose population has come into contact with biomedicine for many decades. With the example of malaria, we illustrate how biomedical knowledge transmitted in health messages coexists, interacts and merges with local pre-existing ideas and logics. The results are syncretic models, which may deviate considerably from what health promoters intended to transmit. We identified three different modes in which biomedical and traditional concepts may be interlinked, and discuss their implications for treatment-seeking, which may include delay and non-compliance with antimalarial therapy. Analysing this medical syncretism clearly demonstrates that even if comprehension of health messages is accurate, the way in which people interpret them may not be. Disentangling syncretic processes permits us to understand the dynamics of how information is processed by the population and provides orientations for health promoters for adapting messages to the local context.

KEY WORDS: Medical pluralism, illness models, health-seeking behaviour, Africa

Introduction

"The perception of malaria on the part of the population is one of the most critical factors in determining if the disease, be it malaria or not, will be treated effectively" (WHO 1993:15). The emphasis on people's perspectives is in the line of the current WHO strategy on early identification and prompt treatment of malaria. It has been reported from different regions throughout Africa that community understanding of malaria may diverge considerably from the biomedical model. A number of studies, mainly in rural areas, called attention to two critical findings. Firstly, significant parts of the study populations were not aware of the malaria-mosquito link (e.g. Agyepong, 1992; Aikins *et al.*, 1993; Mwenesi *et al.*, 1995; Ongore *et al.*, 1989); and secondly, people often did not associate severe manifestations of malaria - convulsions, anaemia and splenomegaly - with the disease. This is well documented in the case of convulsions, which in some areas have been found to be attributed to 'supernatural' agents and to require the consultation of a traditional healer (e.g. Bonnet, 1986; Makemba *et al.*, 1996; Mwenesi, 1993; Winch *et al.*, 1996).

These findings have received growing attention among health professionals. But while they are increasingly taken into account in the development of health messages, little seems to be documented about what happens once information on malaria has been transmitted to the local population. It is clear that people process new information on the basis of what they already know. But does this new information simply coexist with pre-existing concepts, or do they merge? And when they merge, how is the new knowledge incorporated into people's illness models? And finally, does the resulting knowledge in a particular community, if it deviates from the original meaning of the messages, eventually lead to practices that are different from what health promoters intended to encourage?

In a attempt to investigate these questions, we carried out a study in Ifakara, a community of Southeastern Tanzania which has a long history of intensive health information campaigns. The focus of this article is on analysing patterns of information about malaria and their relevance for treatment behaviour. We have called the process of developing these patterns 'medical syncretism'. Whereas syncretism, defined as "the combination or blending of elements from different religious (or cultural) traditions"

(Seymour-Smith 1993:274), is a term usually applied to religious phenomena, it is also suitable to describe the blending of biomedical with indigenous concepts. Our intention is to illustrate that the analysis of medical syncretisms not only contributes to a more detailed understanding of local perception of malaria but also permits us to understand the *logic* which underlies health- seeking behaviour, and consequently to design health promotion activities more effectively.

Studying Medical Syncretism in Ifakara

An ideal setting to study medical syncretism as it applies to malaria, and its influence on treatment seeking, is a site (1) where malaria is endemic and people have extensive experience with the disease; (2) where people have for a long time been exposed to health communication programmes; and (3) which is characterized by medical pluralism and where people can choose among different treatment options.

The study site Ifakara, the administrative capital of the Kilombero District in Southeastern Tanzania, fulfils all three criteria. Situated in the valley, Ifakara is periodically flooded by the Kilombero river (for a detailed description of geograhpic and climatic aspects of the area see Jätzold and Baum, 1968; Monson, 1991). The climatic and ecological conditions favour mosquito breeding and the entire river basin is highly infested with malaria, with an estimated entomological inoculation rate (EIR) of more than 300 infectious bites per person per year (Smith *et al.*, 1993). Most severely affected are children under five. In surveys and hospital records malaria ranks first as a cause of infant morbidity and mortality (Menéndez *et al.*, 1997; Tanner *et al.*, 1991; St. Francis Designated District Hospital, annual report, 1993).

Ifakara with its estimated 40'000 inhabitants is the main settlement of the area. It has both urban and rural characteristics: Whereas in the town centre, business and trade activities, especially with agricultural products from the valley, are increasingly developing, the periphery is mainly inhabited by subsistence farmers who cultivate rice, maize and cassava.

People have come into contact with biomedical information about malaria quite frequently. Mainly since independence, extensive health education programs have brought knowledge about malaria even to the remotest areas of the valley. Especially the national "Man is Health" (*Mtu ni Afya*) campaign in the 1970s intensively transmitted health messages to the population, mainly through radio programmes and health promotion panels (Mkumbwa, 1983). On a local basis, the District Health Management Team (DHMT), based in Ifakara, which co-ordinates and carries out health campaigns in the Kilombero District, has organised educational programmes about malaria. In addition, the Ifakara Health Research and Development Centre (IHRDC), in collaboration with the DHMT, has launched over decades a series of malaria research and health communication activities that directly involved dwellers in Ifakara and its surroundings, and has exposed and increasingly exposes them to scientific knowledge (see annual reports of IHRDC; Tanner *et al.*, 1994; Fraser-Hurt & Lyimo, 1998; Armstrong Schellenberg *et al.*, 1999)

Possibly the most important source from which people receive information about malaria are the local biomedical health services. Apart from several private facilities, Ifakara, as the district town, has a referral hospital. The St. Francis Designated District Hospital (SFDDH), a former missionary hospital with 370 beds, is one of the biggest and best equipped public health institutions in the country and well known for malaria treatment. For the inhabitants of Ifakara, it also offers primary health care services at the out-patient department and the Mother and Child Health (MCH) clinic and organises health education sessions in collaboration with the DHMT. People receive knowledge about malaria not least through experiencing treatment in the hospital and interaction with the health personnel. The hospital is well used and appreciated for the treatment of malaria, but antimalarials are also easily accessible over-the-counter. Besides the non-profit oriented pharmacy adjacent to the hospital, a number of further, private pharmacies have been operating since 1992 in the town, and offer a wide selection of pharmaceuticals. Chloroquine tablets, antipyretics and sometimes antibiotics can also be purchased in the many small shops all over Ifakara.

Parallel to the biomedical health care facilities there exist numerous traditional services. Alone for Ifakara Division, the official list of the Cultural District Office counts 63 traditional healers (*waganga wa jadi*, singular: *mganga*) (Matthies, 1998). The registration

process for healers is, however, difficult, and the real number certainly goes far beyond the official figure.

There are many different types of healers who practice in the community. The most renowned ones are the male and female diviners whose fame sometimes reaches far beyond Ifakara. Their principal domain is the protection and treatment of illnesses and other misfortunes associated with witchcraft and spirits. In Ifakara, most diviners practice spirit mediumship (*waganga wa mashetani*). Through burning incense, chanting or drumming, the healer invokes 'his' or 'her' spirits. Once they have arrived and possess the healer, they speak through the healer and reveal the deep cause of the problem, and its treatment, to the audience, which usually includes the healer's assistants, patients and their accompanying relatives (Gessler *et al.*, 1995a; Matthies, 1998). Less common, but equally respected, are the 'healers of the book' (*waganga wa kitabu*) who divine by using the power of the holy Koran, and the pure herbalists (*waganga wa mitishamba*) who diagnose on the basis of clinical manifestations. All these healers treat patients of different ages, although adults clearly predominate. On the other side, there are the numerous 'knowledgeable women' who specialise in locally recognised childhood illnesses. They are sometimes called 'healers of children' (*waganga wa watoto*), but people usually refer to them simply as 'grand-mothers' (*bibi*). They are mainly consulted by members of their family or mothers in the immediate neighbourhood.

Methods

The ethnographic field work was undertaken between April 1995 and March 1997. The first phase was an extensive collection of qualitative data in Lipangalala, a rural subvillage within Ifakara. We carried out a total of 81 in-depth interviews mainly with mothers of children under five years old. The selection of the interviewees was mediated by our local interpreter. Apart from questions about the recognition of malaria, and treatment practices, we included questions about health and illness in general. A prospective follow-up study with 10 mothers of children under five over a period of 7 weeks (total of 70 interviews)

provided further in-depth data on their understanding of malaria and related illnesses and on treatment-seeking for actual episodes. Furthermore, much information was gained about general aspects of illness perspectives and management through participant observation and informal conversations during 18 months living in the community.

In the same community of Lipangalala, we visited a total of 18 *waganga*: 10 diviners (three men and seven women), 2 herbalists (both men) and 6 *bibi* (see above). With most of them we had continuing contact, enabling us to explore their concepts of health and illness, observe healing practices and talk to their clients.

Based on the qualitative material, the second phase of our fieldwork consisted of the collection of quantitative data. In Lipangalala and the neighbouring community of Mlabani, we interviewed mothers of children under five using a structured questionnaire. We randomly selected 220 mothers, 110 in each of the two subvillages. Two trained local female field workers visited the mothers in their homes and interviewed them about malaria and related childhood illnesses. The mothers were asked in detail about treatment practices at home, the first therapy option and, in case of perceived treatment failure, second and third therapy options. Most questions were hypothetical in order to gain information about normal and normative behaviour and to comprehend the underlying ideas which guide people in their actions. We also included questions about the last malaria episode in order to know about actual behaviour.[1]

Medical Syncretism: Ways of Interaction

The intensive and long-term transmission of health information through various channels of communication has certainly led to a very good community understanding of malaria which corresponds largely to the biomedical model. A close look at the qualitative data revealed that biomedical information about malaria has not always displaced traditional ideas, but rather coexists with and has sometimes merged with pre-existing concepts.

Integrating new information is a dynamic process, which follows and is determined by particular modes of interaction. With regard to malaria, we identified three different

modes of how biomedical and traditional views coexist and interrelate. We shall call them 'accommodation', 'parallel coexistence' and 'complementary articulation'. They are described in the following, with a last section discussing their implications for treatment-seeking behaviour.

Accommodation

By 'accommodation', we refer to the fusing of traditional and biomedical ideas. We call it 'accommodation' when traditional elements are incorporated into or accommodated to biomedical messages. The examples illustrate how biomedical notions about malaria transmission, symptomatology and antimalarial therapy are explained on the grounds of traditional concepts and logics.

The Malaria-Mosquito Link

Nearly all respondents to the questionnaire (216) mentioned mosquitoes spontaneously as a cause of malaria, and the remaining 4 agreed to it after prompting. The causes for malaria mentioned by the mothers in response to the questionnaire are listed in Fig. 3. It is not surprising that, in a setting where the population has been exposed so intensively to health information, people are well aware of the malaria-mosquito link. In fact, the link is even present in everyday language, when people alternatively use *homa ya mbu* ('fever due to mosquitoes') for malaria. This is also the terminology used by health workers as can be seen in the Kiswahili teaching book for village health workers where *homa ya mbu* is synonymously used for malaria (Mkumbwa, 1983).

People's knowledge about malaria transmission goes further than the malaria-mosquito link. Scientific terminology, clearly reflecting the wording of health communication programs and school lessons, has been incorporated into the local discourse. For example, many informants referred to the malaria parasites by their scientific name *Plasmodium.* Generally, they were also aware that there are different types of mosquitoes, not all of which transmit malaria. Several informants, both men and women, were even able

to name *Anopheles* as the malaria mosquitoes, and correctly explained that only the females would bite, while another type they knew was called *Culex*. This knowledge did not, however, have any practical use, as people did not know anything about how to differentiate them or about their ecology, which were both considered to be 'experts' knowledge'. People did realise that the more mosquitoes there are, the higher is the risk of getting infected. In their view, the most dangerous places were the fields, and standing water near the houses, but by 'clearing the bushes' and 'keeping the environment clean', the risk could at least be reduced. 'Cleanliness' as a measure against malaria is an idea which has been strongly promoted in health campaigns, especially in the 1970s, and the expressions people use reflect the wording of government brochures of that time (see Mkumbwa, 1983).
The understanding that 'many mosquitoes mean high risk' has important implications for the use of bednets. On the whole, it is known that bednets are helpful for preventing malaria, but they tend to be seen as being of limited efficacy. As one informant (male, aged 76) put it:

> "The children sleep under a mosquito net. But in the evening, when [there are so many mosquitoes and] we are still talking outside, it is not easy to put them under the net."

While people are very familiar with the malaria-mosquito link, their knowledge is rather vague when it comes to the details of the mode of transmission. Only few informants had detailed knowledge of transmission from an infected to a non-infected person via the mosquito as a vector. Most people we asked were unsure about how the mosquitoes acquire the malaria parasites. A very frequent view was that the mosquitoes ingest parasites when they drink from the dirty water pools where they live. This is vividly described in the following quote:

> "The mosquitoes from the river suck clean water, unlike other mosquitoes [of standing, dirty water] which suck dirty water containing parasites. Once the mosquitoes have sucked them, they can vomit the parasites on a person's body and cause malaria" (female, aged 21).

Most likely, this notion is an inference from other health messages about illness-causing parasites which live in dirty water. Parasites, mosquitoes and dirty water are so

closely related in people's view that health messages about infectious diseases can easily be mingled. Also, the often heard explanation that malaria can be acquired through direct water contact see fig.3), either by drinking or wading through 'dirty water', points towards a distorted interpretation of messages about the prevention of, for example, amoebiasis or schistosomiasis. A 32 year-old male informant stated that "the health doctors explained that there are so many *vijidudu* (literally: small animals) in the water of the puddles that if you drink it you can get malaria". However, it is important to note that although these ideas are biomedically wrong, they do not have any negative implications for people's health. On the contrary, they may even be beneficial by encouraging behaviour that helps to prevent common water-borne diseases.

There is another interesting notion about malaria transmission where biomedical ideas fuse with traditional elements. While all the informants agreed that malaria cannot be directly transmitted from person to person, some mentioned an exception to this with regard to twins. For twins, they say, everything is shared and if one does something, the other will follow. They explained that if one twin falls ill of malaria the other will immediately contract it as well. People give as a reason that twins have the same body constitution and the same blood because they are from one and the same womb. Although anecdotal, this idea already indicates the importance of blood notions for illness susceptibility, which will be dealt with below.

Illness Progression and Malaria

Besides mosquitoes, some further, additional causes for malaria were mentioned. People commonly said that if somebody is exposed to 'hot sun' (see fig. 3) or 'hard work' (for adults, so it was not actually mentioned in the questionnaire) this can provoke malaria. In complete contrast to mosquitoes and 'dirty water', these two aetiologies are in no way associated with parasites which enter the human body. But their link to malaria becomes easily understandable when one considers them in the context of another traditional concept, which regards illness as a dynamic process of transformation from one stage to another. In this view, illness is a continuous progression of different phases that can follow each other. This was made explicit in the in-depth interviews where the informants explained that 'to

stay under the hot sun' (*kukaa juani*) and exhaustion due to 'hard work' (*kazi ngumu*)can provoke an excess of heat in the body, resulting in *homa* ('fever'). *Homa*, then, indicates the first stage of illness that eventually progresses into *homa kali* (high or fierce 'fever') out of which *malaria* and, if it is persistent or deteriorating, *degedege* ('convulsions') can develop. During the progress of an illness, each stage can thus be seen as the cause of the following one. This might explain why nearly all questionnaire respondents mentioned *homa* as an immediate cause of malaria, just as it is seen as a cause of any other febrile illness. Embedding malaria aetiology into this broader frame of illness progression permits us to understand how multiple causes mentioned by the population are associated with each other.
The logic of illness transformation, however, goes beyond the mere description of the course of illness. From the people's point of view, the development of illness transcends the boundaries of a single episode. They refer to illness as something which emerges, disappears and reappears in a different form, and progresses over years. This perception was clearly illustrated when we asked mothers about the last illness episode of their currently sick child. Instead of telling us, as we expected, about the last episode, a mother (aged 22) of a one and a half year-old child explained:

> "He got sick when he was three months old. It started with coughing and *homa kali*. With treatment, [the problem] stops after two to three days. He might be fine for a month, then it starts again."

In the local notion, the personal history of ill health is not a series of independent illness episodes. Rather, illness is regarded as a continuous transformation from one condition to the next, whereby single illness episodes are blurred.

Malaria, body strength and blood groups

People say that some persons have strong blood while others have weak blood. The local notion understands blood as the vital force which accounts for a person's body constitution. The strength of the blood refers to the physical and mental condition of a human being. A person with weak blood is typically somebody who is frail, calm, depressed or easily startled. But blood strength is also associated with one's state of health, whereby

having weak blood means being more prone to contract illnesses and to have less strength to recover. A disease like malaria which directly interacts with and weakens the blood is considered to be more dangerous for people with 'weak blood'.

Blood properties are determined by various factors. On the one hand, they are innate, referring to how a person is created by God. Women and especially children are considered to have naturally less strong blood and therefore to be weaker and more susceptible to illnesses than men. But innate also means the type of blood a person is given by God. The local concept of blood types is an excellent example of how biomedical elements of health information have been incorporated into people's lay discourse. For the classification of blood types, people even sometimes used the biomedical notion of blood groups. A diviner (female, aged 52 years) explained:

> "Sometimes, it develops to *degedege*, and sometimes it is normal malaria. This is due to the strongness of the blood. People with blood group 0 don't easily get acute malaria. Then there are [persons with] A, B, A+, B+. They are more easily attacked by *degedege*."

Age, sex and 'blood group' all determine the basic strength of a person's blood. On the other hand, blood strength can also temporarily be altered by external influences. Good nutrition, for example, was mentioned as having a beneficial effect. Men sometimes explained that beer makes one strong because it makes the blood boil. Or weather conditions may be associated with blood strength and illness susceptibility as explained by an informant (male, aged 24):

> "Malaria is very much related to cold weather. Your blood gets frozen. Maybe he [his son] was bitten at night and the cold pressed the *vijidudu* more inside the blood."

If somebody is severely frightened, this may also change his or her blood strength temporarily.

Parasites and Malaria Symptoms

People's enumeration of malaria symptoms largely overlaps with medical descriptions (see fig. 4). Yet community understanding of how these symptoms arise and relate to each other provides an excellent example of how biomedical knowledge can merge with local notions about illness.

The qualitative data show how concepts about the movements of parasites inside the body relate the three symptoms cited most often in answers to the questionnaire - *homa*, vomiting and convulsions - to each other. In the in-depth interviews, parasites were portrayed as circulating through the body and to 'attack' the blood. The battle between the parasites and the blood is made perceptible with the appearance of 'fever' (*homa*). The idea of the battle comes metaphorically close to the scientific explanation of an immunological reaction. In people's interpretations, however, a link was made between susceptibility and blood strength, and thus to innate or externally influenced blood properties (see above) rather than to a state of acquired (semi-) immunity against malaria. They explained that if a person's blood was strong, the parasites could be more easily combated while a person with weak blood would be more severely affected by malaria.

In the local model of malaria, parasites are transported through the blood vessels to different parts of the body, mainly to the stomach. The accumulation of parasites in the stomach is perceived to provoke severe pains in the abdomen, and vomiting. Informants usually referred to this form as *malaria ya tumbo* or 'stomach malaria'.[2]

The terms and ideas people use for describing the movements of parasites inside the body show parallels to notions about witchcraft that are more than incidental. In both cases, external agents (parasites and 'poison' of witchcraft) are introduced into the body, either by mosquitoes or by witches. Even more explicitly, parasites in the blood are sometimes referred to as 'poison'. Furthermore, it is said that both parasites and the 'poison' of witches make the blood 'dirty' (*chafu*) and in both cases, the circulation carries the polluted blood to one part of the body, typically the stomach. This analogy has important practical implications. Just as vomiting is seen as a sign of cleansing the body from the 'poison' of witchcraft, it is perceived as reducing the severity of malaria and thus as evidence of improvement. As one informant (male, aged 73) explained:

> "If you vomit yellowish, you have decreased the power of malaria. It depends on the strength of the blood. If the strength of the blood is higher than that of the parasites, you vomit yellowish. This is a way to reduce parasites."

Informants recounted that if malaria remains uncontrolled, parasites may continue spreading through the blood circulation until they reach the head, provoking convulsions and in severe cases loss of consciousness, mental disturbance and death. People often described this form as 'malaria of the head' (*malaria ya kichwa*) or 'malaria has gone up to the head' (*imepandwa kichwani*).

Parallel co-existence: malaria and *degedege*

Here, 'parallel co-existence' means that biomedical knowledge has penetrated into the traditional model but has neither displaced its core notions nor merged with them. *Degedege* serves as an exemplary case of this.

Maybe one of the greatest achievements of health information in the area is that, unlike in many other areas of Africa (see Introduction), the population has incorporated convulsions into their model of malaria. However, convulsions are also associated with a traditional, extremely feared childhood illness called *degedege*. Fig. 5 and fig. 6 show causes and symptoms of *degedege* mentioned by the mothers in response to the questionnaire. The symptoms of *degedege* listed by the respondents closely correspond to what could be severe or cerebral malaria, including fever, convulsions, uncontrolled movements of the eyes, stiffness of the body and shivering.

Almost all respondents linked *degedege* to malaria. But at the same time, they also mentioned a certain moth - itself called *degedege*, and zoologically identified as *Nudaurelia zambesina* - as a cause of *degedege*. In the interviews, informants narrated that usually at dusk this moth flies near to the houses and attacks children. In the account of one informant (female, aged 47):

> "The moth enters the house for finding mosquitoes, then it flies around and spreads the flour [of its wings] inside the room. The child can so be attacked by *degedege*."

The double causality of *degedege* - malaria and the moth - in people's narratives displays to a certain degree the dynamic process of integrating new knowledge into local discourse. In the case of *degedege*, health messages which put particular emphasis onto the severe consequences of malaria have found their way into people's models. This information has not, however, displaced the traditional concept of the moth. Rather, to the population, and often to the same persons, *degedege* signifies both a particular stage or manifestation of malaria and a traditional illness inflicted by a moth.

Complementary articulation: malaria and witchcraft

Medical syncretism in the area is most clearly illustrated by the interdigitation of malaria and witchcraft. A detailed description of how during the course of illness ideas about witchcraft can complement the biomedical concept of malaria has been published elsewhere (Hausmann Muela *et al*., 1998).

Typical indications which point towards the malevolent actions of witches are mental confusion, barrenness, abortions or repeated bad luck. However, the peculiarity of witches is that apart from causing these specific ill fortunes, they are able intentionally to provoke any kind of illness manifestation or other misfortune. This makes the presentation of illness ambiguous as the clinical picture does not provide evidence about the origin of the problem. One way of finding out about it is through treatment, as illustrated in the following conversation between the interviewer (I) and a 28 year-old woman (W):

I: Can all diseases be treated at the hospital?

W: Some can be treated, especially those coming from God.

I: Which diseases come from God?

W: For example, normal *homa*, diarrhoea, malaria, all of which can be treated easily. But other diseases are caused by persons who want to torture others.

I: For example?

W: For example *homa* that never stops and any disease which doesn't get successfully treated at the hospital.

Informants explained that witches particularly like to 'play' with malaria because, since it is so common in the area, a person will be misled by its manifestations and (unsuccessfully) try to treat the illness at the hospital.

Two different ways in which malaria and witchcraft can interact were described by the people we interviewed. In the first, witches are said to create 'fake' malaria by indistinguishably imitating its symptoms. Thus the illness 'looks like' malaria, but in fact, has nothing to do with malaria; malaria and witchcraft are, so to speak, two possible, but exclusive explanations for the same appearance of illness. In the questionnaire survey, as many as 73% agreed that malaria symptoms can be imitated by witchcraft.

In the second interpretation, the two aetiologies are syncretically linked with each other. According to the informants, witches can interfere with 'normal' malaria by 'hiding' the parasites, making them invisible in the blood and thus undetectable at the hospital. This interpretation was shared by 62% of the questionnaire respondents. The core that underlies the syncretic explanations lies in people's deep faith in the effectiveness of biomedicine for treating malaria. People have continuously been told and profoundly believe that malaria is curable with western medicine. In their eyes, the hospital with its sophisticated technical instruments and highly trained experts is (almost) infallible. Hence, if the hospital is perceived to fail either with diagnosis or treatment (once, twice or more times), the logical interpretation could be that the problem is possibly not malaria. In this case, the notion of witchcraft, and even more in its syncretic combination with malaria, provides an interpretation for events where biomedical explanations fall short. In this sense, beliefs in biomedicine and witchcraft, rather than being contradictory concepts, not only complement but actually reinforce each other.

Treatment behaviour for malaria and implications of medical syncretism

Local people most probably heard first of 'malaria' at the turn of the century, when the missionaries established the first schools and health facilities in the region. Although the term has been entirely integrated into the local vocabulary, for the local people 'malaria', and the scientific information linked to it, still have an external character. This is made explicit when people state that 'malaria' is something which 'they' or 'people of your sort' (*wenzako*) know about, referring to medical experts, be they foreigners or locals. They oppose 'their/external' or 'biomedical' notions to 'our/own' or 'traditional' notions. Knowledge provided in health messages and biomedical institutions are usually welcomed and well accepted by the population.

Malaria, perceived as an 'external' illness, is very much linked to biomedicine. Even though nearly everyone knows medicinal plants for malaria - usually the informants mentioned *mwarubaini* (sp.), a tree abundantly growing near the homesteads of which it is commonly said that it cures 40 (*arobaini*) diseases and is used for treating fevers - people clearly prefer biomedical treatment to traditional medicine at any stage of the illness. Only one mother among the questionnaire respondents said she (usually) treats malaria with local herbs, and only 2 said they had actually used them in the last illness episode. A few informants stated that as a domestic treatment, they might occasionally use herbal remedies, above all if working on their fields where no pharmaceuticals were available, or if they could not afford them.

What the mothers said they would do at home corresponded closely to what they were told they should do by health messages. 75% stated they would give antipyretics and 65% sponge the child. Almost every fourth mother (24%), however, said she would administer chloroquine at home and 16% answered said that they had done so in the last episode. Although domestic use of antimalarials is not promoted by official health programmes, there are many reasons for people to treat themselves at home. Not only is it much easier to purchase antimalarials in the numerous small shops all over the community than to travel to the health facilities and wait for attention, but people are also so experienced with malaria and malaria treatment that they often prefer to try at home first and only to seek professional

help in case of failure. Moreover, the omnipresent advertisements of private drug companies on the radio, in shops and in newspapers certainly encourage people to buy and use antimalarials without medical prescription.

Informants most explicitly linked malaria to treatment at the hospital, mainly because there they have microscopes for blood examination and drips. In the questionnaire survey, all but one mother, who preferred to consult a traditional healer, mentioned the hospital as their first health care option for treating malaria.

While basic treatment-seeking patterns for malaria follow the messages people are given, certain reported behaviour can only be understood in the context of medical syncretism.

Accommodation

Informants often mentioned that they have to 'cool down' symptoms in order to reduce the disease to a less severe stage. For example, they said that *degedege* should first be converted into 'normal malaria' before strong treatment (injections or a drip) could be applied. Therefore, home treatment for *degedege* is perceived to be a 'first aid' (*huduma ya kwanza*) in order to cool down the child's body, as a preparation for attending the hospital. This perspective clearly relates to the concept of illness progression. Cooling down was seen as an important measure in order to slowly bring down an illness to a milder level and so to avoid a (potentially mortal) clash between strong treatment and strong illness.

Furthermore, the notion of blood properties and blood strength may also have implications for treatment choice. Medications, it was said, have to 'agree' (*kukubali*) with one's blood. One informant said he would always use chloroquine tablets for treating malaria because this was the treatment which 'agreed' with his blood and would therefore never fail. Whether a treatment 'agrees' with one's blood also depended on the strength of the blood. Several informants stressed that a person whose blood was very weak needed to be careful with applying 'strong' medicine. For example injections, although they were considered more powerful and quicker in effect than tablets, were perceived as dangerous if applied to a weak body. One healer explained that he would administer herbal remedies which would give a person strength before or after hospital treatment. Sometimes, and if it was affordable,

people would drink a red manufactured syrup in order to 'increase blood strength' for better recovery after treatment.

Maybe most critical with regard to people's health is the idea that vomiting is a sign of relief. This perception may have severe consequences for treatment compliance. Interpreting that through vomiting the body is expelling parasites, the patient may not see any need to go to the hospital or continue with antimalarial treatment.

Parallel Coexistence

Although people link *degedege* to malaria, they do not follow the treatment pattern for malaria. Unlike for malaria, whose treatment is entirely biomedical, a child attacked by *degedege* is typically first treated traditionally at home or by a knowledgeable woman (*bibi*), and subsequently taken to the hospital. Traditional practices include above all urinating on the child (41%) and herbal remedies for bathing and drinking (35%). Less frequently mothers mentioned using their sanitary towel for menstruation to wave over the child's body (12%) or elephant dung (6%) to rub on it. Elsewhere (Hausmann Muela & Muela Ribera, 2000) we have suggested that the traditional domestic treatments are deeply rooted schemas symbolically linked to the aetiology that a moth is responsible.

Traditional practices can easily be used by the mother at home or by a *bibi*. They are, however, mainly considered as 'first aid', above all enabling the mother to react quickly. But it would be a mistake to conclude that the traditional concepts hinder a person from attending the hospital - in fact, most respondents (93%) regarded the hospital as the preferred health facility to opt for after home treatment. Home practices are only problematic insofar as they can result in temporary mitigation, and therefore interfere with the perception of emergency.

Complementary Articulation

The syncretic explanation of malaria and witchcraft provides the underlying logic of the frequently-observed movement from biomedical to traditional treatment modalities. Patients with a malaria-like symptomatology usually first try hospital treatment; but if symptoms persist, reappear or become inexplicably aggravated, suspicion of malevolent actions of witches may arise, for which only a diviner can provide information and treatment. In the questionnaire survey, 61% of the respondents answered that if there was no improvement after once or twice attending the hospital they would seek help from a *mganga*. Since witchcraft is a serious matter and usually implies the participation of an extended kin-group (Hausmann Muela *et al.*, 2000), people would normally try several times at the hospital before deciding to consult a traditional healer. However, even if traditional assistance is sought *after* biomedical treatment, this may still be a source of delay in seeking further hospital care. From a biomedical perspective, what people may perceive as 'hospital failures' and reinterpret as interventions of witches might be illness relapses due to reinfections, parasite resistance or inadequate/incomplete antimalarial treatment, and therefore require a return to the hospital.

Conclusions

In their book on health promotion, Downie *et al.* (1998) called attention to the difference between 'comprehension' and 'interpretation'. Writing about the communication process, the authors pointed out that interpretation is influenced by what they call a person's 'thinking framework' and that "'messages' must be couched in an appropriate way, based on a knowledge of a patient's background and thinking framework" (p.47).

The study of medical syncretism reveals most clearly that even if health messages are well understood by the population, the meaning given to them may considerably differ from what health promoters intended to transmit. A prime example of this is the analogy between the accumulation of malaria parasites in the stomach and the poison of witchcraft. While people comprehend that vomiting is a manifestation of malaria, they interpret it as a sign of

improvement, a perception which may have fatal consequences since repeated vomiting may actually indicate an evolution from uncomplicated to severe malaria.

The interdigitation of malaria with witchcraft shows the distinction between comprehension and interpretation and its consequences for behaviour even more poignantly. In most respects, the community perspectives on malaria closely correspond to biomedical ones. But an interpretation of malaria in terms of witchcraft becomes probable if biomedical treatment does not provide the expected outcome. On the one hand, this interpretation indicates that the population has not been made sufficiently aware of the existence of parasite resistance and of the possibility of relapses due to inadequate or inappropriate treatment. On the other hand, however, our findings also suggest that this interpretation has been fomented by health messages which overemphasised the 'infallibility' of biomedical treatment for malaria, and therefore leave no room for a biomedical explanation of treatment failure.

The divergence of comprehension and interpretation, moreover, raises important methodological issues. While comprehension of health messages can be studied in questionnaires, interpretation needs to be ascertained with qualitative enquiries. As we have shown, questionnaire results may come to the conclusion that people have good comprehension of cause, symptoms and treatment of malaria, but in-depth information reveals that the interpretation diverges in important respects from the biomedical model. Notably, the opposite can also be the case, i.e. an apparently insufficient comprehension by the respondents may turn out to be a misinterpretation by the investigator. An illustrative dilemma with which we were confronted during the field work is the example of 'dirty water'. People frequently mentioned that malaria can be caused by 'dirty water', which is of course not correct. But when we prompted them, they often explained that "this is where many mosquitoes live". In the questionnaire, we therefore specified our question and asked explicitly whether drinking or wading through 'dirty water' can cause malaria.

In this article, we have presented the interactions between biomedical and traditional knowledge and their consequences for treatment as they occur in one area in Tanzania. While every other region will show its own particular picture, depending on the history of biomedical presence and traditional concepts, we can assume that similar relations and syncretic articulations will be found. Knowing them permits us to understand to some extent

the basic logic that underlies treatment-seeking behaviour, and thus to understand the dynamics of how information is processed by the population. This is certainly valuable for health promotion as it provides practical orientation for adapting programmes specifically to the local context.

Notes

[1]A copy of the questionnaire and question-guides for the interviews can be obtained by the corresponding author.

[2]The terms *malaria ya kichwa* and *malaria ya tumbo* have also been identified for the same region by Gessler (1995b) and Matthies (1998) who described them as different types of malaria.

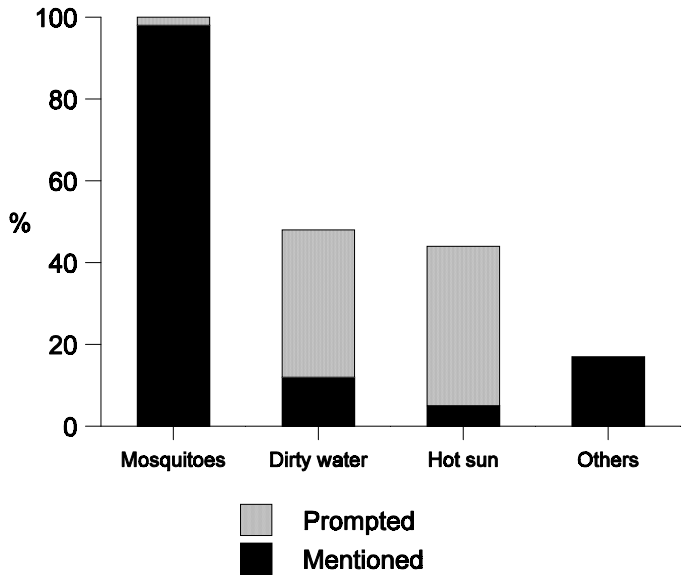

Fig. 3 Causes of malaria mentioned (or mentioned when prompted) by the mothers in response to the questionnaire (N=220).

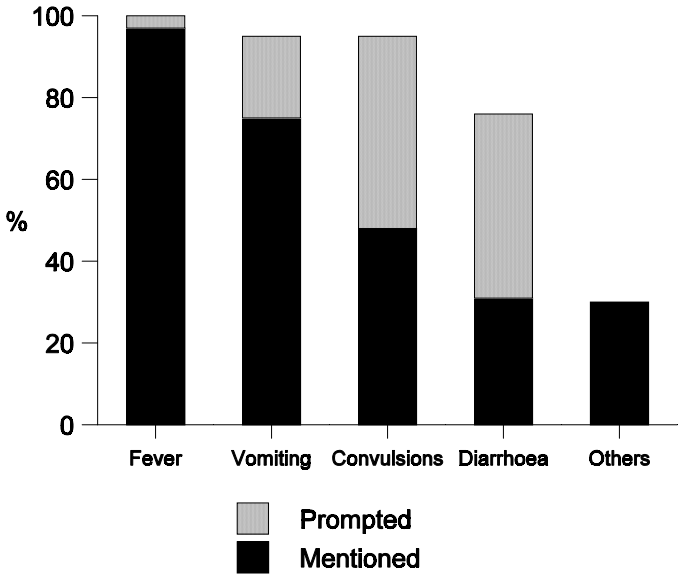

Fig. 4 Symptoms of malaria mentioned (or mentioned when prompted) by the mothers in response to the questionnaire (N=220).

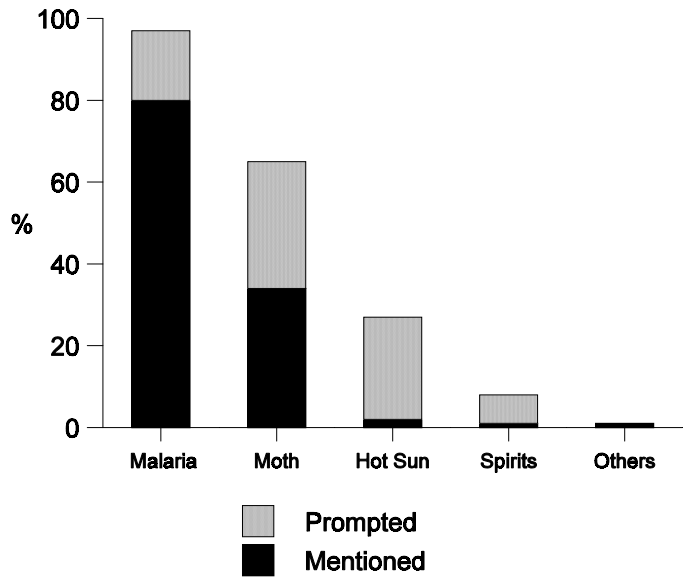

Fig. 5 Causes of *degedege* mentioned (or mentioned when prompted) by the mothers in response to the questionnaire (N=220).

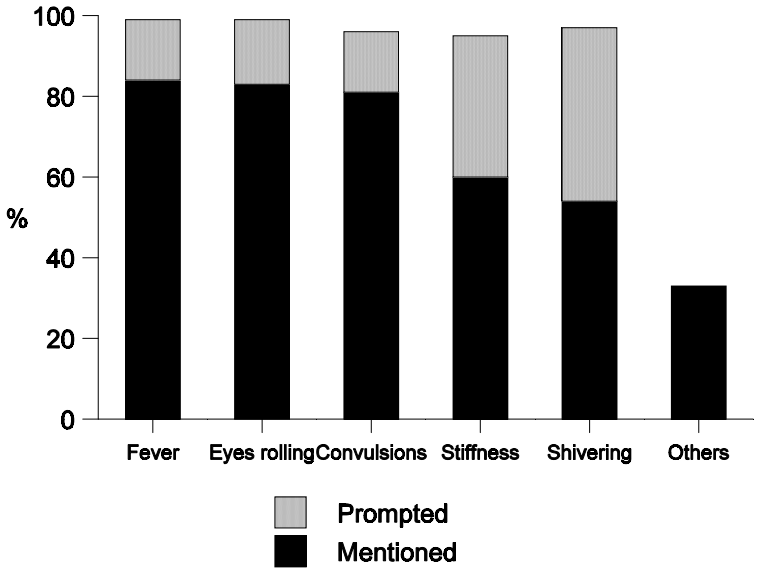

Fig. 6 Symptoms of *degedege* mentioned (or mentioned when prompted) by the mothers in response to the questionnaire (N=220).

Fake malaria and hidden parasites - the ambiguity of malaria

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Abstract

Lay perspectives and health-seeking behaviour for malaria were investigated in an ethnographic study carried out in a village in Southeastern Tanzania. The inhabitants have easy access to hospital services and education programmes, and as a result, biomedical knowledge on malaria is comparatively high. However, the cultural model of malaria does not always explain all the events that occur during an actual illness episode, e.g. when the disease cannot be detected at the hospital or the symptoms persist despite antimalarial treatment. Under these circumstances, the model of malaria may be complemented with the logic of witchcraft. This can lead people to consult sequentially both biomedical and traditional health services for the same illness episode. The consequences can include non- compliance with treatment or delay in seeking diagnosis or treatment. Our analysis offers elements for the understanding of aspects of the dynamics of reinterpretation and health-seeking behaviour for malaria, particularly in the phase *after* diagnosis and treatment at a biomedical health facility. The research is presented with an applied perspective. We propose specific recommendations that could be discussed with health promoters.

Introduction

In the tropics and subtropics, malaria remains one of the principal infectious diseases, and has an immense health impact. The figures speak for themselves: world-wide, 300-500 million persons fall sick and 1.5-2.7 million die from malaria per year (WHO, 1994). In Africa alone, an estimated one million deaths result from the disease annually, primarily among children under 5 years old (Gomes & Litsios, 1993).

Malaria morbidity and mortality can be substantially reduced with prompt and adequate treatment. In recent years, great emphasis has been placed on investigating sociocultural factors that influence health-seeking behaviour for malaria (Tanner & Vlassoff, 1998), in particular in understanding the reasons for delay in attending health facilities. Since the roles of patients' and caretakers' illness perceptions are an essential factor in deciding where and when professional help is sought, knowledge of the cause, symptoms and treatment of malaria has been extensively studied (Aikins *et al.*, 1993, 1994; Agyepong, 1992; Gessler *et al.*, 1995; Hongvivatana, 1985; Jackson, 1985; Kengeya-Kayondo *et al.*, 1994; Lipowsky *et al.*, 1992; Makemba *et al.*, 1996; Mwenesi, 1995; Ongore *et al.*, 1989; Ramakrishna *et al.*, 1988-89; Winch *et al.*, 1996). In various communities, researchers have identified local terms for illnesses that overlap to a large extent with the biomedical concept of malaria (Agyepong, 1992; Gessler *et al.*, 1995; Kengeya-Kayondo *et al.*, 1994; Makemba *et al.*, 1996; Mwenesi, 1995; Ramakrishna *et al.*, 1988-89; Winch *et al.*, 1996). At the same time, in many areas severe manifestations, namely cerebral malaria and anaemia, are excluded from most models of malaria and are often associated with 'supernatural' causes, requiring treatment by traditional healers (Makemba *et al.*, 1996; Mwenesi, 1995; Winch *et al.*, 1996).

Previous studies of malaria perception emphasised the importance of early identification of malaria symptoms by the population, and centred on the health-seeking process from the onset of symptoms until the first attendance at a health care service, in order to detect possible lacunae in knowledge that contribute to delay. However, especially in areas where there is chronic malaria, drug resistance or high reinfection rates, a single consultation at a biomedical health facility does not necessarily result in a complete cure of malaria. The dynamics of health-seeking

for malaria and the possible causal reinterpretation when the disease persists or reappears *after* attending a biomedical health facility do not seem to have been investigated in detail.[a]

In turn, the process of interpreting and reinterpreting illness in general and the labyrinthic health-seeking path for searching for explanations and relief has been portrayed in a series of studies on African medical pluralism (Good, 1987; Janzen, 1978). The observation that illness can be associated with various causes, excluding or complementing each other, is the corner-stone for understanding successive (re)interpretations of illness as a logical and contextualised process of 'choosing' among possible causes (Fassin, 1992). Establishing and negotiating diagnoses involves different types of specialists as well as the 'therapy management group' (Janzen, 1978).

It has been suggested that in chronic or fatal illnesses, when symptoms change abruptly or when treatment does not provide the expected results, suspicions of witchcraft or spirits can emerge (Good, 1987; Mallart, 1983; Pool, 1994). Feiermann has pointed out that "in many cases, illness episodes which are interpreted as 'natural' at an early stage are later explained in terms of sorcery or spirit causes" (1985, p. 77). In areas where biomedical facilities are well accessible and biomedicine is usually the first therapy choice for 'natural' illnesses (Good, 1987; Velimirovic, 1990), the suspicions of evil forces may arise if the illness fails to respond to biomedical treatment (Good, 1987). The reinterpretation of illness from 'natural' to witchcraft or spirit causes can mark the turning point for moving from biomedical to traditional health care providers.

We assume that in the area studied, relapses or reinfections of malaria similarly tend to be reinterpreted in terms of witchcraft. In particular, we are concerned with how, in people's explanations for illness, notions of witchcraft are interwoven with knowledge of the biomedical cause of malaria, and in what way the sequential or complementary use of these concepts affect the dynamics of health-seeking.

Study setting

The study was conducted in Lipangalala, a semi-rural village adjacent to the rural town Ifakara in the Kilombero District, Southeastern Tanzania. The Kilombero Valley is a broad flood plain where malaria is highly endemic and perennial (Tanner *et al.*, 1991). Hospital records indicate that malaria is the most commonly diagnosed disease (Kahigwa, *et al.*, 1993) and the leading cause of mortality for children under 5 (St. Francis Designated District Hospital). The inhabitants of the area have participated in a series of malaria research programmes (Tanner *et al.*, 1994).

Records of intensive movements of populations into the Kilombero Valley date back to the middle of the last century (Brantschen, 1953) and the flow of immigrants continues until the present time. The people who have settled belong to over 30 different ethnic groups (Schaer, 1985). The predominant ones in the community under study are the *Wandamba*, *Wapogoro* and *Wambunga*. Around 70% are Christians (mainly Roman Catholics) and 30% are Muslims. Lipangalala, with an estimated population of 3'000 inhabitants, is one of the economically poorest communities in the area around the town of Ifakara. Subsistence farming is the major economic activity, although an increasing number of villagers are engaged in petty trading and small-scale market gardening.

A variety of health care services are available in or at a short distance from the community. The Ifakara District Hospital, built in the 1950s by Swiss missionaries and located on the edge of Lipangalala, is the main source of biomedical health care. In private town pharmacies, a broad selection of pharmaceuticals is available, and in most small shops of the community antimalarials and other drugs can be obtained without prescription. The 'folk' sector, in the community of Lipangalala alone, comprises an estimated 20 well-known male and female traditional healers and an unknown number of old women who specialize in childhood illnesses and attend patients in the immediate neighbourhood.

Methods

Qualitative and quantitative data were collected within a period of 18 months between April 1995 and March 1997, during which time at least one of the investigators was living as a participant observer in the community. The language used for data collection was Kiswahili.

In a preliminary phase, we used focus group discussions (FGDs) in order to gain insights into knowledge about malaria and related illnesses and health-seeking behaviour. A total of six FGDs were conducted, four in a hospital setting with adult malaria patients and caretakers of children under 5 and two in a community setting with mothers.

With the aid of a local collaborator who facilitated the contacts to the community and assisted the interviewers in both literal and cultural translation, we carried out 81 in-depth interviews with Lipangalala villagers in their homes (including adults of both sexes, but mainly mothers, and all ages). The conversations covered a broad spectrum of issues about health and illness in general, including economic and social aspects.

In a prospective follow-up study of ten households with two or more children under 5 we investigated knowledge about malaria and health-seeking behaviour for actual illness episodes. Over a period of 7 weeks, each household was visited on a weekly basis and the mother of the sick child was interviewed.

Based on the qualitative information, we designed a structured questionnaire for collecting numerical data on knowledge and health-seeking behaviour for malaria. Using a two stage cluster sampling approach, 110 mothers of children under 5 in Lipangalala and 110 in the neighbouring community were randomly selected and interviewed at home by two trained local field workers.

A total of 12 traditional healers (5 men and 7 women) from the community were interviewed. Three of them we visited once (3 interviews), while with nine we had continuing contact, enabling us to gain insights into their healing practice and concepts of health and illness through observation and repeated interviews (31 interviews). Over a period of 2 weeks, we attended healing sessions at a healer's establishment where we obtained information through observation and a series of informal interviews with the healer, her patients and their relatives.

Local knowledge about malaria

The local model of malaria mainly consists of elements derived from the biomedical model, although the two are not entirely congruent. Throughout the paper, we have written 'malaria' in italics when we specifically refer to the local model.

The inhabitants of Lipangalala have been exposed to health education for more than 20 years, starting with the extensive *Mtu ni Afya* national campaign in 1973. The nearby District Hospital, appreciated by the local people especially for treatment of malaria, is the main site of health promotion activities. It is therefore not surprising that the population has a good biomedical knowledge of malaria transmission, concisely illustrated by the following account:

> "I don't know where the mosquitoes first get the parasites from. This is not easy to know. But when a mosquito bites somebody with malaria, and then bites another person, then malaria can be transmitted."

In the questionnaire, 98% mentioned (without prompting, 100% with prompting) mosquito bites as the cause of *malaria*. Some respondents, however, also referred to other modes of transmission, namely drinking or wading through dirty water (12% and 48%, respectively) or being exposed to 'intensive sun' (*jua kali*, 5% and 44%, respectively).

Malaria is felt to be a common, everyday illness that means a big health burden to the whole population. Nearly everyone in the community has already experienced malaria episodes him- or herself. The most frequently reported symptom for *malaria* is *homa*, which literally translated means fever. However, the notion of *homa* has a broader meaning and is also commonly used for expressing general malaise or diffuse body pains. An analoguous meaning of *homa* has been described in detail in other studies in Tanzania (Winch, *et al.*, 1996) and Kenya (Beckerleg, 1994; Mwenesi, 1993). *Homa ya malaria* (malaria fever) is felt to be a recurrent disease of the rainy season. During this period, when the hot and wet weather conditions favour mosquito breeding, people tend to identify *homa* with malaria, while during the dry season, *homa* is more likely to be attributed to hard work, exposure to the cold or to intensive sun (Winch, *et al.*, 1994).

While *homa* is mandatory, a broad range of other signs and symptoms are enumerated as manifestations of *malaria,* and these include severe headache, joint pains, chills, yellowish vomiting, diarrhoea, stomach ache, convulsions, general body weakness, loss of appetite, 'the child does not play' and dizziness. Although malaria often presents in a mild form, people are well aware of its possible severe consequences, especially in children. In the questionnaire, practically all mothers (99%) affirmed that if untreated, the child can die of *malaria*, and 87% stated that death can occur within hours or a few days. Complications of malaria are recognised as such, but are nevertheless also included in the interpretative model of two common 'folk illnesses' of children, *degedege* (convulsions) and *bandama* (splenomegaly and severe anaemia), which will be described in detail elsewhere.

Treatment of *malaria* with pharmaceuticals is clearly preferred to home treatment with local herbs or traditional therapies. Administration of western drugs in the home is widely practised: 81% of the respondents said that they would first treat their child with antipyretics or antimalarials before attending the hospital compared to only one mother who stated that she would give local treatment. Only a single respondent mentioned the traditional healer as her first therapy choice for a child suffering from *malaria*. Even the healers, although they know a selection of herbal remedies for malaria (Gessler, 1995), generally agree that biomedicine has better means to treat an episode.

Issues of health and illness are of major concern to people and are extensively disussed in everyday conversations. In their accounts, people habitually speak of *malaria* as a 'normal illness' (*ugonjwa wa kawaida*) or an 'illness of God ' (*ugonjwa wa Mungu*). Used in this context, the term 'normal' (*kawaida*) does not refer to the high prevalence nor to the grade of severity of the illness, but expresses that such an illness belongs to the natural order created by God. 'Normal illnesses' clearly exclude any ailments resulting from intentional actions of witches (*wachawi*) or spirits (*mashetani*). Describing two types of *homa*, a traditional healer explained:

> "There is *homa* ('fever') from God which is malaria. This is easy to be treated. Another type of *homa* can be caused by spirits. This type is very difficult to treat and it comes time after time."

The witches' crafts

Belief in witchcraft (*uchawi*[b]) is widespread in Tanzania despite a long history of anti-witchcraft campaigns (Green, 1994; Mesaki, 1994). In Lipangalala, plenty of fictional and lived stories circulate, forming part of everyday conversations. There is hardly anybody who does not believe in witchcraft and most informants affirmed that they have been in contact with it, either directly or indirectly as victims or as a result of being accused of performing it.

Witches are male or female adults who have acquired the skill of creating calamities which they use intentionally to harm others. Many witches are said to be found among the traditional healers (*waganga wa jadi*, singular: *mganga*), since a person who has the power to heal has also the power to harm. The healers, when referring to themselves, claim that they would never act as witches even if they could, but recognise that there are other healers who do sell their evil practices clandestinely to clients.

The most commonly cited motives for harming are related to jealousy and hatred. Thus witchcraft suspicions and accusations usually occur among neighbours, friends or relatives. An attacked person can be struck by any kind of affliction such as illness, bad luck, barrenness, abortions and other misfortunes.

The witches' work is occult; they act secretly at night when they are invisible to ordinary people and victims are more vulnerable. A common practice of witchcraft is to apply poisonous substances, usually plant extracts, which can either be put into food and drinks or placed on roads and homesteads. A witch can also prepare a concoction by boiling toxic leaves and roots and blowing the vapour in the direction of the person to be afflicted. A different form, particularly feared, is when specially skilled witches use the power of evil spirits. It is said that some people have the power to keep and control *majini* (bad spirits) which can be sent to the victim with sinister intentions. These witchcraft attacks are perceived to be very serious since the spirits are sent to destroy the victim's life existence and ultimately to kill. The evoked affliction does not necessarily manifest itself in the targetted person him- or herself but may appear in any close family members, bringing misfortune over the entire homestead. While it is said that children cannot be posessed by *majini*, they are the most frequent indirect victims falling ill when a parent

is attacked. The *majini* are capable of provoking an immense diversity of symptoms, thus imitating any 'normal' illness.

The traditional healers have the skills to detect witchcraft through spirit-mediumship divination (*kupiga ramli*) and to treat it by performing cleansing rituals where a variety of herbal remedies are applied. The healers also have the power to protect their clients from witchcraft by preparing charms and amulets *(hirizi)* or placing 'medicine' on the ground of the homesteads to contravene the evil effects. People spend considerable amounts of their wealth to safeguard themselves, their families, the household and the fields. The protection is often only partial, especially if the witch is extremely powerful, or it can lose its effectiveness, in which case it has to be renewed. Once somebody is attacked by powerful, sent spirits, the healer is usually only able to 'cool them down' and protect against new attacks.

While for 'normal illnesses', like *malaria*, people generally state that the 'Europeans' have better medicine, in cases of witchcraft, the 'hospital people' cannot help in any form. Indeed, it is felt that treatment with western medicine is not only inadequate, but can even aggravate the condition of the patient.

Rethinking illness: the ambiguity of malaria

As already noted, people have a clear concept of cause, symptomatology and treatment of *malaria*. However, in actual illness episodes, they are confronted with the ambiguity of malaria. Firstly, because the symptomatology of malaria itself is inherently ambiguous. The manifestations of malaria are variable and its symptoms often diffuse, making a differential diagnosis based on the clinical presentation difficult. Secondly, because absolutely identical symptomatologies can be equally well explained using different interpretative models that coexist in the local cultural repertoire, i.e. '*malaria*' and 'witchcraft'. This makes a causal attribution based on the observation of symptoms impossible. The question then is which interpretation is 'selected' among different possibilities? With the onset of *homa (*'fever'), the most usual interpretation is initially to think of a common and 'normal' illness (usually *malaria*),

treatable with pharmaceuticals. People explicitly recognize this association, but as a first orientation only. They can by no means be certain of it before the disease is diagnosed and successfully treated by a specialist. In the words of one informant:

> "First you have to go for examination (at the hospital). If they detect anything wrong, they can treat it there. It is a matter of trying. If they don't find anything, I decide to go to the *mganga*."

Other possible interpretations - in our analysis we only focus on those related to witchcraft[c]- set in when the model of *malaria* does not provide satisfactory explanations for all events that occur during illness. In filling in the gaps, people call upon available knowledge which transcends the limitations of the model, as will be described below in the section on the dynamics of illness reinterpretation.

During the course of the illness, suspicions of witchcraft may emerge in cases where the symptoms persist or reappear or when the illness is inexplicably aggravated. Characteristic indicators for witchcraft are when the disease cannot be detected at the hospital, or when antimalarial treatment does not provide the expected relief. Suspicions are reinforced when unusual signs, indicating the probable intervention of witches, coincide with the development of the disease. This is illustrated by the account of a mother who one morning found her son with high fever and noticed peculiar scratches on his skin. These she interpreted as the marks of the witch's claws left behind after the attack.

Since illness experiences are inextricably embedded within people's lifeworld, rethinking illness takes place within a broader situational framework. Speculations about malevolent intrusions mainly arise in the context of social conflicts, when a series of misfortunes in the family occurs or when somebody already has a long history of witchcraft experiences (cf. Mair, 1969; Gonzalez Echevarría, 1984). The following case gives an example of how existing social tensions result in witchcraft accusation after illness has not responded to hospital treatment.

The informant had lived together with her husband for several years. When she was pregnant with her sixth child, her husband left her and went to live with another partner. After the child's birth, however, he decided to return to his wife and to take care of his family. This, in turn, upset the mother of the abandoned girl-friend, who wanted him to get separated from his

wife and to marry her daughter. From then on, the wife and the annoyed mother were in constant conflict. One day, the child fell seriously ill and was admitted at the hospital with severe malaria. Despite two weeks of hospital treatment, the child did not recover. The informant decided to ask for advice from a *mganga*. There, she was told that her child was not suffering from malaria, but was bewitched by the mother of her husband's former girl-friend. The *mganga* successfully treated the child and protected him from further attacks of the witch.

Dynamics of illness reinterpretation: exclusivity and complementarity

In her analysis of the diversity of understanding health and illness, Stainton Rogers (1991) noted that for interpreting illness, people have access to and use *alternative* explanations which compete within a culture. She argued that the way to make sense of illness experiences is "a process of making explicit, at any precise point in time, one from a number of co-existing complementary explanations" (p.9). In the study community, *malaria* and witchcraft are two distinctive models for understanding illness. The informants stated that witchcraft can never directly cause *malaria*. However, witches are believed to be able to 'play' with the disease. In people's narratives of affliction, the cultural model of *malaria* is linked to the strategies of witches according to two different dynamics of illness reinterpretation. The first we shall call 'exclusivity', the second 'complementarity'.

Exclusivity

In the interviews we observed that, apart from distinctive manifestations, such as epilepsy or mental disturbance, people ususally think of illness as something 'normal'. A reinterpretation of illness takes place when its aetiology is reconsidered and an *alternative* one is substituted for it. For example, the first diagnosis of an illness as 'normal' may be replaced by a new one, where the cause is considered to lie solely in the sphere of spirits or witchcraft. The reason why the models of '*malaria*' and 'witchcraft' are in a exclusive relationship relates to the mode of action of witchcraft which can provoke exactly the same symptoms that people attribute to *malaria*. A

mganga explained:

> "If somebody wants to harm, he can do bad things and cause malaria, but it is not really malaria. Often you see small children who are very sick and at the hospital, they give injections and the child can die. This is because it was not malaria, but witchcraft. But the symptoms are the same."

The emic explanation of why witches like to imitate *malaria* is that its symptoms easily mislead people, who will attribute them to a common, 'normal' illness that needs hospital treatment. Witchcraft is camouflaged and the witch thereby gains time to destroy the victim. In the words of another healer:

> "Witches are clever. They know that so many people are disturbed by malaria. They send *majini* (bad spirits) to attack the person and to cause problems so that people think it is malaria. But it is not really malaria. At the hospital, they won't detect anything and if there is delay in treatment, the patient gets mentally disturbed."

A few informants state that witches can cause a *malaria*-like condition by preparing parasites through magic powers and sending them with the *majini*. These fake parasites cause the same symptoms as *malaria*. Usually, they cannot be detected at the hospital, but even if they can, the treatment with antimalarials fails, because the parasites are not real.

According to the interpretation of exclusive explanations, the *mganga* can treat the health problem completely, as it is exclusively provoked by witchcraft. To attend the hospital is only the first step to find out the cause, and as its treatment cannot actually be of any help, there is no need to return to the hospital afterwards. We shall see that this is different for the second type of interpretation, complementarity.

Complementarity

Exclusivity involves the co-existence and use of alternative causal explanations. The concept of complementarity is used for the situation where multiple causes, interacting with each other, co-exist and *interrelate* when explaining an illness episode. Complementarity is a syncretic mechanism whereby concepts and logic derived from both biomedical and local models are amalgamated in order to give meaning to illness experience.

Anthropologists (Ackerknecht, 1985; Evans-Pritchard, 1976; Foster, 1976; Gluckman, 1976), in their endeavour to understand the logic of witchcraft, have applied the idea of different levels of causality to non-western illness aetiologies. The 'immediate' cause makes reference to common aetiologies, such as accidents, infective micro-organisms, poison etc. Underlying the 'immediate' cause is the 'ultimate' cause, which is the intentional action of witches, spirits, ancestors or deities.

Immediate and ultimate cause are examples of complementarity, where the underlying cause (witchcraft) is responsible for a person's contracting an infectious disease agent. In his book on the African world-view, Mbiti (1990) provides a hypothetical example of how witchcraft can directly provoke malaria:

> "A bereaved mother whose child has died from malaria will not be satisfied with the scientific explanation that a mosquito carrying malaria parasites stung the child and caused it to suffer and die from malaria. She will wish to know why the mosquito stung her child and not somebody else's child. The only satisfactory answer is that 'someone' sent the mosquito, or worked other evil magic against her child." (p. 195).

However, this direct relationship between *malaria* and witchcraft was not expressed by the informants in Lipangalala. They explained that an individual who is suffering from spirits or witchcraft can be infected with *malaria*, just like everybody else in the community. *Malaria* and *majini* can simply co-exist, by coincidence, in the same person. People clearly stated that it is not possible for witches to send infected mosquitoes. On the whole, all the accounts indicated that witches can never master living beings stemming from the 'realm of God', but they have the skills to imitate and interfere with them. Similarly, they said that when lions or snakes are sent

to kill a particular person, these animals are not real, but produced by the witches' power to convert, for example, a stick into an imitation of a living creature.

Another mode of witches' action, reported by Caprara and colleagues in their work on AIDS on the Ivory Coast, is where "witchcraft can force a person to 'irrational behaviour' exposing him/her to the disease" (Caprara *et al.*, 1993, p. 1231). The informants in our study did not offer analogous examples of inappropriate behaviour - such as failing to use preventive measures against malaria - being guided by witchcraft.

That some individuals get *malaria* more often than others is ascribed to their bodily constitution. Bodily strength is considered to be mainly related to innate properties of the person, age and gender. External factors such as weather conditions, hard work or poor nutrition are also perceived to cause body weakness so that the person is more vulnerable to infection. In this sense, witchcraft can also be understood as an indirect, underlying cause of malaria: People reckoned that 'sent spirits' can weaken the bodies of their hosts by feeding on their blood, which renders them more susceptible to any illness, including *malaria*.

Another, more explicit form of complementarity refers to the direct interference of witchcraft with *malaria*. The community is well informed that malaria parasites, injected by mosquitoes, can be detected in the blood and removed with antimalarials. But it is also known that witches can 'play' with *malaria* to achieve their evil purpose. People believe that witches have the skill to make malaria parasites occult in the blood - just as they can make any 'normal' disease occult - in a way that *malaria* cannot be recognized by the specialists at the hospital. When the illness cannot be identified at the hospital, the suspicion of bewitchment may emerge, requiring consultation with a *mganga* for divination. An elderly woman explained:

> "You can go directly to the hospital. If they see the problem, they can treat it. But they might not find anything. Then you go to the *mganga.* The local treatment makes the medicine at the hospital work. If you don't go to the *mganga,* they won't see the disease. Even if they make an X-ray, all would just be black. Or if you have malaria parasites, they won't detect the parasites, the blood looks completely clean. Bad people have put a black veil between you and the other side, that's why they won't see anything. The *mganga* takes this veil away, then you can go to the hospital. The *mganga* cannot treat the problem, he cannot operate or treat malaria. His ability

is to take off the veil. For further treatment, you go to the hospital, it needs highly experienced doctors."

The health problem is the result of two causes that interact. The spirits sent by witchcraft interfere with 'normal' *malaria*, taking advantage of the disease. In order to eliminate both causes, two types of specialists are needed: first the traditional healer who removes the power of occultation exerted by the sent spirits and afterwards, the medical personnel who treats 'normal' *malaria*.

The following conversation between one of the investigators (SH) (I), a *mganga* (M) and one of her clients (C) with a sick child illustrates the sequential use of both health care sectors for one illness episode:

I: "What is the child suffering from?"

M: "He was very ill with *homa ya malaria*, now the *homa* went down and he is eating well."

I: "Did you detect malaria?"

M: "Yes, the mother went first to the hospital, but there, they didn't detect anything. Therefore, she came to consult me and I detected spirits."

I: "The child has spirits?"

M: "No, the mother. At the hospital, they didn't detect the parasites in the child's blood because of the sprits of the mother."

I: "After the treatment here, will you send the mother to the hospital?"

C: "We already went there after I had applied the local treatment."

I: "And why did you come back here?"

C: "To treat my problem of the spirits."

I: "And the child, does it need further treatment?"

C: "No, he recovered, it's only me who needs treatment now."

I: "What is the treatment so far?"

M: "I gave her (the mother) medicine for bathing and drinking, for 7 days. Then I asked her spirits what they wanted. The spirits told me that they have now received the food and that they won't disturb her any more. So after these 7 days, they said that the mother can take the child to the hospital and there they will be able to treat him. "

Children, as in the case above, are frequently indirect victims, and traditional treatment is needed for all afflicted family members. Bewitchment is perceived to be a serious problem and its therapy, including protection against further attacks, is a long-lasting process. A great number of patients have to undergo various treatments over a period of several months or years, often spending up to seven days at a time, sometimes longer, at the healer's place.

From the hospital to the healer, back and forth

Beliefs in the ability of witches to imitate or interfere with diseases offer elements to understand relevant aspects of observed health-seeking behaviour. As mentioned earlier, with the onset of malaria-like symptoms, the first choice for therapy, after home treatment, is the nearby district hospital. In most people's view, diagnosis and medication at the hospital is the most reliable and convenient way for successfully detecting and treating *malaria*. Moreover, it is the most economical option for finding out about the cause of the illness. Only when the patient or members of his/her therapy management group are convinced that the problem cannot be identified or completely treated, might they consider consulting a *mganga*. In the questionnaire, all mothers but one stated that when their child suffered from *malaria*, they would first go to the hospital. If there was no relief, 60.6% would opt for traditional services after having attended the hospital once (45.7%) or twice (14.9%).

Guessing and evaluating treatment plays a pivotal role in the process of illness reinterpretation and health-seeking behaviour, as illustrated by a mother who was asked whether the *homa* ('fever') of her child could also be caused by witchcraft:

> "I haven't gone to the hospital yet. How can I suspect anything before going to the hospital? ...The first step is to go to the hospital. There, they can examine. Only when I see that they have tried their best, yet are unsuccessful, then I go to the *mganga wa jadi*."

In a modified state of consciousness, the *mganga* reveals the deep cause of the affliction to the client. Once the healer detects the harmful intervention of witches, he or she has the skills

to neutralize the evil actions through application of herbal remedies. However, through divination, the *mganga* is neither empowered to elucidate the detailed strategies of the witchcraft being used nor to determine whether malaria parasites are present in the blood. Notably, while "rethinking illness" is the process that leads clients to the *mganga*, a reflection on whether exclusivity or complementarity is applicable can only take place *a posteriori*, after evaluating the outcomes of the treatment. Recovery after the healing performance supports the explanation that sent spirits imitated *malaria*. The healer's treatment proceeds in order to protect the patient from recurrent attacks and there is no need to return to the hospital. Persistence of illness indicates complementarity, either 'occultation of parasites' or 'induced weakness'. The subsequent step is to go back to the hospital for a check-up and further treatment. This sequential therapy path, from hospital to healer, to and fro, determined by the ambiguity of malaria, may be repeated until the patient recovers. The following case portrays how various events can be intermingled and reinforce each other in the process of explaining illness.

A young, single mother experienced a difficult delivery with her second-born. She figured that her neighbour - an elderly, childless woman - might have tried to harm her out of jealousy. Her suspicion increased when she saw her small daughter suffering from recurrent episodes of severe *homa*. Over a period of nine months, she repeatedly searched for cure at the hospital, where they treated the child with antimalarials. But despite treatment, malaria perpetually reappeared, fostering her suspicion that her neighbour was trying to bewitch her in order to kill her daughter. She decided to ask for advice from a *mganga,* who confirmed her suspicion, treated the child and protected her with an amulet against further witchcraft attacks. Some months later, the woman's homestead caught fire when a sudden gust of wind blew over the cooking fire in the backyard. Soon after this event, the child, who by then had lost her amulet, fell ill again with high fever. The mother rushed the child to the hospital, but no disease could be detected. The concurrent incidents alerted her and she consulted another, well-known *mganga*. He corroborated that the neighbour was still bewitching her. To both her and the child, he administered 'bitter' treatment over a period of seven days. The *mganga* instructed her not to take any ('bitter') antimalarials during the traditional treatment. The ritual was completed when a new necklace to protect the child had been prepared. After the seven days - *homa* was

still persisting - she returned to the hospital where malaria was diagnosed and successfully treated. Asked about whether it would have been necessary to return to the hospital if the child had recovered during the traditional treatment, she said: "No, then you know that it was not malaria, but only malaria-like." When we asked her what she would have done if they still had not detected the disease at the hospital, she answered:

> "This means that the (traditional) medicine has not worked entirely and the treatment needs to be repeated for another seven days. Then you return to the hospital and there they'll detect. If not, you go back to the *mganga* and back to the hospital until they detect the parasites. You should not get tired to continue with treatment as long as the child is sick."

The account illustrates the reflections about illness causation following the logic of complementarity (parasites were made invisible by witchcraft) and exclusivity ("then you know that it was not malaria, but only malaria-like"). It also shows clearly that the explanation of whether an exclusive or complementary aetiology operated is a post-hoc interpretation, based on the course of illness and treatment success. The decision to consult a *mganga* was only taken after several visits to the District hospital. Other informants too explained that before moving to traditional healing modalities, they had attendend the hospital various times because they were sceptical about having received correct examinations or treatments. Also for traditional therapies, informants sometimes mentioned the need to reassure themselves of the correctness of divination results by consulting several *waganga* in order to compare their diagnoses, if they could afford it.

Antimalarials, *majini* and local treatment

The interdependent and sequential treatment of *malaria* and witchcraft poses significant problems for compliance and adequate treatment with antimalarials. People from the community, and especially the *waganga*, offer elaborate explanations of why the intake of antimalarials before or during the treatment of witchcraft may be inappropriate, ineffective or even dangerous.

Antimalarials are felt to be simply inappropriate and useless if the illness is exclusively caused by witchcraft. Moreover, when witchcraft interferes with *malaria*, it is considered ineffective to attend the hospital first, because initially, the *mganga* needs to counteract the spirits' ability to hinder biomedical diagnosis and successful treatment. Apart from their arts of 'making parasites invisible' and 'imitating *malaria*', *majini* are believed to reject any effective medication, e.g., by forcing the patient to vomit the antimalarials, making his/her skin rigid so that injection needles break, or impeding the penetration of the injection into the blood, resulting in a local abscess. In the worst case, it is said that spirits can induce sudden death after a chloroquine or quinine injection.

A further problem is connected with the combination of antimalarials and local treatment. For healing, the *mganga* uses a selection of herbal remedies, some of which are extremely bitter. Depending on the healer's spirit (mainly 'wild' *Chamkela*) and on the patient's symptomatology (especially for abdominal pains), there is a tendency to apply 'bitter' *(chungu)* herbs to treat witchcraft. The term *chungu* not only refers to its taste but also to its 'strength'. In the local classification of medications, 'bitter' is dichotomically opposed to 'cold' (*baridi*). Western drugs, too, are included into these two categories. Of interest here is that for 'cold' drugs (e.g. aspirin and paracetamol), there is no need to take precautions of simultaneous intake of different medication, whereas an excess of 'bitter' remedies is considered harmful (see case study above). In the words of a *mganga*:

> "Chloroquine is 'bitter' and powerful. 'Bitter' local medicine is powerful as well. If you give both, it will harm the patient because he will get an overdose and the blood starts boiling."

This opinion is widely accepted in the community. In the questionnaire, nearly all the mothers (96%) affirmed that chloroquine and 'bitter' herbal treatment could not be taken at the same time. To mix the two treatments always requires permission from the *mganga.* He/she can either refuse to combine them or allow a regimen with a time interval of several hours between local and western medicine.

As a result of these constraints for using antimalarials, the risk of non-compliance with treatment schedules and delay in attending a biomedical health facility presumably increases.

Although these ideas hardly ever present any problems at the beginning of an illness episode, they can gain relevance during traditional treatment in cases where malaria persists or recurs. Especially for infants and small children who have not yet acquired semi-immunity against malaria, a delay of a few days can have severe or lethal consequences.

Treatment of witchcraft usually requires a period of seven days to deactivate the pernicious powers that are 'playing' with *malaria*. In the fight against the sent spirits (*majini*), the *mganga* interprets aggravations of the patient's condition as signs of the spirits' rebelliousness. The angry spirits, when reacting to treatment, seize the body from inside and jiggle it. Their fury makes the victim feel extremely week, trembling, shivering and losing control over the body. Stiffness, vomiting, sudden fevers, convulsions, and talking nonsense are described as characteristic manifestations of the battle taking place inside the patient. Strong *majini* can defeat the *mganga* and lead to irreversible mental disturbance, paralysis or death. Nevertheless, in despair, when the condition becomes extremely severe and is perceived to require urgent treatment, the caretaker might decide to rush the patient to the hospital before completing the healer's therapy, in spite of fear of the 'wrath of spirits'.

What is interpreted as reactions of the spirits corresponds well, from a biomedical point of view, to the development of inadequately treated or untreated malaria. Although people are aware, too, of the symptomatology of severe malaria, at this stage of the health-seeking process, the hypothesis of witchcraft is strong, precisely because of the previous experience of 'hospital failure'.

Conclusion

A society where medical pluralism is well established is rich in knowledge stemming from different explanatory systems. The model of '*malaria*', regarded within the broader context of cultural knowledge, not only co-exists with the model of witchcraft, but the two can also complement each other. Our data permit an understanding of the dynamics of illness reinterpretation and, to some extent, they explain the sequential use of biomedical and traditional

health care services for malaria and malaria-like symptoms.

In the community of Lipangalala, the principal reason for delay in each step of the therapy path is certainly the limited availability of economic resources, especially before the harvesting season. However, a variety of other factors can retard prompt and appropriate biomedical treatment. Our impression is that in the study area, a source of delay in repeatedly seeking biomedical treatment can be explained by reinfections, relapses and recurrence of symptoms which are perceived as 'hospital failures' induced by the witches' craft. Paradoxically, beliefs in witchcraft and traditional healing are not 'cultural obstacles' for people's faith in biomedical effectiveness for treating malaria; on the contrary, by offering supra-normal explanations for the limitations and failures of medical practice, these beliefs actually reinforce the validity of western medicine in the view of people.

The study was not designed in a fashion that would allow us to make a statement about the extent of the problem that traditional treatment can result in delay and non-compliance with antimalarials. As we have no quantitative data for actual episodes, it is difficult to assess the frequency of malaria cases that are reinterpreted in terms of witchcraft and treated by *waganga*. We think, however, that the described pattern of health-seeking behaviour is rather common in the community. The opinion that witchcraft can be related to malaria is widespread in the community - in the questionnaire, 73% of the mothers stated that witches are able to imitate malaria and 62% responded that parasites can be made invisible by witchcraft. There is data showing that recurrent malaria episodes (which can be perceived as 'hospital failure') are common in the area as a result of frequent reinfections (Smith, *et al.*, 1993) and high rates of incomplete cures due to resistant parasites (Mshinda, *et al.*, 1996). It is also observed that the use of subtherapeutic dosages of antimalarials is often practised.

Approaches in health information, communication and education has been successful in transmitting knowledge about when and how people should act to receive appropriate and timely treatment for malaria. However, there is little information about treatment failures. This information could effectively be transmitted during the clinical consultation. Rather than discouraging people in their beliefs about witchcraft, the health personnel should thereby play a key role in sensitizing patients and assisting them with clear explanations of prescribed

treatment and possible outcomes. The specific recommendations, which could be discussed with the health personnel, are to communicate to people that (i) incomplete treatment can give temporary alleviation, but symptoms might reappear; and (ii) intake of antimalarials prior to hospital attendance (a common practice in the area) can produce partial parasite clearance and thereby explain negative findings from a blood examination. Information about drug resistance should be provided to encourage patients to attend the hospital promptly if symptoms persist or recur.

The challenge is to find out how health personnel can effectively enhance clients' awareness of correct administration of antimalarials and drug resistance. People, including the *waganga*, are certainly open to additional information, provided it makes sense in terms of their own experience.

Notes

(a) Winch *et al.* (1996) mentioned that people referred to 'fevers due to spirits' also as 'fevers which do not respond to hospital treatment', indicating a reinterpretation of the cause after hospital attendance.

(b) In the study area, the terms *uchawi* (witchcraft) and *wachawi* (witches) are known to everybody, but they are usually avoided. People use instead euphemisms like *mkono wa mtu* (the hand of man), *mchezo wa mtu* (the game of man) or *watu wabaya* (bad people). In the interviews and the questionnaire we used the euphemisms.

(c) Naturally attacking and ancestral spirits are also said to provoke malaria-like symptoms.

Illness naming and home treatment practices for malaria - an example from Tanzania

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Abstract

Even in areas where biomedical and traditional health services are available and easily accesible, the vast majority of illness episodes are managed at home and professional help is only sought if symptoms become severe or persist. But although home treatment is widely practised, little is known about how people decide what treatment to apply.

In an ethnographic study in South Eastern Tanzania we investigated domestic treatment and health-seeking behaviour for childhood malaria, with a special focus on people's choice between traditional and biomedical treatments. We found that for children, people made a clear distinction between 'normal malaria' (*malaria ya kawaida*) and 'cerebral malaria', characterized by convulsions (*degedege*). Paradoxically, although *degedege* was recognized as a consequence of malaria, home treatment was very different from that for malaria. In sharp contrast to malaria, *degedege* was primarily treated traditionally, with herbal remedies and specific practices, and practically no pharmaceuticals were administered.

The example of the locally used terms *malaria* and *degedege*, each linked to different treatment preferences, illustrates that in this setting knowledge about the cause of an illness plays a subordinate role in the selection of home treatments. Rather, we suggest that it is the name of an illness which guides people in their treatment actions. Naming an illness automatically evokes a specific formula or 'recipe' for the patient (or caretaker), who then knows how to act. The concept of 'recipe knowledge' provides a frame for understanding the role of non-reasoned action in treatment-seeking.

Introduction

In the light of the current WHO strategy to promote early recognition and prompt treatment of malaria, community understanding and domestic treatment of the disease became important fields of investigation. One of the principal objectives of studies on cultural aspects of malaria has been to detect gaps in people's knowledge. Probably the most striking finding was that in many areas, the community did not associate convulsions with malaria, or only occasionally did so. Ramakrishna *et al.* (1988-89), for example, reported from their study in Nigeria that convulsions were thought to be provoked by leaving a child on the 'cold earth'. A number of other investigators found that convulsions were linked to 'supernatural forces' rather than to malaria. The attribution of convulsions to a spirit which takes on the shape of a bird and attacks small children is extensively described in the literature for both West (reviewed by Bonnet 1986) and East Africa (Mwenesi 1993, Winch *et al.*, 1996; Makemba *et al.*, 1996).

This limited understanding of malaria intensified the call for locally adapted health campaigns with the aim of transmitting biomedical information about cause, symptoms and treatment of malaria effectively (WHO 1993). The implicit expectation is that widespread knowledge of malaria will encourage people to use biomedical health services appropriately and promptly. But to what extent does improving biomedical knowledge really change people's behaviour?

While it is clear that social and economic constraints may limit therapy choice, the question also merits attention from a cognitive angle. In this article, we discuss how traditional notions about convulsions can persist even in a community where they are commonly attributed to malaria, and why adequate knowledge about malaria does not necessarily affect treatment behaviour. The data we present shed light on the role of non-reasoned action in making decisions about treatment.

Study setting

The study was set in Ifakara, a semi-rural town in the Kilombero District of Morogoro Region in Southeastern Tanzania. This is an ideal place for investigating how biomedical knowledge influences treatment practices. Firstly, because people are well aware of malaria - in the highly endemic area of the Kilombero river basin, practically everyone has suffered several times from it (Smith *et al.*, 1993). Secondly, there is a remarkably high level of biomedical knowledge in the community (Hausmann Muela *et al.*, 1998), resulting from frequent experiences of malaria episodes, together with extensive health information which has been provided for many years through national and local health campaigns, involvement in malaria research projects (Tanner *et al.*, 1994), school education, radio programmes, and above all attendance at the District Hospital in Ifakara. In addition, the inhabitants of Ifakara generally have good access to biomedical resources. Besides the hospital, several private pharmacies offer a broad selection of pharmaceuticals without prescription, including various types of antimalarials. Furthermore, chloroquine and antipyretics can easily be obtained in the numerous small shops in the community. For a descripition of the local health care system see Alilio & Tembele (1994).

Alongside biomedicine, numerous traditional services exist in the region. The variety of healers and healing practices is enormous and complex, making a clear classification almost impossible. The people themselves, however, differentiate between two basic types: the healers who perform divination (*kupiga ramli*) and the ones 'who only treat' (*kutibu tu*). The more renowned ones in the community are surely the diviners. Their domain is principally to deal with afflictions attributed to witches and spirits, whereas the healers who 'only treat' mainly treat illnesses belonging to the 'natural order'. Among the latter, there are on the one hand the few herbalists who treat mostly adults and on the other hand the numerous 'knowledgeable women' who specialise in childhood illnesses. The 'knowledgeable women' are sometimes called 'healers of children' (*waganga wa watoto*), but people usually refer to them simply as 'grandmothers' (*bibi*). They are mainly consulted by members of their family or mothers of the immediate neighbourhood. The remedies they apply are not only for treatment but also for 'protecting' children from illnesses.

Methods

During 18 months spent living in the community we collected data on people's understanding of childhood malaria and treatment-seeking behaviour. Between April 1995 and March 1997, we carried out a total of 81 in-depth interviews mainly with mothers of children under five years old. A prospective follow-up study with 10 mothers of children under five over a period of 7 weeks (total of 70 interviews) provided further in-depth data on understanding of malaria and related illnesses and on treatment-seeking for actual episodes. In 20 actual cases of childhood malaria we asked in detail about treatment at home.

Based on the qualitative information, we designed a questionnaire in which we asked 220 mothers of children under five about recognition of malaria and related illnesses and treatment practices. Most questions were hypothetical, permitting information to be obtained about normal and normative behaviour and about underlying ideas which guide people in their actions. Questions about the last malaria episode, which provided information about actual behavior, were also included.

Childhood malaria

The questionnaire results confirmed that the population has a very clear idea of malaria (see table 1). Practically all respondents (98%) mentioned mosquito bites to be a cause of malaria. The malaria-mosquito link is also part of everyday language and *homa ya malaria* ('malaria fever') is often used synonymously with *homa ya mbu* ('fever due to mosquitoes'), reproducing terms and analogies used by the Tanzanian Ministry of Health (*Wizara ya Afya*), e.g. in the manual of village health workers for medical education (Mkumbwa, 1983). Other causes such as dirty water (12%) and hot sun (5%) were also mentioned, but always in addition to mosquitoes.

The symptoms listed by the mothers corresponded closely to what would be understood as malaria from the biomedical perspective. Notably, convulsions were a frequently-mentioned symptom (48%), after fever (*homa*, 97%) and vomiting (75%). Unlike the findings from other

areas (reviewed in the introduction), in Ifakara nearly all (95%, when prompted) the respondents recognised convulsions as a severe manifestation of malaria.

Home treatment and therapy choice for malaria

With regard to treatment, the respondents stated a clear preference for biomedical options (see table 3). Most said that at home they would apply antipyretics (75%) and/or sponge the child (65%). Almost a quarter (24%) stated that they would treat the child at home with chloroquine. Traditonal home remedies, on the other hand, were clearly not perceived as a valuable alternative. Although many people knew some herbs which could help against malaria, they usually stated that they did not use them. One informant explained:

> ”There is a tree which helps. It is called Mwarobaini. This is like quinine, very bitter and strong. You have to drink it, then you get better. There is one tree in our garden.. But we don’t use it, we go straight to the hospital.”

Others said that they would only use them in case of emergency, if they were far from a health service or shop to purchase antimalarials. In the questionnaire survey, only one respondent answered that she would use herbal remedies. A similar pattern of domestic treatment could be observed when we asked about the last actual malaria episode: 55% of the respondents stated that they had administered antipyretics, 16% had given chloroquine, 2% antibiotics, and only 2% herbal remedies. When professional help was considered to be necessary, people strongly relied on biomedical facilities, as these words of one informant clearly show:

> ”Do you think I could go to the *mganga* for malaria? No, it is only at the hospital where malaria can be treated.”

Only one mother mentioned the traditional healer as a first recourse, while all the others said they would attend the hospital.

Degedege

Although convulsions were linked to malaria, they were more explicitly associated with a severe childhood illness called *degedege*.The characteristic manifestations of *degedege* which the respondents listed were acute fever (84%), convulsions (81%), uncontrolled movements of the eyes (83%), stiffness of the body (60%) and shivering (54%) (see table 2). Because of its acuteness and because it is a life-threatening condition, *degedege* is extremely feared by the population. Almost all the respondents (98%) stated that if *degedege* is untreated, the child will die and 77% of them said that death can occur even within hours.

Thus while the term 'malaria' is primarily used to describe mild or uncomplicated malaria, *degedege* closely corresponds to what would be considered from the biomedical perspective to be complicated and in particular cerebral malaria (see also Gessler *et al.*, 1995; Matthies, 1998). The terminology, however, does not mean that malaria and *degedege* are regarded as isolated, distinct disease entities, as has been found for coastal Tanzania (Winch *et al.*, 1996). In fact, *degedege* was commonly clearly understood as a consequence of malaria (mentioned by 80%, and even 97% when prompted) - probably as a result of the intensive health campaigns that focused much on informing the community about malaria in its different forms.

Besides malaria, the respondents mentioned that *degedege* can also be caused by spirits (1%, 8% when prompted), by being exposed to hot sun (2%, 27% when prompted) and especially by a certain big moth (34%, 65% when prompted) - itself called *degedege*, which has been zoologically identified as *Nudaurelia zambesina* (Natural History Museum, Basel). It was described as a very big insect, like a butterfly, of black and white colour with points or eyes on its wings. People explained that *degedege* is common in the area and flies around the houses at dusk. When a child inhales the white powder which spread from the moth's wings, s/he will be attacked by *degedege*. Several informants recounted that once the moth falls onto the ground, it moves convulsively, just like a child with *degedege*. One informant remembered:

> "Once my child was attacked by this *mdudu* (insect)...He was playing with his friends and after he had touched that *degedege*, I saw the child confused."

At first sight, one might think that, in analogy to the bird-spirit reported from other areas (see above), the moth might be a kind of naturalised spirit. This was however clearly denied by the informants who stated that both the moth as well as the illness *degedege* belong to the 'natural' realm. Nevertheless, the moth can be understood as a natural being by its nature but similar to the spirits in its characteristics: Like spirits, the moth comes in the darkness, attacks suddenly and fiercely. Moreover, the symptoms of *degedege* resemble so closely those provoked by spirits that they can easily be confused. One healer (female, aged 52) explained that:

> "when a spirit enters into a person's body, it can control the movements of its victim, seize the body from inside and vigorously shake the arms and legs of the possessed, thus provoking convulsions that might look like *degedege* but are different from 'normal' *degedege.*"

Malaria and the moth coexist side by side in people's causal explanations of *degedege*. Which of the two aetiologies is referred to is not a matter of what a person believes is correct, but depends on the narrative context or on the investigator's questions. To mention both causes, even in the same account, was not considered contradictory, and the informants saw no need for an explanation which would bring the two models together. Only when the informants were 'forced' through the interviewer's questions, did they sometimes provide a complementary link of the two causes. On one occasion, an informant replied that body weakness provoked by malaria would make the child more susceptible to being attacked by the moth. In most cases, however, people themselves were unsure about how malaria and the moth were associated, as can be seen in the following interview fragment:

> "Once this butterfly passes nearby, it leaves its powder and this attacks the child. The child starts getting fever, and it goes up to malaria. Then it comes to *degedege*." [The butterfly brings first malaria?] "Yes. It starts from malaria." [And this malaria is not caused by mosquitoes?] "It can start from mosquitoes, or you can get it from *degedege*." [And if malaria is caused by the butterfly and you go for check-up, can parasites be found in the blood?] "Yes." [Where are they from?] "Once the butterfly spreads this powder, it attacks the child. At the hospital, they detect malaria parasites. We don't know whether it is from the powder, maybe?"

The finding of the coexisting double causality has significant implications for health programmes as it suggests that even if awareness about severe manifestations of malaria can be raised through information campaigns, people will not necessarily abandon their traditional explanations for it.

Home treatment and therapy choice for *degedege*

Although *degedege* is widely recognized as a severe stage of malaria, treatment at home for *degedege* is very different from that of 'normal malaria' (see table 3). While domestic treatment for malaria is principally biomedical, *degedege* tends to be treated with 'traditional' home practices: 41% of the mothers said they would urinate on the child and 35% would administer herbal remedies for bathing and drinking. Some mothers mentioned using their personal 'secret cloth' - referring to their sanitary towel for menstruation - for treating *degedege* by waving it over the child's body (12%), or preparing a paste of elephant dung to rub on the child's skin (6%). Typically, as several informants explained, these treatments are performed at special places, usually in the entrance of the homestead or at the threshold of the door.

> "If *degedege* attacks, you have to take [herbal] medicine and put it an the centre of the door. Then you wash the child. Then you take that medicine and spray it into his ears and on his face...and you put some into the rope [for the child to wear as a protection]."

Less frequently mentioned were sponging (23%) and administering antipyretics (10%) or chloroquine (2%).

Our female informants stated that they had learnt these traditional practices from their mothers and grandmothers, but more often they mentioned having asked a *bibi* from the neighbourhood for advice and especially for the herbs. The boundaries between home treatment and treatment by a healer are, however, blurred as the consultation of the *bibi* is frequently considered to form part of domestic help, not least because in many cases, the *bibi* is a relative of the client. All these traditional practices, whether performed by the mothers themselves or by

a *bibi*, were not seen as the only measures to take. Rather, they were said to be applied as 'first aid' (*huduma ya kwanza*) in order to cool down the child's body as a preparation for attending the hospital. However, the mothers also usually remarked that if the traditional treatment proved to be successful and the child got relief, there was no need to visit the hospital anymore.

However, on the whole the hospital was widely accepted for treating *degedege*. 93% of the respondents in the questionnaire stated that their first choice of a health service would be the hospital while the remaining 7% would consult a *bibi*. If the hospital was not perceived to be successful after one or two attempts, three out of four respondents (73%) would opt for traditional services - 47% for the *bibi* and 26% for the diviner. Whether as first or as second choice, the *bibi* and the hospital were both valued alternatives for treating *degedege*. To some extent, they were also seen as complementary: while biomedical treatment was felt to be highly effective, it was also considered too strong and therefore dangerous if applied without first reducing the child's body heat by traditional means.

The traditional model of *degedege*

Traditional treatment practices for *degedege* are not empirical but follow a symbolic logic. This logic is, however not something explicitly existing in people's minds, but has to be reconstructed by the investigator in order to explain the hidden essence of these practices. At the core of what we call 'the traditional model of *degedege*' is the moth around which all the elements are articulated. On the one side, there is the metaphorical link between the moth and the illness, i.e. the analogy between convulsive movements of the moth when it falls on the ground and the convulsions of a patient with *degedege*. On the other side, the moth is associated with darkness and dirtiness, clear symbols of a dangerous mystical pollution which has to be internally and externally cleansed using herbal remedies and counteracted with powerful substances, i.e. menstrual blood, urine and elephant excrement.

These body substances are themselves considered to be dangerous polluting agents, but at the same time, their power can be canalized and utilized for different purposes. In Ifakara, as has been described for many other places all over the world (Bourke, 1976; Buckley and Gottlieb,

1988; Douglas, 1966), they can be used for preparing charms either for protection from malevolent forces and misfortunes or for bewitchment. As medicines, body excretions form part of the pharmacopoeia of numerous medical traditions. They are employed for treating various common illnesses and spiritual afflictions, and against mystical contamination - like the moth of *degedege*.

The paradox

Contrary to what one would expect, our data show that there is no clear correlation between the causal attribution of *degedege* and the selection of domestic treatment. In sharp contrast to home treatment of 'normal malaria', only a few mothers saw pharmaceuticals as an appropriate choice for treating *degedege*. Despite the high fever, only 10% said they would apply antipyretics; and even more strikingly, despite the association of *degedege* with malaria, practically no mothers (2%) would administer antimalarials at home.

Paradoxically, even the 76 respondents who saw *degedege* as a consequence of malaria, and explicitly denied the moth as causal agent, preferred traditional practices (urinating 39%; herbal remedies 22%; 'secret cloth' 2%; elephant dung 13%) to pharmaceuticals (antipyretics 17%; chloroquine 1%) (see table 3).

Traditional treatment of *degedege* as 'recipe knowledge'

'Recipe knowledge' is a term introduced by Alfred Schütz (1964) and divulged by Berger and Luckmann (1966) in their well-known work "The social construction of reality: A treatise on the sociology of knowledge". Persons dispose, the authors suggest, of a repertoire of knowledge for action which is, one might say, automatically at hand for coping with the confrontations of daily life. This knowledge is like a recipe book containing formulae for solving routine problems. 'Recipe knowledge' is used in a pragmatic way. It is the type of knowledge which is considered correct for dealing with common occurrences. By its definition, 'recipe

knowledge' is not reasoned knowledge: The formulas are sufficient for a person to know how to act, but they do not provide the underlying relations between cause and effect. The 'recipe knowledge' for treating an illness is, so to speak, a 'scheme for therapeutic action', meaning here a culturally learned and well-established formula which provides guidance about what to do and how to do it.

We think that the concept of 'recipe knowledge' offers a useful frame for the analysis of our data on treatment practices for *degedege* and probably for other illnesses. At least, it provides a plausible solution to the paradox stated above that even those mothers who replied that they did not believe in the illness-causing power of the moth mainly use traditional practices derived from the 'moth model of *degedege*'. Although the traditional treatment for *degedege* is certainly not a routine in the sense of a daily habit - the kind that the above-cited authors mainly refer to - it is a habitual practice which 'everybody in the community knows about'.

The herbal baths and teas, urine and menstrual blood as well as the elephant excrements all form part of 'recipe knowledge' shared by the women of the community (we do not have any quantitative data from men). 'Shared knowledge' does not mean that everybody has exactly the same body of ideas. Obviously, individual variations exist in the composition of the 'formulae', depending on the instructions the women received from their mothers or grandmothers or the *bibi*, on their region of origin, or on the effects of former experiences. 'Recipe knowledge' is a guide for action, but this does not necessarily mean that it determines the action taken. Probably all the women of Ifakara know the 'traditional recipe', yet some will never actually use it, be it because they remember bad experiences, because these practices correspond to what would be considered 'backward', or because they see pharmaceuticals in principle as more effective.

In the real experience of the illness, the 'recipe' for treating *degedege* is activated following a process of perception and identification of symptoms. In contrast to 'normal malaria', which usually manifests itself with a diffuse symptomatolgy that could indicate very different illnesses and which therefore needs the diagnostic validation at the hospital, *degedege* presents itself with very clear, unambiguous symptoms, which do not leave the mothers any room for different interpretations.

An important result from our data is that knowledge about a specific illness, and in particular knowledge about its aetiology, seems to play a subordinate role in the selection of a

specific type of home treatment. In other words, even though the cause plays a central role in understanding the internal logic of treatment as well as the whole model, the majority of the respondents apparently do not establish a cognitive link between treatment and causality. Rather, it seems that the naming of the illness (by the interviewer) automatically evokes a particular 'recipe' for treatment.

The interplay of 'traditional' and 'modern' knowledge

The marked difference in treatment preferences for malaria and *degedege* also stands in relation to another level of associations. In everyday usage, the terms 'malaria' and *degedege* are associated by the people of Ifakara with 'modern' and 'traditional', respectively. But these terms are not being used in a chronological sense, but rather people refer to 'traditional' as 'belonging to our own culture', in contrast to the 'modern', 'European' knowledge and institutions that come from outside. In this way, the term 'malaria' is associated with 'foreign' things which the 'experts' know about, whereas *degedege* is immediately identified with autochthonous knowledge. In the in-depth interviews, people clearly described *degedege* as 'our illness', an affliction completely unknown to the European doctors and missionaries who arrived in Ifakara in the beginning of the century. On several occasions, mainly elderly informants explained that nowadays, 'the hospital people' know how to treat *degedege* thanks to the intervention of Sister Arnolda.

Sister Arnolda Kury of the Capuchin Order started her missionary activity in Ifakara in the late 1920s (Härdy *et al.*, 1964). Throughout all the years until her death in 1962, she worked in the community as a nurse and midwife. Her collaboration with traditional healers - she herself cultivated and administered a variety of locally used herbal plants - helped to make her extremely popular and respected in the community. Up to today, people remember her as a person of great charisma and as somebody who understood their culture.

One can say that at least from the perspective of the community, Sister Arnolda played the role of a mediator between local and European culture, particularly concerning health issues. More than one informant recounted that Sister Arnolda learnt from the healers how to treat

degedege and introduced this knowledge to the 'hospital people'. Her mediation, the informants explained, enabled the European doctors to recognize the illness and to adapt their therapies accordingly. In former times, they said, so many patients with *degedege* died at the hospital while nowadays, thanks to Sister Arnolda, the doctors know that they first have to 'cool down' the symptoms in order to reduce the illness to 'normal malaria'.

The persistence of traditional treatment

It is clear from our study that nowadays the population of Ifakara does generally accept and appreciate hospital treatment for *degedege*. Yet the idea that the illness must first be 'cooled down' *at home* is widespread, and for this the traditional scheme is clearly dominant. One of the reasons could be related with to local ideas about 'protection'. In the first months after childbirth, the mothers usually take their newborns to a *bibi* who prepares amulets worn as a necklace or anklet by the child for protection against *moto* (literally: 'heat', referring to the contagious heat that adults can transfer to children after sexual intercourse) and *degedege*. Protection does not mean that the child is immune against *degedege*. It is said that the amulet, which usually contains elephant dung, repels the illness-causing moth. If, however, a child is still attacked by *degedege*, the amulet will attenuate the power of the illness. In the words of one informant:

> "If he is protected, and the *mdudu* comes and spreads the powder, the child won't be attacked very strongly. Firstly, the *degedege* is afraid of the smell of the amulet. There are onions in it and a piece of wood and elephant dung. The child wears it as a necklace and the smell of it makes the *degedege* go away. And secondly, the powder is neutralized by the protection."

In a similar sense, the traditional 'cooling down' of *degedege* at home is regarded as an effective 'protection' or 'first aid' before attending the hospital, which may or may not be seen to be necessary afterwards.

The traditional formulae for home treatment are clearly very persistent, and the question of why this is so remains to be discussed. Following Schütz (1964), 'recipe knowledge' persists

as long as a person does not perceive a reason to question his or her action. Thus, as long as traditional treatment of *degedege* is felt to bring relief, people are likely to continue with their practices. Furthermore, besides the quick, at least momentary, improvement of the condition, traditional treatment for *degedege* has important practical advantages over hospital attendance. There is always a *bibi* who lives nearby, and can urgently be consulted at any time of the day or night. Accessibility is not only a matter of time and distance; the *bibi* is more accessible than the hospital with its predominantly male personnel because there is no social or cultural distance between her and her female clients. Probably the most crucial advantage, however, is the fact that the *bibi* usually do not charge money for their services. Most commonly, they are given a reward later on - a chicken or a cup of rice - which is seen as a gift rather than a payment. All these reasons are particularly important for women, as they permit the treatment of *degedege* to be almost their exclusive affair, largely independent of men's participation in decision-making.

Conclusions

The basic question which we posed in the introduction was to what extent improving biomedical knowledge about malaria would change people's behaviour. Our particular interest in this paper was to elaborate on this question from a cognitive point of view. Analysing our data from Ifakara on community perspectives on childhood malaria we conclude that, at least for domestic practice, knowledge about malaria acquired through health information, even if it has been well understood by the population, is not necessarily of first importance at the time of deciding about treatment action. There is no doubt that a general good knowledge about aetiology, symptoms and treatment does to a certain extent influence people's behaviour when someone falls ill with malaria, and results in their seeking the biomedical treatment generally regarded as effective. This can be deduced from the finding that in Ifakara, a community with a long history of health education, nearly everybody would opt for biomedical treatment of malaria, either pharmaceuticals at home and/or attendance at the hospital.

However, the example of *degedege* raises important questions concerning decision-making. We found that although almost the entire population has accepted that *degedege*

corresponds to severe malaria, this does not imply that traditional notions, particularly about the aetiology of *degedege*, have disappeared. Rather, malaria and the moth coexist as independent causes without people being much concerned about elaborating explanations which would coherently integrate the two aetiologies. Neither does the link between *degedege* and malaria, even for people who explicitly deny the moth as a cause, necessarily imply that the illness would be treated as malaria.

We propose that the idea of 'recipe knowledge' for treatment provides a possible explanation for the discrepancy between knowledge and behaviour. In contrast to the decision-making which is determined by reasoning about the possible causes of an illness, 'recipe knowledge' functions by establishing an automatic association between the name of an illness and its 'therapeutic formula'. In an interview, the name of an illness is often mentioned by the researcher while asking questions. In everyday life, an illness is named when a particular set of symptoms appear that are so clear-cut that the identification is not in doubt, as is the case for *degedege*. The formulas which are linked to the name of an illness have to be considered in a broader context. Practical reasons for using traditional rather than biomedical treatment, such as the economic and social advantages described above, further reinforce the persistence of the traditional practices.

It will be interesting to know more about the situations in which an action is reasoned and in which it is automatic. We think that in research on health behaviour, increased attention should be paid to the concept of 'recipe knowledge', as it might contribute to the understanding of non-reasoned action in making decisions about treatment, and thus increase our comprehension of treatment-seeking behaviour.

MALARIA

Symptoms			Causes		
Fever	**97%**	**(100%)**	**Mosquitoes**	**98%**	**(100%)**
Vomiting	**75%**	**(95%)**	**Dirty water**	**12%**	**(48%)**
Convulsions	**48%**	**(95%)**	**Hot sun**	**5%**	**(44%)**
Diarrhea	**31%**	**(76%)**			
Anaemia	**1%**	**(60%)**			
Enlarged spleen	**0%**	**(14%)**			

Table 1: Symptoms and causes mentioned (and prompted) for malaria, N=220.

DEGEDEGE

Symptoms			Causes		
Fever	**84%**	**(99%)**	**Malaria**	**80%**	**(97%)**
Eyes rolling	**83%**	**(99%)**	**Moth**	**34%**	**(65%)**
Convulsions	**81%**	**(96%)**	**Hot sun**	**2%**	**(27%)**
Stiffness	**60%**	**(95%)**	**Spirits**	**1%**	**(8%)**
Shivering	**54%**	**(97%)**			
Diarrhea	**1%**	**(16%)**			
Anaemia	**0%**	**(34%)**			
Enlarged spleen	**0%**	**(3%)**			

Table 2: Symptoms and causes mentioned (and prompted) for *degedege*, N=220.

Malaria		*Degedege* (1) (all respondents)		*Degedege* (2) (Moth denied)
Antipyretics	75%	Antipyretics	10%	17%
Sponging	65%	Sponging	23%	30%
Chloroquine	24%	Chloroquine	2%	1%
Herbal remedies	1%	Herbal remedies	35%	22%
No treatment	2%	No treatment	17%	14%
		Urinating	41%	39%
		"Secret cloth"	12%	2%
		Elephant dung	6%	13%

Table 3: **Home treatment for malaria and *degedege*. *Degedege* 1 includes all respondents (N=220). *Degedege* 2 only includes the respondents who explicitely denied the moth as a cause of *degedege* (N=76).**

Cost and affordability of traditional and government health services in Tanzania: policy implications of a paradox

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Abstract

Since the introduction of user fee systems in the government health facilities of most African countries, which shifted part of the burden of financing health care onto the community, affordability of basic health care has been a much-discussed topic. It is sometimes assumed that in areas where high levels of spending for traditional treatments are common, people would be able to pay for basic health care at governmental facilities, but may not be willing to do so. However, examining willingness to pay and ability to pay in the broader context of different types of illness and their treatment leads us to a very different conclusion. In the course of a medical-ethnographic study in south-eastern Tanzania, we found evidence that people may indeed be willing, but may nevertheless not be able, to pay for biomedical health care – even when they can afford costly traditional medicine. In this article, we suggest that the ability to pay for traditional treatment can differ from ability to pay for hospital attendance for two main reasons. Firstly, because many healers – in contrast to the hospital – offer alternatives to cash payments, such as compensation in kind or in work, or payment on a credit basis. Secondly, and more importantly, because the activation of social networks for financial help is different for the two sectors. Especially for the poor, ability to pay for health care depends a great deal on contributions from relatives, neighbours and friends. The treatment of the 'personalistic' type of illness, which is carried out by a traditional healer, involves an extended kin-group, and there is high social pressure to comply with the requirements of the family elders, which may include providing financial support. In contrast, the costs for the treatment of 'normal' illnesses at the hospital are usually covered by the patient him- or herself, or a small circle of relatives and friends.

Introduction

It is well known that wide sections of the populace in urban and rural Africa spend considerable amounts of money on traditional therapies. This fact has frequently led to the conclusion that if people can afford the high cost of treatment by traditional healers, they should also be able to pay for basic health care at governmental facilities. In a recent study of traditional healers in Tanzania, Patterson Bakari (1997) observed that the costs of treatment by healers were often higher than the fees of the governmental hospital, from which she inferred: "Therefore, one cannot say that most patients cannot pay for basic care they receive at government facilities, but may not be willing to pay for treatment they see as less effective, convenient or accessible than that obtainable from traditional healers." (p.5). The quotation presumes that high levels of spending for traditional therapies mean that resources for paying for health care are potentially available. Thus, whether people attend public health facilities or not, when they have to pay, is regarded as a question of *willingness* rather than *ability* to pay. Already the baseline document for the Bamako Initiative, the influential World Bank Policy Study (1987), used the same argument for promoting the introduction of user fee systems into the public health care sector, where services at that time were generally free. It was argued that the amount people spent on traditional practitioners indicated "an ability and willingness to pay for traditional curative care and perhaps for some ineffectual drugs; the public sector could tap this source to finance modern curative care and effective drugs and free public funds for preventive programs" (p.31). This statement has direct policy implications. The availability of resources often seems so self-evident that it is an implicit assumption in many discussions of policy-makers about promoting price adaptations, and extensions of user fee systems to the primary health care services. But does the fact that people pay high treatment fees for traditional healers really indicate a general ability to pay for basic health care?

In this article, we explore the question of willingness and ability to pay for biomedical as compared to traditional services from an anthropological perspective. Our reflections are largely based on field observations from an ethnographic study focused on lay perspectives of malaria and its treatment, carried out in Ifakara, the capital of the Kilombero District in south-

eastern Tanzania, between 1995 and 1997 (Hausmann Muela *et al.*, 1998). A later consultancy study for the St. Francis Designated District Hospital (SFDDH) in Ifakara on the impact of the cost-sharing system (Mujinja *et al.* 1997) stimulated the idea of re-examining our ethnographic data and seeing what light they could throw on the discussion of user fees.

In the semi-rural town of Ifakara (for a description of the area see Tanner *et al*., 1987; 1991) both biomedical and traditional health facilities exist side by side. While both types of health care providers charge for their services, the traditional sector, on the whole, is known to be far more expensive than the government facilities. The more expensive traditional services are intensively used, so at first sight it would appear that the population of Ifakara has considerable resources available to pay for health care. Nevertheless, when we interviewed clients of healers, we met many people who were spending large sums of money on traditional therapies, but at the same time said they could not afford to attend the hospital. To understand this paradox, willingness and ability to pay for either biomedical or traditional services cannot be detached from the social context of illness and therapy. We argue that paying for health care is conditioned by a combination of specific factors that apply differently to the two types of health services. Since perceived aetiology plays a key role in the choice of health care, willingness to pay, and the involvement of social networks in illness management, we begin with a delineation of the local classification of illness causation. Secondly, we consider the different types of treatment available, treatment choice and willingness to pay. Thirdly, we consider differences in payment modalities; and finally, the role of the social network in traditional as compared to biomedical treatments.

‘Normal’ and ‘out of the order’ illnesses

For the inhabitants of Ifakara, and probably for most African societies, aetiology is the main element according to which illnesses are broadly classified. People distinguish between ‘normal illnesses’ or ‘illnesses of God’ as opposed to illnesses caused by witchcraft and spirits,

sometimes also referred to as 'out of the order' illnesses. 'Normal illnesses' are said to belong to the natural order created by God. They are understood as part of human life and suffering, and can 'just happen' to any exposed and susceptible individual. In this sense, 'normal' disease agents affect a person accidentally. This is not to say that such illnesses are considered to be unavoidable, since it is known that preventive measures reduce susceptibility, but it does mean that no intention is seen behind them. The causes of 'normal illnesses' are animate or inanimate natural forces or conditions such as germs, heat, cold etc. Locally recognised illnesses like malaria, schistosomiasis, diarrhoeal diseases or 'worms' are all classified as 'normal'. People believe that the hospital, with its technical examination tools and medical experts, is the most effective site for a correct diagnosis and treatment of a 'normal illness'. However, although biomedicine is generally said to be stronger and more powerful than local treatments, for the treatment of certain 'normal illnesses', knowledgeable elderly women who administer herbal remedies, and are specialists in treating childhood illnesses and reproductive disorders of women, are sometimes preferred.

'Out of the order' illnesses typically include afflictions like barrenness, impotence, mental disturbance and chronic disorders. However, 'supranormal' pathogens are considered to provoke any kind of sign or symptom, thus making differentiation from 'normal illnesses' *a priori* difficult. The distinctive characteristic of 'out of the order' illnesses is that they are not treatable at the hospital but are the domain of the traditional healers, especially the diviners, who have the skills to enter into contact with the invisible world. The treatment system for these ailments is markedly different from that of 'normal illnesses'. Diagnosis is not based on the examination of clinical manifestations - the sick patient is sometimes not even present - but is obtained through divination (*kupiga ramli*). Most of the healers in Ifakara use the power of spirits for divination. During the divination session, the healer invokes the spirits by chanting and burning incense. Then, when the spirits arrive, the healer acts as a medium through which the spirits reveal the deep cause of the client's problem or misfortune and its treatment. Both men and women practise divination through spirit mediumship. Another form of divination, only performed by Muslim men, uses Arabic books. Book diviners are respected Muslim leaders who have learnt their skills in a long apprenticeship. They do not invoke spirits; the divining power

is said to be contained in the Arabic verses inspired by Allah. The verses are read out aloud in Arabic and their meaning explained to the client. Both Muslim and Christian clients consult the few book diviners in Ifakara.

Divination aims to identify the reasons why a person is struck by misfortune. Three main types of agents are said to afflict people. The most common and much feared type is witchcraft (*uchawi*). The performance of witchcraft is related to quarrels and frictions in the social world. Witchcraft suspicions and accusations are usually raised among neighbours or relatives involved in conflicts, who are believed to act out of jealousy and hatred. Witchcraft is a very serious misfortune since the aim of the witch is to torture and ultimately to kill. The victims suffer from the pernicious effects of poisonous substances or foreign objects, like thorns and small bones, which are put into their bodies by the witch. Or, even more commonly, they are attacked by bad spirits (*majini*) which are sent to them through witchcraft.

The second type of agents are ancestral spirits (*mahoka*) who are said to send misfortune to punish their descendants if they are neglecting their obligation to worship them. Unlike witches, the *mahoka* trouble only members of the kin group, with the moral intention of reminding them to perform the family rituals. The manifestations primarily appear in children who fall sick, and may die if the ceremonies are not celebrated. Witchcraft and ancestral spirits can be labelled as what Foster (1976) calls personalistic aetiologies, i.e. “the active, purposeful intervention of an agent” (p.775). The third type, finally, comprises the many different spirits who lurk everywhere and attack their victims unexpectedly, with no prior relationship between the spirit and the victim.

Hospital and traditional health care in Ifakara

As the capital of the Kilombero District, Ifakara is well served with a 370-bed referral hospital. Formerly a private missionary facility, the hospital was designated to the Kilombero District in 1976. While the ownership of the structures remained with the diocese, the St. Francis Designated District Hospital received government subsidies for recurrent expenditures and

offered free health services to the population (for details see Frei, 1997). In response to the economic crisis in the Tanzanian public health care sector, and as part of the health sector reform process, the hospital introduced a cost-sharing system in 1993, being one of the first institutions to do so. The system adopted is on a fee-for-service basis, with separate charges for consultation, admission, examination, laboratory and operation services. Drugs are provided in a private, non-profit-oriented pharmacy adjacent to the hospital. In recent years, the system has undergone repeated adaptations and price mark-ups. However, routine treatment in the out-patient department is still relatively cheap. At the time of the study, treatment of uncomplicated malaria, one of the most frequent interventions, cost an adult patient around $ 1.70 ($ 0.50 for consultation, $ 0.85 for lab services and $ 0.35 for drugs). On the other hand, in-patient treatment ($ 4 for one to four days) and examination fees (between $ 1.70 and $ 8.50 per examination) increased costs considerably.

The 'folk' sector encompasses a broad diversity of healers who live and practice in the communities. The official list of the District Cultural Officer includes 63 healers for Ifakara alone (Matthies, 1998). These are the ones who have paid the compulsory license fee. However, the majority of healers are not registered, so the real number is much higher. A few healers practise full-time, and some of them even have in-patient clinics (described in detail by Gessler *et al.*, 1995; Matthies, 1998). Most healers, however, engage in farming as their main activity and practise healing only part-time. The income of the different types of healers from their practices varies widely. The pure herbalists and 'knowledgeable women' who specialise in childhood illnesses offer their services as a sideline activity with very modest costs or free of charge. The diviners, on the other side, charge high prices for their services; their therapies are substantially more expensive than biomedical treatments. With their skill in mastering supranormal powers, diviners generally have a relatively high social and economic status in the community. However, big differences of wealth are also found among them. A healer's income depends much on his or her reputation and the status of the clients. Furthermore, they usually do not have standard fees, but charge according to the health problem, the duration of the treatment and the wealth of the client.

At the time of the study, typical fees of an ordinary healer for basic therapy were around

$ 1 for divination and between $ 5 and $ 15 for a one-week treatment. Depending on the wealth of the client, however, such 'simple' treatments could go up to $ 50 and more. The fees do not include the ritual utensils such as a piece of cloth, a chicken and special spices etc., which have to be bought by the clients. 'Out of the order' illnesses usually require long-lasting or repeated therapeutic interventions and most of the clients are under treatment over months or sometimes even years. For witchcraft problems, the most frequent afflictions, treatment usually not only means curing the ailment, but also taking precautionary measures against further attacks. Thus large amounts of money may be spent on applying protection to the afflicted, the other household members and the entire homestead.

Treatment becomes most expensive when the healer prescribes participation in a drumming ritual. The public ritual called 'drums of the spirits' (*ngoma ya mashetani*) lasts for two to three days. Several healers, their assistants and a group of patients take part in dancing and singing to the rhythmic sound of the drums. Under the guidance of the leading healer, the bad spirits are chased away and the patients receive treatment. Barren women, and mothers who were suffering from barrenness and are believed to have conceived children thanks to the help of the healer, receive special treatment and blessings from the healer's spirit. Clients who were diagnosed as having a spirit who wants them to take up divination become possessed and the spirit speaks through them, giving requests and instructions. Although the costs for the *ngoma* ritual are shared among the clients, they are still high, since the drummers, the healers' services, food and locally brewed beer for all the participants need to be paid for. Depending on the number of clients, a *ngoma* may cost a client between $ 10 to $ 70 or more.

Willingness to pay

Are people more willing to pay for traditional than for hospital services? In our ethnographic study we gained information about people's expectations of traditional and hospital service , and their views on the quality of care and the fees charged. People generally expressed a high willingness to pay for hospital care. With respect to the (spiritual) healers, the common

opinion was that most of them charge too much for their services. What makes people spend large amounts of money for traditional services in spite of this is that there is no other option. The choice between the two health care sectors, the biomedical and the traditional, is guided primarily by the expected treatment success. The traditional healer is consulted when it is felt that the hospital will not be effective, either because the problem is not a physical one or because the illness has already failed to respond to hospital treatment. Looked at in this light, the attempt to compare willingness to pay for the two different types of services is highly questionable. Since there is no alternative to attending a healer for treating 'out of the order' illnesses and the hospital for most 'normal' illnesses, paying the fees is a matter of necessity rather than of willingness.

When we asked the informants in a focus group discussion about their willingness to pay for traditional treatment, a lively discussion arose about whether healers should be paid or whether they should offer their services for free. A few informants were of the opinion that healers should serve the community without expecting any compensation. Most, however, agreed that the healers deserved a good payment, since they spend a lot of their time on their practice and should be remunerated. The main concern they raised was that of confidence. This was interesting, because it is commonly assumed that confidence in the practitioner is a strong factor in people's decision to attend a healer instead of the hospital, but we obtained a rather different impression. Although the empathy in the patient-practitioner relationship is lower with hospital personnel (who were accused of being rude and giving only scanty information) than with traditional healers, the informants were much less sceptical about the trustworthiness of the hospital than they were about traditional services. They were very critical about the sincerity of the majority of healers, who they alleged to be strongly business-minded rather than having the intention of serving people. It was said that there are many fake healers who only pretend to have the skills of divination, and actually manipulate and exploit clients in order to obtain money. Since access to the invisible spiritual world is the domain of healers, ordinary people cannot have any control over the validity of diagnosis and treatment. In contrast, people expressed much faith in the hospital mainly because of its technical examination tools through which a 'normal' illness, in their view, can be infallibly detected.

Confidence – and, linked to it, willingness to pay – is certainly a crucial factor when people choose *among* different healers or between medical practitioners and herbalists. For decisions between biomedicine and spiritual treatment, however, it plays a subordinate role. Here, the determinant factor is the perceived cause of illness, whether it is 'normal' or 'out of the order', and hence the expected treatment success from the different health care providers.

Payment modalities

The majority of the inhabitants of Ifakara are subsistence farmers, mainly cultivating rice and maize (Tanner *et al.*, 1987). Agricultural production is the main source of household income in the area (KVTC, 1993) and income patterns therefore undergo large seasonal fluctuations determined by the agricultural calendar. The payment modalities offered by the traditional healers are well matched to people's economic situation. Although the healers usually prefer to be paid in cash, many also accept payments in kind. Especially when crops have just been harvested, food is a common means of payment. The period before the harvest, which is economically the most difficult time, is also a labour-intensive farming period, and clients and their supporters can often compensate for treatment costs by working on the healer's fields. A frequent practice is to start the treatment on a credit basis, though this is usually only offered to clients who have to undergo long-lasting treatments or who are known to the healer. If after some time the client is not ready to pay, the treatment is interrupted and only continued when the debts are paid. Healers complained, however, that many clients avoided paying by moving to another healer for treatment continuation.

These alternative payment schemes – in kind, by labour or on credit – enable people to cope better with health costs, especially during the times when resources are limited, than they can with the hospital system, where 'no cash means no treatment'. Furthermore, in contrast to hospital charges, those of healers are usually negotiable, and are often adjusted to the economic status of the client. Most appreciated were healers who charged part of the fees only after treatment success. In the opinion of the informants, their credibility as healers who serve the

community was highest.

Table 4 summarises the main differences in methods of payment for hospital and traditional services. In the literature, payment modalities are often cited as the main difference between traditional and biomedical services with respect to ability to pay (e.g. Russell, 1996; Abel-Smith and Rawal, 1992). However, although certainly relevant, they cannot entirely explain why some people state that they are able to afford traditional but not hospital services. The key issue, we think, is the way in which the social network is involved in illness management, which leads to different patterns of resource mobilisation for paying for traditional and hospital treatments.

	Hospital	**Traditional Healer (Diviner)**
When to pay?	before treatment is started	during treatment or after recovery
How to pay?	cash	cash, kind, labour work
Fees	fixed	negotiable

Table 4 Payment modalities at the hospital and the traditional health services

Social network support

Coping with illness costs is normally not the endeavour of the sick person alone but involves assistance from a social network. It is a widely held view that in Africa extended families function as well-structured 'social support nets' for illness management. This view is strengthened by the numerous anthropological descriptions of treatments in which the family takes part. In his famous work in Lower Zaire, Janzen (1978) analysed in detail the ways in

which kinship groups are implicated in diagnosis and treatment choice. With his investigation of the 'therapy managing group', he called attention to the influence of family networks in therapeutic processes. His concept can be applied for studying the economic costs of illness and strategies to cope with them, as has been suggested by Sauerborn (1996a). However, Janzen focussed his case studies on severe and chronic illnesses for which he portrayed the pivotal role of extended groups of relatives in illness negotiation and management. For 'banal' or 'simple' health problems, in contrast, he already pointed out that the 'therapy managing group' comprises only a few persons and is much less relevant. There is thus a clear difference of the role of kinship and other support groups for different types of ailments.

Similarly, we found that the involvement of relatives differs for 'normal' illnesses and 'personalistic' illnesses. 'Normal' illnesses affect primarily the individual, though they do of course have a social dimension, because coping with illness entails reallocation of time and economic resources in the household (Sauerborn *et al.*, 1996a) and at the family level. To what extent reallocations take place depends very much on the position of the sick person within the household and the kin group. There are good grounds for supposing that under difficult conditions, less effort to save a person's life would be undertaken for a sick child than, for example, for the money-earning male household head. Furthermore, illness activates social roles which, following the moral norms of society, demarcate responsibilities for caring and for financial aid. However, economic obligations are limited to only a few close relatives – usually mainly the husband or father. And, more importantly, the social pressure to observe these obligations seems to be rather low. A close look at patients' strategies for coping with illness costs gives rise to doubt about the relevance of solidarity networks for paying for basic hospital care. At least in our study, tight family bonds and organised support structures for paying for hospital treatments seemed to be a myth rather than reality. Adult men, and also a surprisingly large number of women, reported that they usually pay for routine hospital attendances themselves. If they had received financial support, it was usually after asking for help from several persons and often only as a loan. In child health care, examples of weak family bonds are particularly evident. Although the norm is that fathers are economically responsible for their children, the burden of paying for a hospital visit for a sick child not seldom fell on the mother.

Women of the community complained outspokenly about the indifference of husbands and partners towards their children. A father who cared for his children was considered a fortunate exception rather than the rule, which illustrates that social pressure to comply with the norm is minimal.

In contrast, 'personalistic' illnesses lead to a much broader social involvement. They are perceived as vital family matters, which concern persons belonging to the extended kinship group rather than only close relatives. Notably, when somebody is affected by witchcraft or spirits, members of his or her kin-group are urged by the family elders to participate in the traditional healing process, assisting in decision-making as well as financially, according to their position in the lineage. Before and during traditional treatment, family gatherings are held in order to discuss therapy actions and payments, and even relatives who live far away have to be consulted and contribute to the therapy. For 'personalistic' ailments, unlike for 'normal' illnesses, the kin group exerts high social pressure on its members to comply with their economic duties. This can go so far that, as we could observe, persons who reject witchcraft beliefs are forced to give financial support to the performance of anti-witchcraft therapies, notwithstanding their reluctance.

There is thus a very different level of involvement of extended kinship groups in the management of illnesses treated by the healer as compared to illnesses treated at the hospital. But why does the kin-group take on a much more central role for 'personalistic' than for 'normal' illnesses?

'Normal' illnesses refer to a natural disorder within the individual body whereas 'personalistic' illnesses manifest that something is wrong in the social world, and endanger the group. 'Personalistic' illnesses reveal 'perturbed social relations' (Augé 1984:80), meaning that an underlying social conflict manifests itself in the form of illness. Suspicions of 'personalistic' causation of illness mainly emerge in the context either of existing quarrels among relatives or neighbours (witchcraft) or the neglecting of family customs (punishment by ancestors). The person who is struck by illness is not necessarily the person in conflict or the transgressor, but the victim can be any member of the disordered kin-group. In this sense, the sick person represents his or her group and, at the same time, embodies a 'social illness' (Turner, 1970). On

the other hand, 'personalistic' illnesses can be regarded as social ailments, because they transcend the vulnerability of the individual and can potentially harm anybody in the family. As long as no countermeasures are taken, misfortune and deaths are likely to continue within the kin-group. This signifies that everyone in the lineage is at risk of being the next victim of the pernicious or punitive actions, and the existence of entire families is jeopardised. In fact, people's economic behaviour in treatment-seeking seems to follow the basic logic that the more an illness affects a social group, the more will the group be involved in illness management.

Figure 7 delineates the relations between the nature of the illness and the activation of financial resources for traditional as compared to hospital treatment. However, the marked contrast which is reflected has to be looked at with caution. Firstly, because the many situations of illness and treatment cannot be rigidly categorised. A person in a high position, for example, is likely to be capable of mobilising resources from his or her extended kin-group for a serious 'normal' illness needing costly treatment at the hospital. Or, when an affliction attributed to witchcraft is thought to have its origin in a minor conflict, it will presumably not set in motion a complex 'therapy managing group' with the participation of an extended kin-group. Secondly, the dichotomy shown in the figure is misleading in that it suggests that with the onset of illness the type of aetiology, the appropriate treatment and the social implications are immediately determined and definite. Rather, illness needs to be understood as a process where interpretations and reinterpretations of the cause can lead to complex therapy paths (Hausmann Muela *et al.*,

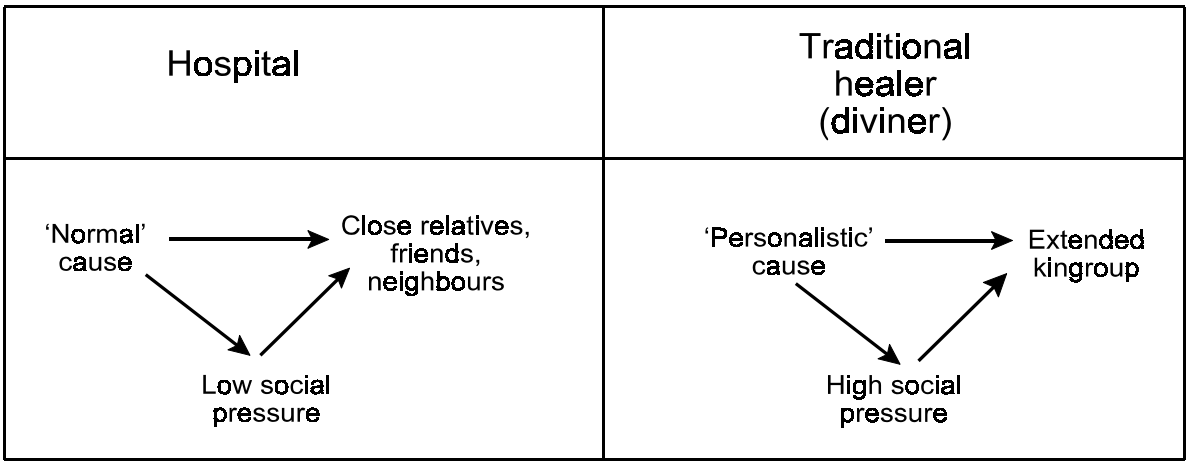

Fig. 7 Activation of financial resources in relation to the perceived nature of illness and health service use

1998). In the course of the illness episode, the involvement of support groups in illness management can therefore successively change (Janzen, 1978). With the shift in interpretation from a 'normal' to a 'personalistic' illness, the support of the group will change from a simple to a complex social involvement, from the support of close relatives and friends to authoritarian directions from the family elders, accompanied by increasing social pressure.

Conclusion

People's ability to pay for health care is not only determined by treatment costs but depends on a series of other economic and social factors. One of these is the role of payment modalities. In the study area we found that some traditional healers (diviners) offer flexibility with respect to *when* and *how* fees are to be paid, and this is well adapted to the economic constraints of the population. The popularity of their system might motivate health planners to create comparable alternatives to the current rigid pricing policies of biomedical health services.

The role of social networks in coping with illness costs is even more important, and is little acknowledged in policy reports. We have illustrated that the financial contributions to illness management by relatives, friends and neighbours clearly differ according to whether an illness is perceived to be caused by spirits or witchcraft - and thus only manageable by a traditional healer - or whether it is thought to have a natural cause, for which biomedical treatment is usually preferred. Thus, to assume that the fact that members of a community can afford traditional health care implies that they can afford biomedical health care is questionable, and could even be dangerous. In health policy discussions it might be used as an argument for promoting pricing adaptations and extensions of user fee systems, but this is probably unjustified. We emphasise the need to carry out studies on the impact of health costs on the community before user fees are increased or extended. In particular, affordability studies should consider *who* ultimately pays for the treatments and investigate the factors that contribute to the involvement of social networks.

Our reflections centred on the various support networks implicated in illness management in relation to the perceived nature of illness, but support networks certainly also change with respect to the perceived severity, the situational context and the capacity of individuals to mobilise human and economic resources. Support networks do not function as rigid structures, but have a fluid organisation. Information is needed about the members of the support networks and their relation to the sick person and to each other, their social and economic status, their role within the network and the community, and social pressure exerted on them. A better understanding of these points might contribute to a public health perspective of basic care in which illness and its management are seen in the context of the family and the community. We think that these observations should be considered within the ongoing review of cost-sharing schemes as part of health sector reform processes in Africa.

Women, seasons, and resource-seeking for treating childhood fevers and malaria - case studies from an African community

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Abstract

Even in areas where health facilities are available, patients often delay before obtaining professional care. Especially in children, febrile illnesses such as malaria can progress very rapidly, even a short delay can have severe or lethal consequences. An important reason for delaying treatment is the time spent on resource-seeking, i.e., the time which passes from the decision to attend a health facility until money is found to cover treatment costs. In 22 case studies, we explored how mothers obtained money for covering treatment costs for a recent hospital attendance with a feverish child. For women who were not supported by a male relative, finding money was not only difficult and burdensome, placing them at an increased risk of delaying health care, but also carried potential negative long-term implications. Particularly important is the finding of a seasonal pattern of risk as a result of an interaction between disease, gender, and labour factors. During the wet and early in the dry season, when malaria transmission is highest, agricultural work most intensive, and the economic situation most adverse, women and children are most at risk of infection and also of delays in treatment. Our data suggest that health programs and investigation should increasingly include gender-sensitive and/or season-adapted approaches. Based on gender inequalities in access to resources, we propose recommendations which follow the line of a 'gender and development' (GAD) approach, i.e. a policy approach which centres on gender-related factors and their underlying reasons.

KEY WORDS: coping strategies, malaria, gender, seasonality, Tanzania

Introduction

The current strategy of WHO to reduce malaria morbidity and mortality centres on early recognition and prompt treatment (WHO, 1993). Rapid identification of malaria and adequate treatment can prevent irreversible complications and avert most deaths. However, even in areas with good access to health services, it is common for malaria patients to present at health facilities late or not at all. This is especially problematic for children, as their condition can deteriorate very rapidly, and even a short delay in treatment can have severe or lethal consequences. Recent data from Tanzania estimate that 90% of all deaths of children under five years old who suffered from fever with seizure occurred at home, 48% of them without any prior contact to a formal health facility (AMMP, 1997).

One of the most important factors that can cause delay is the time spent on resource-seeking, that is, the time which passes from the decision to attend a health facility until cash is found to cover direct and indirect treatment costs. Access to resources depends not only on the actual availability of cash, but also on how effectively resources can be mobilized, which is largely determined by a person's social network and the capacity to develop "coping strategies" (Sauerborn *et al.*, 1996a). These, in turn, are influenced by gender, both of the sick person and the person responsible for obtaining treatment.

In a recent article, Tanner and Vlassoff (1998) stressed the importance of gender issues in treatment-seeking behaviour for malaria, and called for a better understanding of gender differences in order to implement malaria intervention programs more effectively. Most literature on gender and health care has regarded resource-seeking and control over resources as a mainly male dominated sphere. Some authors, however, have focussed their investigation on the role of women in coping with illness costs of their families. For example Cosminsky (1987) reported from a Guatemalan plantation that "when a husband is unable to provide cash for medicines, the responsibility falls on the woman. She must resort to strategies to supplement the wages and find ways to increase her resources" (p1166). Similarly, it was found that widows and separated women living in female-headed households in the urban setting of Dar-es-Salaam, Tanzania, were left to fend for themselves and their children (Obrist and Minja, 1997).

In this article, we explore the role of women in resource-seeking for malaria treatment in

children. “Malaria” as used in this paper is not defined in a biomedical sense, but is based on the mothers’ diagnoses of the child’s fever, which did not always correspond to the diagnostic results from the hospital. In particular, we focus on the coping strategies of women who cannot count on the economic support from the father of their children or other male family members.

Study Setting

The study was conducted in Ifakara, the capital of the Kilombero District in the Morogoro Region, Southeastern Tanzania. With its estimated 40,000 inhabitants, Ifakara is the main settlement of the Kilombero Valley, a broad flood plain where malaria is highly endemic (Tanner *et al.*, 1991, Smith *et al.*, 1993). In the health profile from 1983-85, malaria ranked first as a public health problem in the area (Tanner *et al.*, 1991) and hospital records list the disease as the leading cause of mortality for children under five years old (Schellenberg *et al.*, 1999; St. Francis Designated District Hospital, Annual Report 1993).

People of the Kilombero Valley mainly engage in subsistence farming, cultivating rice and maize as the most important staple food (KVTC, 1993). The uncertain climatic conditions and the diversity of micro-ecologies with only few highly fertile zones are the most critical factors for farmers and greatly limit large-scale crop production (Zehnder *et al.*, 1987; Monson, 1991).

Inhabitants living in and near town centres have increased access to other economic activities such as trading, business and paid employment. The main field work was carried out in Lipangalala, a subvillage of Ifakara, which although only few kilometres away from the town centre, has very rural character and most of its inhabitants engage in subsistence farming. Lipangalala belongs to the less developed areas of Ifakara which does not have an electricity supply and housing is generally poor.

As a District capital, Ifakara has a referral hospital. The St. Francis Designated District Hospital (SFDDH), a former missionary hospital, is with its 371 beds one of the biggest hospitals in Tanzania. The hospital also offers primary health care services to the population of Ifakara. Since 1993, a cost-sharing systems has been established charging for consultation (children under five years of age are officially exempted) and diagnostic services (Mujinja *et al.*, 1997).

Prescribed drugs have to be purchased from the private sector, either from the non-profit oriented hospital-based pharmacy or from one of the several profit-oriented town pharmacies. Antimalarials, antipyretics and sometimes antibiotics can also be obtained without prescription from the numerous small shops in the community.

Methods

Much of the background information is based on our ethnographic research focussed on lay perspectives and treatment-seeking behaviour for malaria which we carried out between 1995 and 1997 in Lipangalala (Hausmann *et al.*, 1998). As informants repeatedly emphasised economic constraints as the main barrier to seeking prompt care, we decided to investigate resource-seeking behaviour for hospital attendances. During the wet season, in March, which is the economically most adverse period, we carried out in-depth interviews with 22 mothers who had recently attended the hospital with a child suffering from acute fever, considered to be malaria by the mothers. The selection of the mothers was a convenience sample, identified by information from other female study participants and acquaintances. The interviews were carried out in Kiswahili with the assistance of a (male) local interpreter. We enquired systematically about who generally paid for treatment when this child was sick, and who specifically paid and how money was obtained for the last hospital visit. We also recorded information about the mother's marital status and the occupation of the person who paid for the last hospital visit. In three focus group discussions (FGDs) - one with mothers, one with female and one with male ten-cell leaders (*balozi*) of the community - and in two interviews with female key informants, differences among women in the community, their status and gender-related problems were discussed.

Further data was available fro us from a study of the impact of (Mujinja *et al.*, 1997) carried out half a year later, during the dry season in September 1997, where 22 adults were interviewed at the hospital pharmacy about payment for drugs. Due to the different setting, the selection of the study group and the interview approach, this data set is not comparable to the case studies of the mothers, but it does provide additional information for the economically less adverse dry season.

Gender differences in access to resources

No matter in what sector of economic production, men tend to have advantages over women. In agriculture, the main income generating activity in the region (KVTC, 1993), men are clearly dominant in cash crop farming while women are more likely to engage in subsistence farming. This is reflected in the substantial differences in the mean holding sizes between men and women as they were observed in the socio-economic survey for Kilombero and Ulanga Districts in 1991 to 1993. The report concludes that "the difference could more likely be due to differential access to capital and labour rather than to legal or customary barriers to women land ownership..." (p.24).

Trading as a major source of income is also dominated by men. Shops in town and stands on the main market as well as the numerous small shops in the community are almost exclusively owned by men. Most other small-scale enterprises which provide social prestige and a regular income are undertaken by or offer employment to men, who work as carpenters, masons, tailors and bicycle repairers.

As in other East African regions (Whyte, 1997), wage labour opportunities exist for both men and women, but the majority of salaried jobs are occupied by men. Women can be found in salaried jobs, but most of them require special training, like those of hospital nurses, teachers or secretaries. With the difficult access for women to secondary education, only a few women have the opportunity for such training. Among unqualified workers, men are again in an advantageous position since most jobs, like clearing forests or guarding houses, require a male labour force.

The only income generating activity open to women on a large scale is petty trading. Although men have the more lucrative opportunities, like selling fish or game meat, or supplying shops with items bought in bigger towns, the majority of petty trading activities is carried out by women. On a small scale and usually on irregular basis, women trade home-made pastries (locally known as *chapati, vitumbua, maandazi*), green vegetables, firewood, charcoal, tobacco etc. All these activities require little capital but on the other hand provide only a small profit. An exception is the brewing of local beer (*pombe*). For the Kilombero District, it was estimated that

local beer brewing was the major source of income in 6% of the households a major and a secondary source in 35% (KVTC, 1993). As in other regions of Tanzania (unicef, 1990), beer brewing is the surest and most profitable source of income for women during the slack agricultural season.

Who receives support from whom?

It is commonly assumed that in Africa the burden of caring and health costs does not fall on the sick individual alone, but is shared by an extended kinship network. Elsewhere (Hausmann *et al.*, 2000) we have argued that this might well be true for illnesses perceived to be caused by spirits or witchcraft, but not for 'normal' illnesses which are treated at the hospital. As spirit and witchcraft problems are social in nature and do not only affect an individual but concern and endanger a whole kin-group, the decision to attend a traditional healer (diviner) tends to be a matter for the family, and is directed by the elders. In contrast, 'normal' illnesses, for example malaria, only affect the individual directly. Simple hospital interventions therefore only involve the support of an immediate circle of relatives or friends, and rarely that of an extended group of persons. This is also confirmed in the case studies, both of the mothers interviewed at home and those at the pharmacy. Among the 22 mothers, all the 11 who received help were supported by an immediate relative. In the pharmacy data set, out of the 11 persons who received help,10 were supported by a close family member and only 1 by a non-relative. Male patients who were supported were either elderly men or students who depended on other persons. None of the economically active men received support. In both data sets, the supporting relatives were almost always men, usually either partners, fathers or, for elderly patients at the pharmacy, their sons. In only 4 cases (3 of the 22 mothers and 1 person in the pharmacy data set), was the supporter a female relative, either the mother, mother-in-law or a sister.

While none of the mothers of the 22 case studies was in a paid job at the time of the interview, many of the male supporters had an occupation with a regular income: 4 of the 8 men who supported their partner for the last hospital visit in the present study, and 5 men of the 11 who were recorded as supporting a patient in the pharmacy data set.

It is striking for this community that many children are born out of wedlock. At the time of the interview, only 9 mothers out of the 22 case studies were in an established relationship with the sick child's father or his family: 6 were married, 1 in process of marriage, 1 in divorce, and 1 was a widow. All the other 13 mothers were not, nor had they ever been married to the sick child's father. The relationship to the child's father was found to be highly determinant with regard to a partner's economic support of the child: Women who were married to the sick child's father (or in an established relationship with him or his family) could almost always count on his (or his family's) help. Only in 2 cases was a married woman not (or only irregularly) supported by her husband. Although both these accepted the child as theirs, they had usually refused in the past as well as in the latest episode to pay for treatment costs. Women who were not married to the sick child's father typically had to struggle themselves, or received a little support from their own family. There was only 1 case of a non-married woman who was (albeit irregularly) supported by her partner for child care. Among the other 12 fathers, 5 accepted the child but refused to pay, 5 denied fatherhood and 2 had left Ifakara.

These findings draw attention to the unequal situations among women with regard to economic support as a result of their relationship to the father of the child (and his family). Even under the most adverse economic conditions, a married woman is at least likely to be supported in coping with treatment costs, as husbands in this community mostly seem to fulfil their economic obligations in child health care. Unmarried women, on the other hand, usually have to fend for themselves.

Women whose partners refuse to pay generally have a double burden. Not only do they have little access to economic support from others, but they are usually restricted in access to resources, and rarely have a regular income. To study their strategies for coping with treatment costs is therefore of particular interest, as they are more at risk of delaying adequate health care for their children (and themselves).

Coping strategies of mothers not supported by a male relative

Among the 22 case studies of mothers interviewed in their homes, 14 women said that for the last hospital visit, they had not been supported by a male relative, but either had to fend for

themselves, or (in 3 cases) received help from a female relative. At the time of the interview, only 2 of the 14 mothers were married, one as her husband's second wife.

We focussed our analysis on three main questions. How do these women who lack support from a male relative cope with treatment costs? In what way may their coping strategies contribute to delay in seeking care? And what are possible negative long-term impacts resulting from coping with treatment costs? Special attention was given to the influence of seasonality in women's coping strategies and their consequences.

In a society where the majority of people are subsistence farmers and small scale traders and money is limited but increasingly needed for clothing, school fees, fertilizers, taxes etc., to cover treatment costs is certainly not an easy endeavour. A serious illness episode requires urgent treatment and thus immediate cash. Women of the community have adopted a variety of coping strategies which they carry out with more or less success in reaction to these immediate cash requirements. From the case studies, we could discern seven strategies, often undertaken in combination and according to the women's skills, their situation at the moment and current opportunities. The seven strategies are: taking money from savings, selling crops or brewing beer, carrying out petty business, engaging in casual labour work, borrowing money, pawning personal items, and attempting to find less expensive treatment.

Savings

If savings are available, prompt treatment is most likely to occur. However, although using savings is of great advantage at the moment of treatment, it can have important negative implications on a broader level. It may mean that a person has to cut back on other, less urgent investments, as for example a mosquito net or fertilizers for the fields, for which the money was being saved. On a larger scale, higher treatment costs can imply more far-reaching consequences. One of the 22 mothers interviewed told us that because a member of the family had required urgent surgery they had been unable to carry out planned repairs to the roof of the house. In another case, recorded during our ethnographic fieldwork, a daughter could not continue with higher education because her sister, living far away, had to be in hospital a long time.

Most women, however, do not have savings at their disposal. As subsistence farmers, they have to struggle daily for even the smallest amounts of money. Among the 14 cases where women

had to raise the money for treatment, none stated that they had access to savings.

Crop sales and beer brewing

After the harvesting period, selling crops is certainly the most practised and one of the quickest strategies for obtaining cash. Crop sales are, however, much determined by local market fluctuations. In the months after harvesting, when there is an abundance of crops, it can be difficult and time-consuming to find a customer, and crops often have to be sold at very low prices. The urgent need for money is likely to further reduce the prices. Most serious are the implications for subsistence farmers, for whom unforeseen crop sales at one stage mean food shortages later. To purchase staple food from the market later in the agricultural year is a double financial burden. Not only does staple food need to be bought, but because of an increased demand towards the end of the cultivating period, it has to bought at a much higher price.

During the last months before harvesting (mainly from February to April) crops are mainly sold by men engaging in cash crop cultivation, but only exceptionally by women. Among the 14 case studies, which were recorded in March, only 2 mothers reported to have obtained money through selling rice.

Related to crops is local beer brewing. This activity, traditionally carried out by women, is one of the most important income generating activities in the area. It is, however, only possible for women who have sufficient rice or maize (or money to buy it) and the necessary knowledge and equipment. It is thus open to only a few women in the community. Moreover, although it is certainly a lucrative business, beer brewing has its limitations as a strategy for immediate cash requirements. First, since it can only be prepared freshly, it is highly demand-dependent. Demand is high during the slack agricultural period, but low during the cultivating and harvesting period. Secondly, the preparation of beer is labour-intensive and requires three days of work. Two mothers out of the 14 case studies said they had obtained the money through local beer brewing.

Petty business activities

For women, the most important income-generating activity is petty trading. This is certainly an important strategy for covering treatment costs, as it permits a woman to obtain money within a relatively short time. Especially home-made pastries can easily be prepared and

sold within the community and along the roads. There are, however, two main constraints which limit the business: First of all, the need for little starting capital, and second, time-constraints during the labour-intensive farming period. Thus although it is a widely practised strategy, it must be noted that not every woman can carry it out it at any time, nor is it a reliable way for coping with treatment costs. In our case studies, 4 women had engaged in petty trading for covering hospital expenses, 2 through selling home-made pastries (*maandazi*), one selling vegetables in the small market, and one selling tobacco leaves.

Casual labour work

The most common way to obtain resources, and one open to any active adult, is through casual labour. Most opportunities are offered on the fields during the intensive farming period, either during the planting, weeding or harvesting season. The need to work as casual labourers during the cultivation season can, however, have serious implications. To women, the situation means a loss of working time for their own fields because they have to work on the fields of others, in addition to the time spent caring for the sick child. The result can be a substantial loss of their own harvests, which for subsistence farmers signifies extremely critical food conditions later in the year, when staple food will have to be bought from the market at high prices.

Among the 14 case studies, 8 mothers stated that they had obtained resources for the hospital expenses through casual labour in another person's fields. Since obtaining resources through casual work requires considerable time and effort, it is most often combined with borrowing money.

Borrowing

When immediate cash is needed, the quickest way to find resources is probably through borrowing. Usually, money is borrowed from persons with a regular income, such as employees and shopkeepers, and mostly within a circle of relatives and friends. It is, however, not always easy to find someone who will lend money. Sometimes two, three or more persons have to be asked, an effort which may imply considerable time. While some women have extended social networks with different potential money-lenders, others, especially immigrants (locally named *wageni*, guests) from other regions, find it difficult to borrow money. An important factor for being helped out is whether the person asking for a loan is reliable in promptly paying the money back. On several occasions, women said they could not ask for money from the person who usually supported them because they were still in debt.

In the case studies, 7 mothers reported that they had borrowed the money for prompt attendance at the hospital. The borrowed money was (or was intended to be) paid back by casual work (4), petty business (2), and crop sales (1).

Pawning

A rather rare strategy is to pawning items from the household. This is primarily an option for persons who otherwise have no access to loans or family support, usually for immigrants. Only one mother in the recorded case studies used this strategy. She explained that she took her hand-made mat and, with a written agreement signed by the village leader, received money from a pawnbroker.

Using cheaper treatment options

A particular treatment strategy may be chosen for purely financial reasons. If people have no money available or want to try and avoid hospital costs, illness is managed at home with the means available. Either herbal remedies or, possibly more frequently, pharmaceuticals which were stored at home or received from a neighbour, are administered. A common practice is also to purchase drugs, usually antimalarials, antipyretics or antibiotics, from the small shops in the communities or from town pharmacies. Although the prices are higher compared to that from the hospital pharmacy, the possibility to buy partial courses of treatment makes these drugs more

accessible when a limited amount of money is available.

Domestic treatment with antimalarials can result in inadequate drug use, which has important implications. Temporary relief can cause a patient to interrupt treatment, resulting in under-dosages and subsequent relapse. If the patient is eventually taken to the hospital, over-dosage is possible, when medical personnel prescribe a full dosage of antimalarials after a patient has already taken antimalarials at home. Intake of antimalarials prior to hospital attendance can also result in partial parasite clearance, providing a negative blood examination result. Elsewhere (Hausmann *et al*., 1998) we have described in detail how recurrence of fever and negative blood results can be reinterpreted as an illness caused by witchcraft, thus requiring the intervention by a traditional healer and delaying further hospital treatment.

The following case study, recorded in September during the dry season, illustrates a mother's difficult path of resource-seeking and its implications.

When her 3 year old daughter fell ill with high fever and shivering, Fatuma used her small savings from her petty trade in home-made pastries (*maandazi*) which she practised illegally (at the time, food business was banned because of a local cholera epidemic) for paying the consultation and examination fees of 700./= TShs. (around $ 1.10, rate 1997) at the hospital. The money was, however, not enough to purchase the prescribed antimalarials and antibiotics. Her neighbours helped her out with two antipyretics which gave the child some relief. Leaving both her children with their grandmother, she went 10 km away to carry bricks as casual work. Two days later, she had not yet received her wages, and the child's condition deteriorated rapidly. Her uncle, a shopkeeper whom she asked for help, said he could not support her with money because of his own debts, but gave her two aspirin and two chloroquine tablets from his shop. Despite some relief, her daughter continued to have fever. Although Fatuma repeatedly asked for her wages, her temporary employer refused to pay her and later left Ifakara. A new, serious fever attack motivated the desperate mother to ask us for assistance, and with the drugs she could then purchase, the child recovered.

Some time later, she told us that because of repeated illness episodes of her two children, she could only cultivate part of her farm. Three months after harvesting, she had already sold half of her crops for paying hospital expenses, and the remaining harvests would last at most for three more months. Neither did she have access to capital for reactivating her petty business. Asked about how she will manage during the next eight months, she replied: "I don't know. I hope my uncle will help me, or other relatives. God will help me."

Seasonality: Pandora's risk box

"The seasonal occurrence of harvests implies a seasonal pattern of food shortage, hunger and associated diseases and debilities." (Raikes, 1981:67). Seasonality in Ifakara has a particularly strong influence on childhood malaria. Table 5 lists the four season-dependent factors for the wet and the dry season - malaria epidemiology and community perception, agriculture, gender, and coping strategies.

Ifakara has two marked seasons, the long rains in February to April ('wet season'), followed by a long 'dry season', which determine the agricultural calendar (Monson, 1991). The harshest period in many respects is during the long rains, when a series of season-related circumstances contribute to hardship and an increased risk of disease. From February to April is the peak time of agricultural labour when the rice fields are prepared for cultivation and weeded (Zehnder *et al.*, 1987). Work is intensive and burdensome, and a lot of time has to be spent working in the fields which are often located far from home. Both time and distance are serious constraints for prompt attendance at health facilities. The difficult transport conditions during the rainy season reduce accessibility to health services further for patients who live far from the hospital. But apart from the intensive workload and the temporary residential shifts the rainy season is also the 'hunger period', when stored food is running short and new harvests of maize and rice are not yet ready. Associated with food shortages are nutritional deficiencies and, related to this, an increased susceptibility to malaria (Bradely, 1981) and other illnesses. For this area, a clear seasonal pattern of the nutritional status of the population has been shown, with high deficiencies in energy and protein in all age groups during the wet season (Tanner and Lukmanji,

1987).

But as if this were not enough, the marked seasonal patterns of malaria transmission add much to the risk of infection during the wet season and during the early dry season. With the beginning of the rainy season, the mosquito population rises and malaria transmission increases (Smith *et al.*, 1993). Early and recent surveys from the study area showed a peak of clinical malaria during the late wet and early dry season (Freyvogel and Kihaule, 1968; Smith *et al.*, 1998). 'Malaria' was defined on the basis of what mothers recognized to be malaria, and therefore has a strong perception component. People see a close relationship between the frequency of malaria and the abundance of mosquitoes (Hausmann *et al,* in preparation). Thus people are most likely to decide that a fever case is (or might be) malaria and requires hospital treatment during the wet season, when mosquito densities are highest. The impact of increased perception of malaria during the wet season is also supported by the higher attendance rate of children with malarial fevers at the hospital during that time (St. Francis Designated District Hospital, annual report 1993).

The seasonal stress period of peak labour requirements and hunger has adverse effects on coping strategies, especially for subsistence farmers with no or limited income. During the wet season, little of no produce is available for selling, and in the worst case, if previous production had been below subsistence levels, staple food has even to be bought from the local market. For other income-generating activities, like petty business or beer-brewing, there is neither time nor capital available, nor is there, particularly for local beer, a demand in the community. The only widely accessible and more or less reliable coping strategy is casual labour work. We have, however, already pointed out that when persons are forced to work as casual labourers, there is a serious loss of time for cultivating their own farms, with severe implications for the coming post-harvesting season. The time required for obtaining the money is the reason that casual labour work is mostly combined with borrowing. During the wet season, however, borrowing money is difficult since, although women and subsistence farmers are most affected, it is a bottleneck period for everyone, making it difficult to find a money-lender.

Seasonality has a particularly strong gender-related impact on risk. First, because the agricultural workload, primarily during weeding, is biggest and most time-consuming for women. Secondly, because the income-generating activities available to women are highly season-

dependent, and at all times of year they have negative implications for many. During the wet season, abundant opportunities to work as casual labourers are available, but time is constrained. During the dry season, although diverse options for income-generation are possible and access to resources generally easier, the limited demand for female casual workers results in a difficult situation for women in low economic status who lack capital for petty business and do not have crops for sale. Their coping strategies are thus most irregular, and women have fewer opportunities than men to find alternative, more stable, or less season-dependent work. In addition to other tasks, the job of caring for sick children and other family members is likely to be even more time-consuming in the wet season, when more people have malaria.

Conclusion and recommendations

Even though treatment costs for malaria are low, the main problem which patients (or caretakers) face when a child has a feverish illness is the immediate need for cash. Even after the decision to take a child to the hospital has been taken, a critical time may pass until resources for covering treatment costs are obtained. Due to the different access to resources for men and women, mothers who lack economic support from a male person are most at risk of delaying treatment for a sick child for economic reasons. In this article, we have explored how women cope with treatment costs for childhood malaria and the potential implications for delay.

Our data indicate that women opt for a series of coping strategies, adapted to the opportunities and limitations given by the local social and political structures. Maybe most importantly, our findings describe an important seasonal pattern of risk as a result of an interaction between disease, gender and labour factors. During the wet season, when malaria transmission is highest, agricultural work is most intensive, and the economic situation most adverse, women and their children are most at risk of infection and of delaying treatment, and thus of morbidity and mortality.

We suggest that health programs and investigation should increasingly include gender sensitive and/or season-adapted approaches. Our findings permit us to propose a series of recommendations for implementation at different levels.

Firstly, the hospitals and other health facilities might adopt a pricing policy that accounts for the high local seasonal fluctuations of income generation. One suggestion would be to introduce a seasonality adjusted pricing scheme with "seasonal cross-subsidies" (Fabricant 1992, cited by Sauerborn *et al.* 1996b) that permit fees to be set lower during the difficult period of the year(e.g. January to June) and higher during the less adverse one (e.g. July to December). Another suggestion is the introduction of personal health cards which allow payment in advance or at a later stage when money is more easily obtainable.

Secondly, as unmarried or divorced women who are subsistence farmers are likely to be at higher risk than others of delaying treatment, marital status combined with occupation could be a valuable indicator for identifying target groups for intervention projects, for example for exemption/waiving systems at the hospital, or for subsidised voucher programs like those already used for the promotion of bed-nets (Armstrong Schellenberg *et al.*, 1999).

Thirdly, knowing the different coping strategies women use for obtaining resources permits us to build on and extend them. For example, the fact that women engage in casual labour could inspire the creation of better opportunities for this type of work all year round.

Fourthly, particularly for small-scale business, access to reliable loan systems would certainly improve the situation of many women. An interesting approach, based on broad positive results from Africa and Asia, are micro-credit projects for women. In a community like Ifakara where women are self-dependent, or to a great extent have control over their own economic means, micro-credit systems might be a promising approach. The mutual support groups known from Tanzania (unicef, 1990) and many other African countries (Roost Vischer, 1997), and rotating credit systems in which women make regular contributions and the whole sum collected is paid out in turns to each participant (in Tanzania known as *Upatu*) might provide useful approaches for groups to establish 'social security systems' and facilitate income-generating activities or access to higher education.

Accounting for the disadvantaged position of women in access to resources compared to men, our recommendations strongly support a focus on ‘strategic gender needs’, an approach which “helps women to achieve greater equality and challenges their subordinate positions” (WHO, 1999:31). They thus follow the line of a ‘gender and development’ (GAD) approach, a policy approach which centres on gender relations and their underlying reasons rather than on “women as the passive victims who need welfare and special treatment” (WHO, 1999:4).

	Malaria epidemiology and community perception	**Agriculture**	**Gender**	**Implications for women's coping**
Dry season (Months 7 to 2)	Low transmission rates (Smith *et al.* 1993) Few clinical cases (Smith *et al.* 1998, St. Francis Designated District Hospital, annual report 1993) Weak relation between fever and malaria by the community	Slack agricultural period - time available for caring and hospital attendance - short distance to hospital Food availability - crops available - better nutritional status (Tanner and Lukmanji 1987)	Women have little alternatives for income generation compared to men Single mothers: limited access to social network	**- Petty business** **- Crop sales** **- Beer brewing** **- Borrowing** **limited:** **- Casual labour work**
Wet Season (Months 3 to 6)	Higher transmission rates (Smith *et al.* 1993) Many clinical cases (Smith *et al.* 1998, St. Francis Designated District Hospital, annual report 1993) Strong relation between fever and malaria by the community	Intensive agricultural activity - time constraints for caring and hospital attendance - long distance to hospital during stay on the fields Food shortage - limited crops available - low nutritional status (Tanner and Lukmanji 1987)	Women have higher workload (for agriculture and caring) compared to men Women have little alternatives for income generation compared to men Single mothers: limited access to social network	**- Casual labour work** **limited:** **- Borrowing** **- Petty business** **- Crop sales** **- Beer brewing**

Table 5 Season-dependent factors and their implications for women's coping strategies.

PART V

GENERAL DISCUSSION AND CONCLUSION

Malaria control and studies in treatment-seeking

After 100 years of strategic control efforts, malaria remains a major health problem, costing the lives of more than one million and bringing suffering to several hundred millions of people every year. Many lessons have been learnt from the past decades. Unlike during the eradication era, it is now universally recognised that no single strategy can resolve the malaria problem, but that it has to be tackled with a combination of control measures tailored to the local setting.

In recent years, an increasing body of new knowledge about malaria has been emerging. There are new insights into molecular mechanisms of pathogenesis, and there is more and more detailed epidemiological knowledge. New drugs or combinations of drugs are being discovered, and there is promising progress in vaccine development. The challenge of today is to translate these new research results into locally adapted, operational control programmes.

Especially since the primary health care (PHC) concept of the late 1970s, with its focus of tackling the problem through local health services, the relevance of communities in control programmes has been clearly recognised. The acknowledgement of the vital role of human behavioural aspects has led to a an increasing call to include social science studies in malaria research (e.g. Gomes and Litsios, 1993; Oaks *et al.*, 1991; Targett, 1991). The focus on social sciences was promoted by the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR). Early studies and workshops funded by the Social and Economic Research (SER) component of TDR contributed much to the increasing emphasis on socio-cultural and socio-economic research on malaria (e.g. Gomes and Litsios, 1993; Sornmani and Fungladda, 1991).

Taking behavioural aspects into account continues to be of great importance, and the need to do so recognised in all recent statements about and initiatives for malaria control. It is clear that any implementation of malaria control, particularly when it is to be based on an integrated effort of different approaches, can only be successful if it considers the human response to malaria and to control measures. Any new tool which is introduced into a particular area - be it a new vaccine, a new drug combination, the promotion of impregnated bed nets, or

improved home management - will only be effective and sustainable if it is adapted to needs of the local population - i.e. if it makes sense to people.

The current focus on control based on diagnosis and prompt treatment marks a clear necessity to emphasise people's treatment-seeking behaviour. As outlined in the introduction, one side is the technical part of health care provision that needs to be tailored to specific settings; resources must reach people. At least equally important, however, is the human part. Individuals have to use the available treatments; that is, they have to reach the resources.

Treatment-seeking for malaria has been emphasised in the culturally oriented literature on malaria for the past two decades (e.g. Bonnet, 1986; Brieger, *et al.*, 1984-85; Mwenesi, 1993; Ramakrishna. *et al.*, 1988-89; see section "Literature review" in Part I). Recent investigations show that it is still a much-studied topic, and is considered as important as ever (e.g. review by McCombie, 1996; review by Tanner and Vlassoff, 1998; Winch *et al.*, 1996). Much work has centred on local understanding of malaria and related treatment-seeking, with a principal focus on investigating what people know about biomedical malaria, and in what respect local notions deviate from biomedical concepts (e.g. Brieger, *et al.*, 1984-85; review by McCombie, 1996; Mwenesi, 1993; Ramakrishna. *et al.*, 1988-89; Winch *et al.*, 1996; see section "Literature review" in Part I).

Practically the entire literature starts with the idea of a 'traditional' versus 'modern/biomedical' dichotomy and attempts to fit elements of individuals' 'beliefs' and 'knowledge' about malaria and related illnesses into one or the other category; to detect elements that are 'purely' biomedical (i.e. are thus understood by the population) and elements that are 'purely' traditional (and are thus in the sphere of 'beliefs'). One of the principal findings is that severe manifestations are often not linked to malaria, but associated with a distinct, locally recognised 'folk' illness, often with a 'supernatural' cause, which requires traditional treatment, and this can result in a delay in obtaining adequate care. These findings, strongly influenced by the traditional / biomedical dichotomy, have clearly determined much of the investigation into the socio-cultural aspects of malaria reported in the literature, and applications have been based on these findings.'Beliefs' about severe malaria and the relevance of traditional treatments as a source of delay in attending a health facility are among the topics most frequently discussed.

This thesis builds on the tradition of studying cognitive aspects of malaria relevant for treatment-seeking, but the idea from which it departs is different to those of previous studies. In medically pluralistic settings - and these exist practically everywhere in contemporary Africa - biomedicine and traditional medicine have co-existed over decades. This fact makes it more than probable that one system of knowledge has influenced the other, and vice-versa.

A leitmotif of the thesis, continuously appearing throughout the work, is that local knowledge is the result of an amalgamation of the biomedical and the traditional. By attempting to identify how traditional and biomedical elements interrelate in local illness concepts, this thesis thus questions the customary dichotomy between traditional and modern/biomedical. More than any other, this approach permits the analysis of local understanding of both uncomplicated malaria - which only apparently seems to be purely biomedically understood - and severe or complicated malaria - which only apparently seems to be a purely traditional concept.

The interplay between traditional and biomedical concepts in the local understanding of malaria and related illnesses leads to a new focus in the discussion about the role of traditional medicine for treating malaria. If there are no 'folk illnesses' that overlap with malaria, what aspects related to malaria does the healer treat? And what implications does this have for the healer's accepting biomedicine and referring patients to the hospital?

The strong focus on cognitive factors in treatment-seeking is justified through two assumptions, outlined by Connor and Norman (1995:2). First, cognitive factors are highly relevant for determining behaviour and second, they are more open to change than other factors (e.g. personality). The greater part of the recommendations for interventions proposed in this thesis are based upon focussing on cognitive factors for encouraging behavioural changes. However, cognition is only one aspect among many which are relevant for treatment-seeking. In the last two papers, socio-economic aspects are considered. Cognitive aspects (perceptions about aetiologies) are related here to the implications of social networks and their contributions to covering treatment costs. An analysis of mobilisation of support networks and resource-seeking permits us identify groups at risk of delaying hospital care for economic reasons. The finding that economic obstacles are to a great extent gender-related provides the basis for recommendations within a gender-and-development approach.

From 'folk illnesses' to medical syncretisms: rethinking the traditional - modern dichotomy

Most cultural studies on malaria centre on the status of knowledge about the disease in the community and treatment practices associated with this knowledge (e.g. Brieger, *et al.*, 1984-85; review by McCombie, 1996; Mwenesi, 1993; Ramakrishna. *et al.*, 1988-89; Winch *et al.*, 1996; see section "Literature review" in Part I). The comparison between malaria as it is locally understood and malaria as it is biomedically defined permits the identification of vernacular terms which correspond most closely to malaria, of lacunae in knowledge about the disease, and 'folk illnesses' whose symptomatology largely corresponds to severe manifestations of malaria. A 'folk illness' refers to an illness entity, i.e. a locally recognised illness with its own cause, symptoms and treatment which does not correspond to biomedical nosology (Helman, 1990; Rubel, 1984).

Practically all the reviewed studies on malaria actually show the co-existence of native terminologies, traditional concepts and 'folk illnesses' with notions derived from the biomedical interpretation of malaria. Nevertheless, in general, the data are organised and interpreted within the framwork of clear-cut 'traditional' and 'biomedical' categories. There are descriptions of how antimalarials, like other pharmaceuticals, are valued and utilised according to native logics (Bledsoe and Goubaud, 1988; Etkin *et al*., 1999), which represents a typical type of syncretism, but there is a lack of studies which focus on how 'traditional' and 'biomedical' malaria-related concepts are interwoven in the local models of illness.

Our data clearly show syncretic interpretations for malaria in all its different aspects; 'normal' malaria, '*degedege*' and 'malaria and witchcraft' (see paper 1, paper 2, and paper 3).

'Normal' malaria

Cultural studies on malaria show that a number of informants have good knowledge of the symptoms, cause and treatment of the disease . In quantitative studies, a correlation can usually be observed between knowledge and socio-demographic variables like age, sex, education and residency (rural/urban setting). However, if no important gaps in knowledge are

reported (as, for example when people are unaware of the malaria-mosquito link), the authors consider people's perspectives on 'normal' malaria as unproblematic.

Nevertheless, a good comprehension of biomedical messages does not necessarily mean that interpretations of causal processes or symptoms correspond with interpretations in biomedicine (Downie *et al.*, 1998).The data from Ifakara show that even though knowledge about 'normal' malaria broadly overlaps with biomedically defined malaria, the logic which explains these concepts and frequently interlink them follows principles outside biomedical explanations (see fig. 8 and paper 1).

The two locally recognised illnesses, *degedege* and *bandama*, are both closely linked to malaria by the population, but have further causes (for degedege see paper 2). *Bandama* is characterised by splenomegaly and anaemia ("the child looking whitish"). People relate it to malaria and sometimes to various causes like eating dirty soil or fresh mango leaves. Most informants, however, ignored the cause. *Bandama* is one of the illnesses which 'knowledgeable women' specialise in treating.

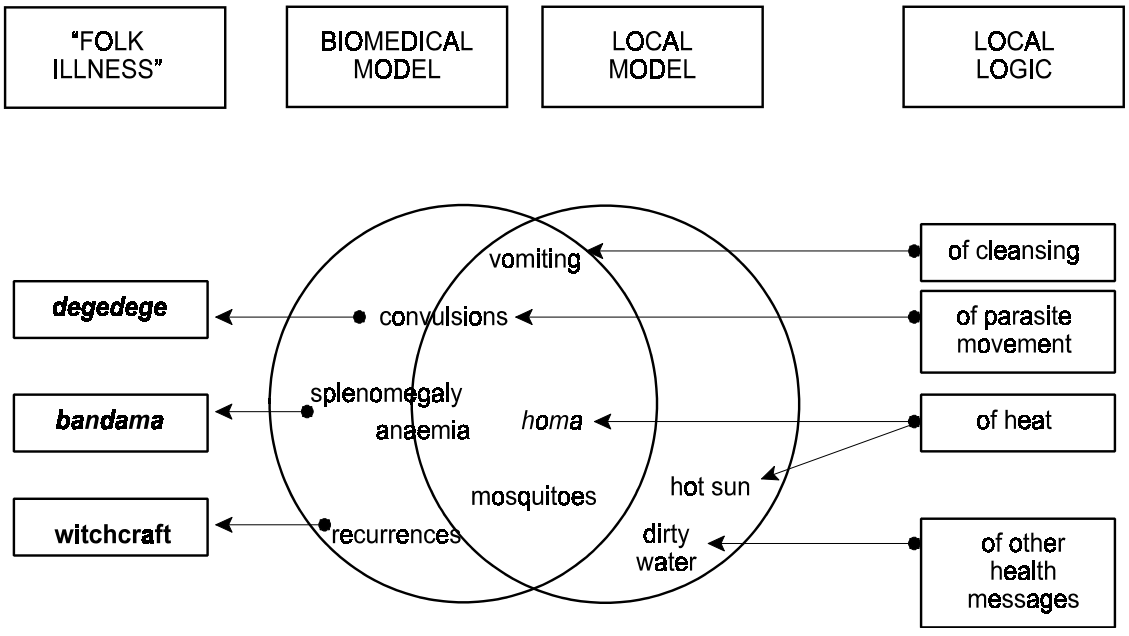

Fig. 8 Local and biomedical model of malaria and cultural logics which interrelate

Degedege

While 'normal' malaria represents the pole of 'biomedically defined diseases', and only a detailed study permits us to identify the underlying local logic which provides full meaning to the elements that form the model, *degedege* is the prototype of the 'folk illnesses'.

The symptoms of *degedege* - in particular its determining symptom, convulsions - are related in the 'traditional model' to a big moth, and to practices completely foreign to the western pharmacopoeia. In parallel, the same term *degedege*, with the same symptomatology, also refers to the local model of 'severe malaria', indicating a clear comprehension of biomedical messages.

The paradox of *degedege* is that it can be ascribed to the two poles of the dichotomy. At the same time, and very commonly for the same persons, it is a term that can be classified into the category of 'biomedically defined' and into that of 'folk illness'. Although logically the bi-causality remains contradictory in the local model, the dichotomy is clearly transcended by most people in a therapeutic scheme which links the 'traditional' with the 'modern' in a coherent treatment sequence (see fig. 9 and paper 2). The treatment order follows the principle of 'cooling down', based, on the one hand, on a necessary balancing between the 'strength' of the therapy and the condition of the patient, and, on the other hand, on the logic of illness progression. The same logic also explains the transformation from malaria to *degedege* (see paper 1).

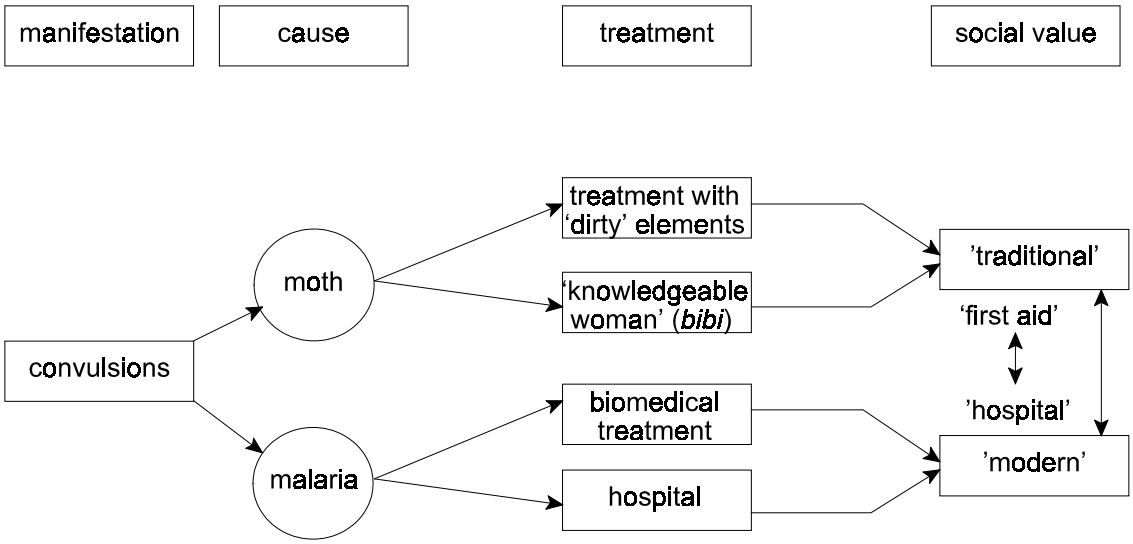

Fig. 9 The complexities of degedege

Malaria and witchcraft

The analysis of the causal relation established between biomedically defined illnesses and witchcraft (Gluckman, 1976; Mbiti, 1990) departs from the idea articulated by Evans-Pritchard (1976) that in African models of illness different levels of causality co-exist for the same affliction. On the one hand, there is the 'immediate cause', which is habitually ascribed to the realm of natural phenomena (like "the collapse of a granary because its supports were eaten away by termites" (Evans-Pritchard 1976:22)). This explains how a misfortune has occurred. On the other hand there is the 'ultimate cause', which refers to the underlying reason ('why the collapse of the granary killed precisely this person'), that is to witchcraft. Biomedically defined illnesses become integrated into local models of illness as 'immediate causes', following the same logic of causation. The same basic principle explains the processes of reinterpretation of malaria in terms of witchcraft observed in Ifakara. In paper 3, we focus on the specific logics which link the arts of witchcraft with parasites, and on their implications for treatment and delay of treatment.

In summary, the three aspects of malaria described here show three different perspectives of an interplay between biomedical and traditional elements. In the first case, represented by 'normal' malaria, the basic concept is biomedical, but cultural logics have been incorporated into it. In appearance, local knowledge comes very close to biomedical concepts, but if carefully looked at, important deviations become evident. In the second case, that of *degedege*, the opposite occurs. In appearance, *degedege* is a purely traditional 'folk illness', but under detailed scrutiny, biomedical elements contained in the model of *degedege* come to light. In the third case, 'malaria and witchcraft', the biomedical concept of malaria is complemented with the logic of witchcraft without either of the two views losing content.

In the same way as malaria represents the results of an interplay between traditional and biomedical elements, any other illnesses and, in fact, any other aspects of culture needs to be considered from this perspective. Since Hobsbawm and Ranger's (1983) influential book on the modernity of tradition, it is well acknowledged that the idea of a tradition which remains unchanged within fixed geographical and social margins is no longer tenable.

In a global context of increasing biomedical presence, the opposition between 'tradition' and 'modernity' hides the processes of synthesis which shape local medical knowledge. As Comas (1998:44) stated: "Occidentalisation, which is a homogenizing phenomenon, also generates variety and diversity. We cannot ignore pre-existing communities, values and traditions which are re-elaborated in a synthesis between the old and the new". In this same sense, local medical knowledge and related health behaviour can be regarded as the interplay between the homogenizing tendencies of biomedicine and the particularities of traditional ideas and practices. To paraphrase Godelier (1991), who refers to the processes of cultural transition in general, the penetration of biomedicine implies the disappearance of traditional and the appearance of biomedical concepts, but especially gives rise to a peculiar and distinctive recombination of old and new elements.

In conclusion, the traditional - modern dichotomy in socio-medical studies needs to be thoroughly rethought. The fallacy of the traditional-modern models of illness and medicines is that it steers the collection and classification of field data into mutually exclusive categories, therefore reproducing this opposition as though it were a true picture of reality.

Traditional treatments: a source of delay in obtaining adequate care?

With the focus of current malaria control on prompt and adequate treatment, to understand delay in attending a health facility is one of the most essential topics. Delay has a quantitative as well as a qualitative aspect. Quantitatively, it is important to know how many hours, days or weeks a patient may delay (or not attend a facility at all). But on a qualitative level, it is important to know *why* people delay, and, ultimately, what can be done qualitatively in order to reduce delay quantitatively.

The role of traditional healers in the management of malaria has received much emphasis in the literature. Investigators reported that traditional treatment could be an important source of delay in attending a health facility. They based this statement on the principal finding that severe manifestations and complications, like convulsions, anaemia, and splenomegaly -

precisely the symptoms which would indicate immediate hospital intervention - were often not recognised by the community as consequences of malaria, but were understood as a 'folk illness' which required traditional treatment (e.g. Makemba *et al.*, 1996; Mwenesi, *et al.*, 1995; Winch, *et al.*, 1996). In both the 1992 Global Malaria Control Strategy, and later in the TDR work plan on malaria home management (UNDP/World Bank/WHO, 2000f) the problem of delays between initial symptoms and admission due to traditional treatment was explicitly stated.

But what is the situation in an area like Ifakara where community knowledge about malaria is good? Do traditional healers still play a role for treating malaria or related illnesses? And if so, is traditional treatment a source of delay for admission at a biomedical health facility?

Our data show that even in Ifakara, where people are well aware of biomedically defined malaria as it is biomedically defined and have to a great extent integrated the link between malaria and 'convulsions' (*degedege*) into their concept of illness, traditional healers still play a role in treating malaria. However, the picture is different from that reported from settings where knowledge is not adequate. In an area where hospital treatment is well accepted and accessible, and people recognise biomedically defined malaria, including its severe manifestations, the reasons for seeking traditional treatment, and the time of seeking it, are different.

The first observation is that, unlike what has been described in other studies, healers do not only play a role for the management of severe malaria, but they are equally, if not more, important for treating uncomplicated cases. The two types of malaria, complicated and uncomplicated malaria, imply the intervention of different types of healers, based on different interpretations of illness and leading to different practices. It is important to distinguish clearly between the traditional treatments of the two types of malaria as they have very different implications with regard to delay and for interventions aimed at diminishing this delay.

The role of healers in the treatment of malaria in Ifakara is closely linked to the syncretic interpretations in the local model of malaria and related illnesses. In the case of uncomplicated malaria, traditional treatments can play a role if malaria symptoms persist, become aggravated or recur. When malaria symptoms appear, the preferred first treatment option is clearly biomedicine, as has also been observed in other studies (reviewed in McCombie, 1996; Matthies, 1998; Winch *et al.*, 1996). As Chavanduka wrote for the Shona of Zimbabwe, most people in

Ifakara "assume that an illness is a normal one until subsequent events prove otherwise. Thus when in need of professional help, most patients nowadays make scientific medicine their first choice" (1978: 40, quoted in Good, 1987). It is only when something unexpected occurs, e.g. when biomedical treatment is perceived to have failed, that malaria may be reinterpreted in terms of witchcraft (see paper 3). Thus for malaria symptoms, a traditional healer (diviner) is almost always only consulted *after* biomedical treatment has been tried, but has not provided expected results. This gives a different perspective to the delay. Although visits to traditional healers can delay, especially because they usually last for several days or weeks, it is not delay in attending a health facility, but rather in returning for further treatment. In a situation where malaria often recurs in patients because of drug resistance, wrong treatment prescriptions, non-compliance with treatment, and reinfections, delay in re-visiting a health facility can be important, but it certainly does not have the same dimensions as a delay between the appearance of initial symptoms and starting treatment.

In the case of complicated malaria, the situation is different. Traditional treatment for *degedege*, the term which most closely describes cerebral malaria, is sometimes the first option, before attending a health facility. However, the described two-step sequence (first traditional, then biomedical), which is the widely accepted treatment-seeking for *degedege*, questions whether the traditional treatment by the *bibi* can be regarded as a source of delay. It may seem like this because the practices (urinating, applying elephant dung etc.) sound very exotic to a biomedically educated person. But the problem of delay is not a direct consequence of these practices, whose application at the longest takes a couple of hours, neither is it inherent in the interpretation of the illness. It is simply a problem of relief. Any treatment - whether 'exotic' urinating or home treatment with 'scientific' antimalarials/antipyretics - which brings at least temporary relief, is likely to interrupt any treatment sequence. Therefore, if delay results from using traditional remedies it is probably not because they are considered as a better alternative than the hospital, but because they make hospital attendance seem less urgent. To promote attending the hospital after traditional treatment is probably as difficult as encouraging a patient to continue with the antibiotic regimen when he/she feels relief, which is a well-known problem.

In summary, both types of healers (diviners and *bibi*) can be source of delay in attending

a health facility for severe or cerebral malaria, or re-attending in cases of uncomplicated, but recurrent malaria. However, their importance should not be overestimated. In any area, the relevance of the healers' treatments as a source of delay needs to be better, and also quantitatively, assessed before clear statements can be made.

Traditional treatments and implications for interventions

The role of traditional treatments for the management of malaria , as it is described in the literature on malaria, has led to propositions for malaria control interventions at two different levels. On the one hand, interventions targeted at the general population have been proposed, with the main focus on improving community knowledge about malaria. On the other hand, including traditional healers in intervention programmes has been recommended. The observations from Ifakara with regard to traditional treatment and treatment-seeking behaviour provide further insights relevant to the discussion about interventions on these two levels.

Interventions targeted at the general public

Basically, the central point of all the recommendations was a call for an increased emphasis on severe malaria in control programmes. Based on the finding that severe manifestations were not always understood as a consequence of malaria, a main proposition was to provide better information to the community about common complications of malaria. Winch *et al.* (1996), for example, stressed that a careful use of terminology in malaria control and primary health care programmes is crucial. In their health messages, they included the term *degedege*, making explicit that malaria can be a cause of it. Similarly, the KINET project in the Kilombero study area designed posters painted by a local painter which showed a convulsing child, indicated with the term *degedege*, in their malaria health promotion campaign (Armstrong Schellenberg *et al.*, 1999).

Efforts to improve community knowledge about malaria are aimed at inducing a change in people's behaviour with regard to treatment-seeking for severe malaria. They are based on the

assumption that if people were well aware of the link between severe manifestations and malaria, they would no longer consult the healer with a convulsing child, but prefer to attend the hospital.

The findings we report indicate that people in the study area link malaria with convulsions and understand *degedege* as a consequence of malaria. However, their biomedical knowledge has not led them to abandon traditional practices. In other words, successful transmission about malaria as the cause of convulsions does not imply that people necessarily change their behaviour. This finding clearly questions the common assumption that knowledge about aetiology always determines the selection of the health care sector. In paper 2, we have argued that at least in an early stage of illness, reasoning about the aetiology plays a subordinate role for treatment choice and that action might instead be automatically activated when certain, clearly identifiable symptoms appear. In the specific example of *degedege*, there would be a need to analyse the model of action and to adapt the messages accordingly. This calls for a re-thinking and re-orientation of much of the activities in the Information - Education - Communication (IEC) approach. The challenge for health communicators is to integrate local concepts and logics into the health messages - with a critical assessment of the relevance of instructions for action, rather than merely increasing people's knowledge by propaganda-like health communication.

In the case of *degedege*, as a direct implication for the transmission of health information, a recommendation would be to encourage people always to attend a health facility, explicitly stating that they should do so even in cases where they feel relief after traditional treatment. Since for people in the study area, the actual model already includes the hospital as a treatment option in a second step, it is likely that such a message would be well accepted. Knowing also the motivations for using traditional treatments, local concepts, e.g. the concept of 'cooling down' an illness, could be used in the promotion of other treatments to be used before attending the hospital, e.g. the administration of artemisinin derivatives at home prior to hospital attendance in severe cases (UNDP/World Bank/WHO, 2000b).

Degedege in Ifakara is only one example of how decisions of treatment-seeking are not always based on reasoning about the illness aetiology. Non-reasoned action is certainly important in other aspects of therapy choice, but its implications are a neglected field in investigations

aimed at recommending and designing interventions, such as information campaigns.

The second set of implications for interventions with regard to traditional treatments concerns uncomplicated malaria. The strong focus on severe malaria in the socio-cultural literature on malaria has led to an under-representation of studies on the cognition of uncomplicated malaria.

Also for uncomplicated malaria, the conventional approaches of improving community knowledge about malaria (which in the study area is anyway already high) have only a limited effects and need to be reconsidered. Since malaria is an inherently ambiguous illness, recognition by the community can never be fully accurate. Even among scientists, case-definition in highly endemic areas is a much debated issue (for a discussion see Smith *et al.*, 1995). Health information should therefore be oriented towards more practical knowledge, e.g. what to do when a child's fever rises in the middle of the night far away from a health facility. But the ambiguity of malaria has a second dimension. The complementation of the local malaria model with the logic of witchcraft described in paper 3, which makes a differentiation based on symptoms impossible, results in treatment itself becoming an important instrument for diagnosis. Perceived treatment failure indicates that witches may be involved.

An analysis of the traditional logics involved in the malaria model can provide new aspects for recommendations for malaria control. In the specific case of malaria and witchcraft, two approaches can be thought of. Firstly, raising community awareness about drug resistance and possible treatment failures leading to recurrent malaria episodes might help to animate people to re-visit biomedical health facilities before moving to a healer. Secondly, in an area of high drug resistance against chloroquine (Hatz *et al.*, 1998; Mshinda, *et al.*, 1996, Mshinda, 2000) like Ifakara, the treatment policy could be reconsidered and shifted to more effective first-line drugs in order to reduce treatment failures Mshinda (2000) discusses the problem that patients often fail to re-attend a health facility if symptoms persist or reappear, and supports the introduction of fast-acting drugs in combination with e.g. sulphonamide and pyrimethamine (SP).

Interventions targeted at traditional healers: implications for referral systems

In the Alma Ata Declaration of 1978, and in the context of the Health for All resolution, traditional healers started to be considered as an important potential for primary health care coverage. In 1978, WHO launched a big, cross-cultural programme of promoting the integration of traditional healers into the formal health care sector (WHO, 1978). After a first boom of ambitious collaboration projects, a shift towards more focussed contributions of healers to specific health issues has taken place, for example in the management of AIDS and other STDs (Green, 1999).

In the case of malaria, healers started to be seen not only as a problematic source of delay, but also as a potential source for community-based case detection, as their places were identified as the site where patients with severe malaria first appeared. Mwenesi *et al.* (1995), for exmple, explicitly mentioned the potential benefit of integrating healers in intervention programmes. In the following, the idea of referrals emerged. Makemba *et al.* (1996), for example, proposed to teach traditional healers how to distinguish febrile convulsions from cases of severe malaria (although he did not mention how) and to explain to them the importance of prompt referral of severe malaria to a biomedical health facility. Currently, TDR is running a project on improving referral practices for severe malaria by traditional healers in Kongwa District, Tanzania (UNDP/World Bank/WHO, 2000f).

The data presented in this thesis support the potential value of referral systems, but at the same time, they call for careful local assessments of how to set them up. First, one needs to know what type of healers are actually involved in malaria management. For the case of Ifakara, both diviners (but by far not all of them) and 'knowledgeable women' (*bibi*) play a role in treating malaria. Secondly, the healers' and patients' interpretations which underlie the treatment logics have to be assessed. For Ifakara, it is likely that the *bibi* would agree to refer patients to the hospital promptly after she had 'cooled down' the symptoms. In fact, this is what they already do, but it could certainly be further stimulated and its urgency stressed. In the case of treatments by diviners, prompt referrals might pose more problems. It is not that they would not agree in principle, but to send a patient to the hospital before traditional treatment to remove witchcraft is completed simply does not make sense to them (or to the patients). 'Teaching' healers about

symptoms of severe malaria would be useless, first because they already know them, and second because they are treating the illness at another level. Here, ways would have to be found to allow and encourage patients to attend the hospital while they are under traditional treatment (most healers do allow this, but others do not) or to encourage parallel use of traditional and biomedical treatments. Thirdly, logistic factors need to be considered. The diviners in Ifakara are well known by the community and some are even organised in associations. To identify them and establish a system would therefore probably be feasible. In contrast, the *bibi* are 'small healers', often not easy to differentiate from the popular sector, and only known to the households in their immediate neighbourhood. To establish a referral system with *bibi* would therefore be difficult.

The example of Ifakara serves as an illustration for the need to clearly know what the local interpretations and other reasons are which lead people to use traditional treatments. But it is even more important to assess whether in a particular setting traditional treatments are really an important source of delay, or whether other factors are equally or more important and would therefore merit more attention from intervention programmes.

The tools are there, but where are the means? Economic obstacles for treatment-seeking

Downie and colleagues (1996:35) portray the 'traditional approach to health education' as a narrow and orderly sequence from knowledge through attitudes to behaviour. In medical anthropology as well as in other disciplines, particularly social psychology (Stainton Rogers, 1991), the idea that knowledge about illness permits the prediction of health-seeking behaviour has been questioned. In the introductory chapter to a special issue of Medical Anthropology Quarterly, entitled "Negotiating relevance: belief, knowledge, and practice in international health projects", Yoder (1997:138) argues that "local knowledge of illness is useful for understanding the logic of actions but cannot be expected to predict individual behaviour". Firstly, because individual actions are influenced by intertwined relationships between cognitive factors (Pelto and Pelto, 1997), including knowledge about illness and treatment, perceptions of disease threat,

knowledge about external limiting and enabling factors, and attitudes to illness and health care. However, the selection between health care specialists of different therapeutic fields - e.g. biomedicine and spiritual healers - follows a clear cultural logic which is principally based on the perceived nature of illness (Whyte, 1997).

Secondly, the intention to act according to what one considers appropriate and essentially feasible can be impeded or hindered by a broad variety of factors, including geographical factors (e.g. distance), scarcity of biomedical resources (e.g. drug shortages), social factors (e.g. intra-domestic power relations for decision-making and control of funds or inequalities in access to resources) and economic factors (direct, indirect and opportunity costs). Tanner and Vlassoff (1998) point out that in both high and low malaria endemic areas, the limiting factors for prompt and adequate health care affect women and their children more than men on cognitive, social and economic levels, because of deeply rooted gender inequalities.

In Ifakara, where knowledge and biomedical resources are in good supply, so that 'tools' for adequate treatment are actually there, an important source of delay in obtaining prompt care is the period of time which passes between the intention to attend the hospital and the finding of cash for covering treatment costs. Economic barriers for health care affect above all the poorest sector of women before the harvest period, when shortage of money is most evident (see paper 5).

One of the usual critiques of applied medical anthropology is the ubiquity of cultural aspects in studies about health and illness, particularly the overemphasis on 'exotic native models' (Scheper-Hughes, 1990) and the neglect of the social, economic and political relations which shape social life (Singer, 1989). Likewise, social processes or economic strategies do not occur in a cultural void (Stolcke, 1992). In order to gain a more comprehensive picture of the reasons which in one way or the other condition delay in attending a health facility, cognitive, social and economic aspects must not be analysed separately, but require consideration of different factors which intervene in the process of treatment-seeking.

The relation between interpretative processes, characteristics of social networks and access to economic resources can best be illustrated with a hypothetical example:

Because of lack of funds, the hospital (which charges consultation, examination and drug fees) might not be attended promptly after the onset of symptoms (*delay 1*). Meanwhile, in order to control the symptoms, antimalarials which were stored at home, obtained from a neighbour, or bought from a shop might be taken, but in inadequate amounts. After a period of relief, a new bout of malaria might appear, which could be interpreted as a manifestation of witchcraft (see paper 3). A healer might be consulted, and his treatment might last a week (*delay 2*). Analysed against the background of different levels of causality, one might say in this case that the 'ultimate' cause of delay was economic, while the immediate reason was the process of reinterpretation and the characteristics of the resulting therapy. Moreover, the economic factor is not separable from the social sphere, as social networks are differently activated and include different persons if illness is perceived to be 'natural' or to be caused by witches or spirits (see paper 4).

Summarising, the implications of the different aspects - social, cognitive and economic - are intertwined, and they need to be analysed in their specific context if relevant factors for delay are to be assessed.

Implications for future research

The findings of the results presented in this thesis call for a novel focus in treatment-seeking behaviour for malaria at the cognitive level and stresses the need to include socio-economic perspectives increasingly in research for application. It would be valuable to carry out studies with a similar approach in order to compare these findings with the situations in other settings, showing different socio-economic and cultural profiles. On the one hand, this would validate the findings of this study. On the other hand, it would serve to encourage studies which account for the rapid cultural and economic transitions of rural areas, a phenomenon which has recently been called 'rurbanisation' (in French) (Bassand *et al.*, 2000).

First of all, assessments are required which investigate the relative weight of each of two levels, cognitive and economic, for delay in attending adequate care. While much emphasis has been placed on cognitive aspects, it is not clear in how far they can really be made responsible for delay. Similarly to what Foster (1976b, cited by Inhorn and Brown, 1990) warned already in the 1970s, there is a danger of 'inappropriately blaming culture'. For example, the role of traditional healers as a source of delay needs to be reconsidered, and their importance weighed against other possible factors for delay. This would be central before thinking of implementing referral systems and collaborations with traditional healers.

On the cognitive level, an orientation of treatment-seeking studies towards more analytical approaches is required. Rather than trying to predict behaviour, an emphasis should be placed on understanding cultural logics which provide information about *why* people behave as they do. The examples of medical syncretisms show the relevance of logics for uncomplicated and recurrent malaria also. Further research should not only focus on severe malaria, but also study treatment-seeking for uncomplicated cases (by far the most numerous ones and the ones which might develop into severe forms). Two areas would be important to focus on: (i) logics which underlie home treatment practices, and (ii) logics that underlie multiple therapy choices. There is still very little known about people's perceptions and behaviour *after* attendance at a health facility.

Further research is also needed on the importance of non-reasoned action, not only for home treatment practices for *degedege*, but also for other therapy choices and other aspects of malaria illness. Non-reasoned action could play an important role in adapting control tools which activate certain responses. This field of investigation and application would certainly also require inputs from cognitive psychology.

A further area of research which emerges from the results, but is not further elaborated on in this thesis, is to know more about the broader social implications of therapies. The treatment of *degedege* by the 'knowledgeable women', for example, creates a therapeutic unit among women (mothers and *bibi*) which might have important social values and provide a feeling of reassurance for women within the community. This might be another reason why it is not as easy to change patterns of treatment priorities as one might expect. Moreover, if mothers

did change their behaviour, this might have further, unforeseen implications on their social life.

The role of 'knowledgeable women', who often treat members of the family and are not traditional healers known to the entire community, also raises the question of the role of elderly women in therapy management. Interventions have traditionally been directed at mothers (and sometimes men), but little is known about the social support and advice giving by grand-mothers and other elderly female relatives, and their influence on decision-making.

Moreover, there should be a reassessment of the role of health information campaigns as the most important tool for changing behaviour. Although well-informed people are certainly better prepared than non-informed ones, other obstacles to seeking or receiving adequate care might be equally or more important. Certainly, more information is needed on socio-economic factors that can cause delay, but also on institutional ones (e.g. availability and accessibility of adequate health facilities, quality of care).

Finally, a field where research is needed is related to women. While it is commonly accepted that women are in a worse position than men with respect to decision-making, controlling, earning and mobilising funds, little is known about differences *among* women within the community. In order to better target health and other campaigns, gender-related research should focus more on identifying the most vulnerable groups among women.

Recommendations for action

Specific recommendations which arise from the findings of this study concern the community level, the institutional level of health facilities, and drug policy.

Community level: improve information

Although community knowledge about malaria is generally very satisfactory, there are some areas of information which need to be better addressed in information, education, communication (IEC) campaigns. Firstly, the strong faith in biomedicine, and limited knowledge about recurrences because of wrong administrations of drugs, non-compliance, drug resistance

or repeated reinfections, may trigger the reinterpretation of persistent or repeated illness episodes in terms of witchcraft. People should therefore be better informed about possible failures of antimalarial treatment. The most important information is to explain why symptoms may reappear or persist after treatment and what to do if this occurs. Clearly, the most important role in transmitting these messages lies with the health personnel at the hospital where antimalarial treatments are prescribed. Shop-keepers have recently been shown to be a potentially important source for drug provision and information, and training them could be a valuable approach for bringing drugs and information to the people (Marsh *et al.*, 1999). This and other channels could be considered for transmitting information about drugs and possible relapses.

Secondly, the finding that aetiology does not necessarily play a role in treatment actions for *degedege* implies that information should not only mention the link between malaria and *degedege*, but explain what needs to be done when the symptoms appear. Messages like 'go to the hospital' are not sufficient. More emphasis should be put on home management with clear explanations of what should be done at home (how symptoms can be 'cooled down'), on insisting to attend the hospital even if there is relief.

Thirdly, the good acceptance of biomedicine for uncomplicated malaria and the notion of 'cooling down' symptoms before going to the hospital might be useful for introducing new drugs at the household or the peripheral health care level. Prepackaged antimalarials for home management of uncomplicated malaria (UNDP/World Bank/WHO, 2000f), with clear instructions about when to take them, are likely to be well accepted and will probably improve compliance with full dosages if they can be integrated into people's repertoire of automatically activated action. The administration of rectocaps (rectal artesunate) (UNDP/World Bank/WHO, 2000b) is a promising way to reduce the time lag between onset of severe symptoms and first treatment, especially in rural areas. The findings of this thesis indicate that these drugs are likely to be readily accepted by the community and could be promoted as 'first aid' treatments which require further follow up at the hospital in order to encourage people to seek adequate care. If home management continues to be a strong focus of malaria control, knowledge about how people decide when to act will serve to promote correct use of antimalarials at home and to attend health facilities adequately.

Fourthly, the results show that mothers is an important target group for promoting home management of febrile children. But it would be essential to know the role of elderly women and to include them in IEC campaigns.

Community level: broader approaches

Health intervention programmes should pay increased attention to the problem of economic constraints for people's health care expenditures. Implementation of health cards and health insurance systems would be a possible way of helping patients to cope with treatment costs. Access to reliable loan systems would be highly advantageous to enable people to cope with immediate health care costs, especially during the harsh period before the harvest.

In view of the disadvantaged position of women in access to resources compared to men, development strategies which consider women's needs and skills are recommended for promotion. Loan and micro-credit systems could help people, and especially women, to establish their own small scale business activities. There is certainly a big potential for helping women to help themselves. The outlook is positive: as women already have their established coping mechanisms and show their independence of generating their own income, action-research projects, following the ideology of the well-known 'recherche - action - formation' (RAF) projects (ENDA Graf Sahel, 1994) would be a promising approach for promoting women's capacities. Similarly, the already widely known mutual support groups (in Tanzania known as *Upatu* groups) merit increased encouragement and support.

Traditional healers

Referral systems for severe malaria which include traditional healers would certainly be valuable approaches, provided healers are found to play a central role in treating malaria or related cases within a particular community. Understanding of different healers' and patients' interpretations of malaria are a prerequisite for proposing recommendations for implementation programmes. Healers' informal and formal associations and operational constraints (e.g. difficulty in location) need to be carefully assessed before implementation can be planned. In consensus meetings, similar to those carried out with farmers (ENDA Graf Sahel, 1993), mutual

agreements between traditional healers and health planners could be worked out.

Health institutional level

Cost-sharing systems at health facilites need to be adapted to the economic situation of the community. The implementation of a health cards system might be a worthwhile approach as it accounts for the problem of people's unstable income patterns throughout the year.

Assessment of risk groups based on criteria that are relevant in a particular community (e.g. unmarried and divorced female farmers) should be encouraged in order to implement voucher and exemption/waiving systems targeted at the most vulnerable people.

Drug administration should also be reconsidered in the light of community perspectives. The use of largely ineffective first-line drugs (such as chloroquine in areas with high resistance patterns) poses a serious problem for delay in obtaining adequate care. First, there is delay due to ineffectiveness of the drug. Second, there is delay because of the obstacles to re-attend a health facility, e.g. because of difficult accessibility (due to work load, transport etc.) or because of lack of affordability (lack of funds). Re-attendance might be felt unnecessary because of reinterpretaion of persistent illness in terms of witchcraft (see paper 3). The combination and accumulation of biological, economic and cognitive factors can thus contribute to long delays. Careful assessments drug policies for first-line drugs which take different aspects into account are therefore required (for a discussion see Mshinda, 2000).

A simplified view of the the potential sites for delay in attending adequate health care during the treatment-seeking process for uncomplicated, cerebral, and recurrent malaria are shown in figures 10, 11, and 12.

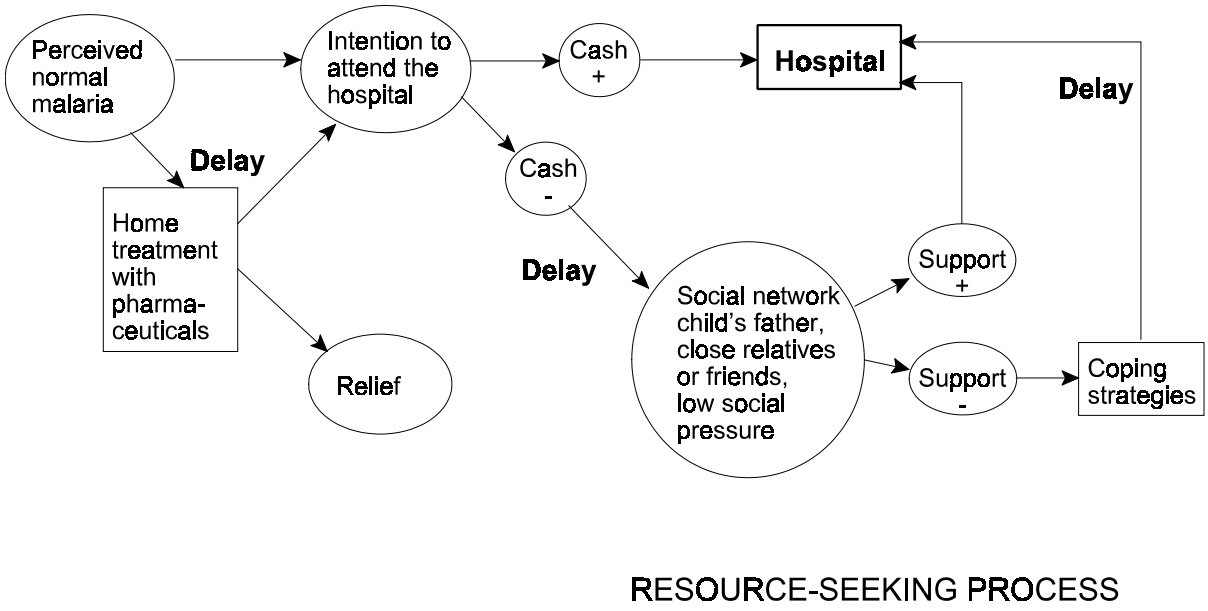

Fig. 10 Treatment-seeking process for 'normal' malaria and potential implications for delay.

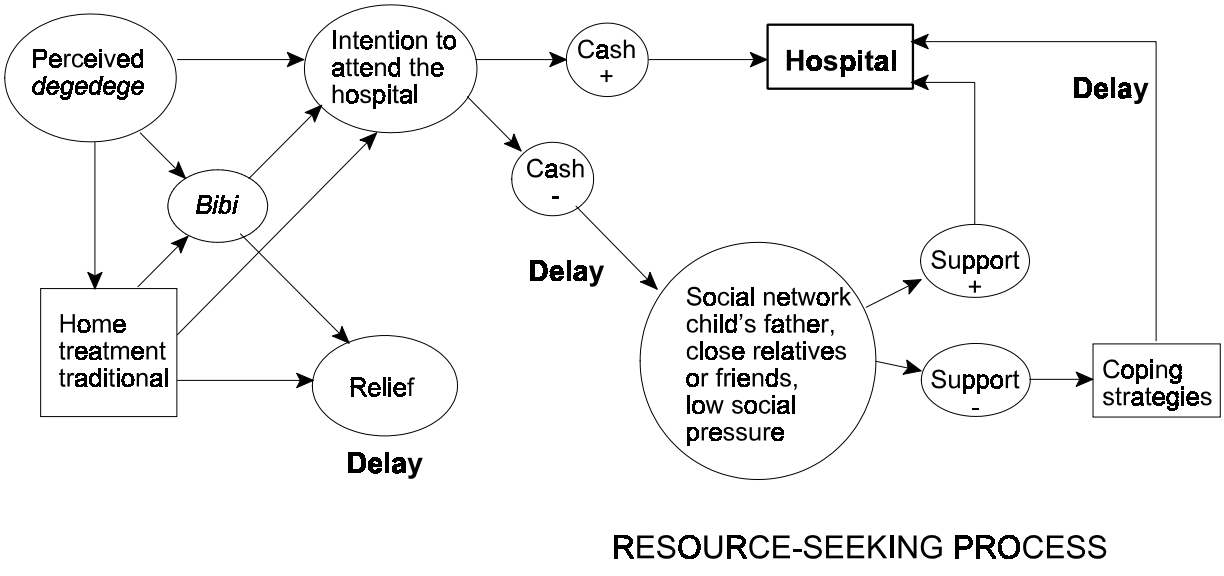

Fig. 11 Treatment-seeking process for cerebral malaria (*degedege*) and potential implications for delay.

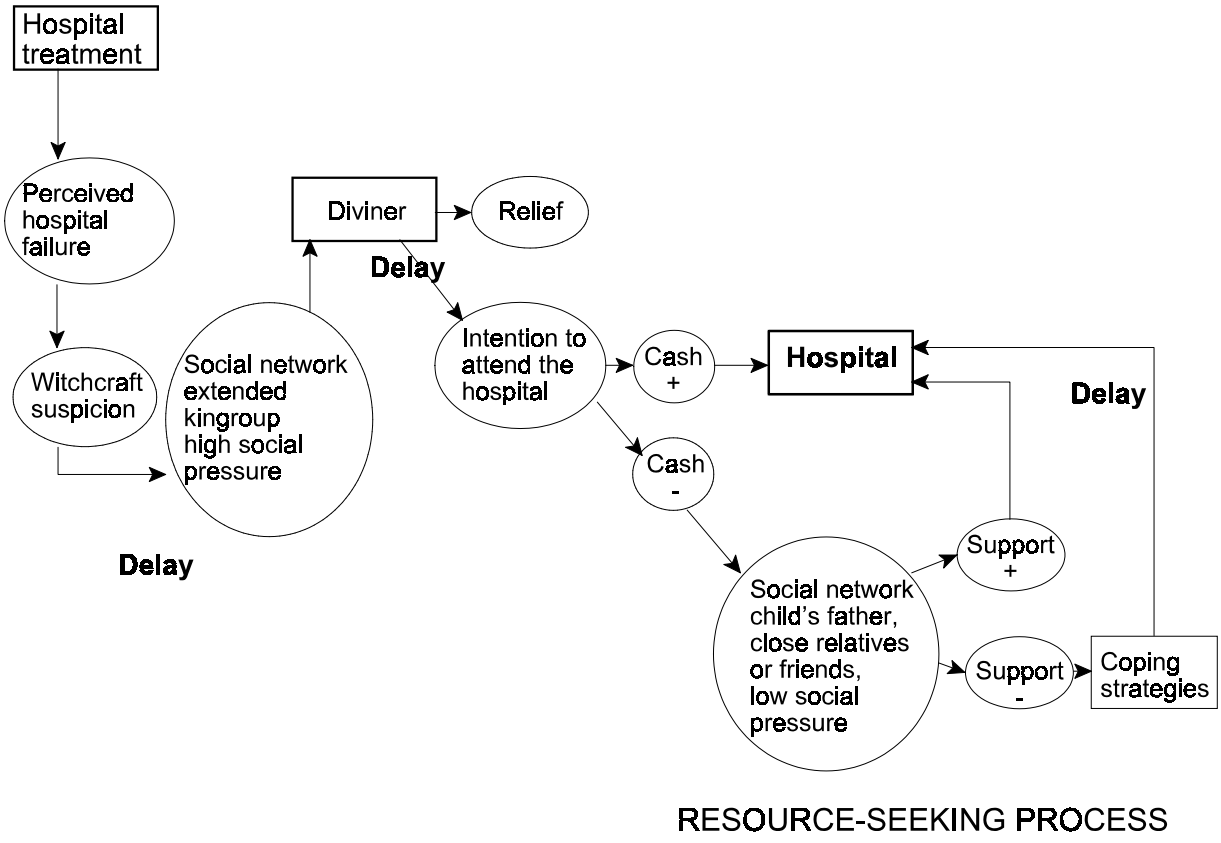

Fig. 12 Treatment-seeking process for recurrent malaria and potential implications for delay.

Conclusion

"When the insights of anthropology and education fully permeate the way in which environmental control is implemented and are not just added on as afterthoughts, and when the most sophisticated results of molecular biology are applied through appropriate simple technologies to epidemiological strategies developed decades ago, then real progress in control can be made." (Bradley, 1991:28)

In the past decades, as never before, it has been widely recognised that malaria control needs a holistic approach, based on the interaction of many disciplines (Brown, 1999). Within this context, studies on treatment-seeking play a vital role for the success of control programmes, or as Oaks *et al.* (1991) stated, "it is the behaviour of individuals and groups that determines how or whether efforts to prevent or treat malaria will be successful" (p.258).

Much work has been done in the arena of human behaviour and treatment-seeking for malaria. The research in this field is much influenced by the traditional approaches of the KAP (knowledge attitude and practice) and KABP (knowledge attitude behaviour and practice) studies promoted in the late 1970s and 1980s (Pelto and Pelto, 1997). These studies certainly have contributed much to the understanding of community perspectives on malaria. They do, however, have their limitations as they provide a static and descriptive picture of what people 'know', what they 'believe' and what they 'do' (or report they would do) when confronted with an illness. With their focus on knowledge and belief, they are deeply rooted in the tradition of the 'traditional - modern dichotomy'.

The papers contained in this thesis have attempted to take a different focus. More than describing treatment patterns, they try to understand the cultural *logics* which underlie treatment-behaviour. It is by understanding theses logics that control interventions can be more adequately targeted to the community.

In contemporary Africa, where traditional ideas and biomedicine have co-existed side by side for so many years, it is evident that interactions between different types of knowledge are likely to have occurred. The analysis of logics permits the recognition of lay understanding and

treatment-seeking as a result of the interplay between traditional and modern ideas. A novel focus on socio-cultural malaria research which goes beyond the 'traditional - modern' dichotomy could therefore bring new insights into people's perspectives of the disease.

But the focus of the thesis is not only on cognitive aspects. Treatment-seeking needs to be regarded in a broader context, which includes people's real life situations. Economic constraints of coping with treatment costs, in connection with mobilisation of social networks, resource-seeking strategies, gender-related aspects and seasonality, are important but greatly underrepresented topics in the socio- cultural and socio-economic literature on malaria. It is hoped that this thesis can stimulate further research in this field.

It is clear that all these aspects can benefit much from the input of anthropology and other social sciences. The aim of medical anthropology as applied to public health should be to provide insights into a specific public health problem. Already in the 1980s, Foster (1987) noted that one of the problems in behavioural research is the failure "to keep research simple" (p. 713). He criticised the tendency of many researchers to be so "keen on conveying an impression of research sophistication that they overlook entirely the need to address the question of the ends for which the research is carried out" (p714). The challenge of applied medical anthropology is to use anthropological concepts, which may be based on complicated theories, to produce answers to important questions and translate them into clear, simple and focussed messages.

Using anthropological concepts, this thesis is an attempt to contribute information that can be used in control interventions to tackle the specific problem of delay in seeking prompt and adequate care for malaria. The challenge, on a different level, is now to actually use the research results and to translate them into health policy actions.

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APPENDIX

Appendix I

Appendix Ia

Question-guide for FGDs on malaria: inquiry phase

1) Please explain: how does a malaria episode start and how does it develop?

2) If you think the symptoms you / your child is suffering might be malaria, what do you first?

3) If someone in the household gets sick with malaria, do you comment it to other people? Do you get support, advice from others?

4) Before you came to the hospital, what did you do for helping yourself / your child?

5) When did you decide to attend the hospital?

6) If malaria symptoms start, do you always attend the hospital? What do you do for mild episodes, what for severe?

7) In general, what are the problems you encounter when you seek treatment?

Appendix Ib

Question-guide for FGDs on gender

1. Are men and women equal in the community?
   If not, what are the differences?
   Economically, who owns what?

   a. Are there differences among women in the community?
      What differentiates them?
      - Education
      - Fields: size, ownership
      - Status related to number of children
      - Clothing
      - Business (including small scale business)
      - Income (personal, of the husband/partner)

   b. To which category do most women of the community belong to?

2. a. Which qualities give respect to a woman in the community?
      - Marriage
      - Children: number, to educate them, clothes, their health
      - Habits of talking
      - Leadership/position in the community or family
      - Work
      - Clothing
      - Income (personal, of the husband/partner)

   b. What lowers a woman's dignity / causes her to be disrespected?

3. What problems do women face in the community in general?
   Are all women affected in the same way / level?
   married / unmarried / widowed / divorced-separated

4. Decision-making
   a. Are there women in the community who make important decisions in the household or in the community?
      e.g. about
      - Health
      - Marriage
      - Work (incl. work on the fields, household activities)
      - Money

   b. In your household, what decisions can you make without consulting others? For what decisions do you have to consult others? Who do you have to consult?

   c. Decision-making for malaria episodes of children. Can you make decisions without consulting others? Who do you have to consult for what?

5. a. What are the main health problems of children in this area?
      boys / girls
      age groups

   b. What are the main health problems women as mothers face?

   c. What problems do old women face?

6. How do women cope with these health problems? What are the limitations, challenges?
   treatment at the hospital / traditional healers / home remedies

7. Are the problems women face changing over time? How?

8. Experiences / narratives in relation to health problems (in particular malaria) and decision-making

9. Socioeconomic characteristics of the respondents:
   - education
   - type of house
   -ethnicity
   - religion
   - income
   - farm (size, ownership)
   - children (number, educated/non-educ.)
   - marital status (single, married, divorced, widowed)
   - occupation (including small-scale business)
   - social status (in the household, in the community)

Appendix Ic

Question-guide for FGDs opinions and expectations from hospital services

Date:
Participants:
Site:
Topic: Community expectation and satisfaction with governmental health services (St. Francis Hospital in- and out-patient department, MCH and pharmacy), Ifakara

Moderator:

Observer:

Introduction:

- The discussion is part of a project about health and illness, and particularly malaria, in Ifakara
- Please mention examples of your own experience or of what you have heard

Question 1:

What do you think about the quality of the services at the St. Francis Hospital?

- experiences
- expectations
- waiting time
- drug shorages
- accessibility (e.g. transport)

Distinguish between OPD, in-patient, MCH, pharmacy

Question 2:

What do you think about the staff at the Hospital?

- experiences
- expectations
- patient-staff relation

Question 3:

What do you think are the main problems people face for getting good treatment at the Hospital?

Question 4:

Are you, or people in general, satisfied with the health services at the hospital?

Question 5:

How could the quality of care at the Hospital be improved?

Question 6:

What are the alternatives people choose when they are not satisfied with the Hospital treatment?

- private health services (Kikopa clinic, town pharmacies)
- services offered by waganga ya kinyeji

Question 7:

What do you think about the introduction of the user fees?

Please invite the informants to participate in another FGD on traditional healers.

Appendix Id

Question-guide for FGDs opinions on traditional medicine

Moderator:
Observer:
Participants:

Introduction:
- Part of the study on traditional medicine.
- Conversations with many *waganga* and observation of treatments
- We would like to know the opinion from the community
- Tell about what you have experienced or heard

Question 1:
Why do you think so many people go to the *waganga*?

Question 2:
Do you think they are helpful for the community?

Question 3:
How do you see the client/patient-healer relationship?
- compared to the hospital

Question 4:
There are different types of treatments, herbal and spiritual. What do you think about the two?

Question 5:
Should the healers get any reward or payment?

Question 6:
WHO proposed a collaboration between traditonal healers and hospital. What do you think about that?
How do you think it could be undertaken?

Question 7:
Recommendations and Comments

Appendix IIa

Question - Guide for In-Depth Interviews with mothers

1. Type of house

- Type of roof, ceiling
- Cooking place inside or outside?

2. Farm

- Number and size of the farm?
- What do you plant?
- How far away is the farm?
- Expected harvest?
- Do you use fertilizers, insecticides, tractor work, employed people?
- Problems with birds, insects, pigs and other animals? What do you do against it? Who and when?
- Protection of harvest before transport? Who and when?
- Do you sleep on the farm? How often? Do the children (<5 yrs.) sleep there?
- What do you take to the farm?
- Is there a risk of getting malaria on the farm? Compared to home?
- How do you protect yourself from mosquitoes? Do you use a mosquito net?
- Is malaria dependant on seasons? Why?
- When is the peak of malaria? When does it start decreasing? Why?

3. House

- How many people sleep in the house?
- How many mosquito nets?
- How many people sleep under a mosquito net? Who? Why?
- What other measures against mosquitoes do you know?
- Which of them do you use?
- Do you store any drugs in your house? Prompt: CQ, aspirin, panadol
- Which and how much? Where did you buy it?

4. Health problems and health-seeking-behaviour

- Was there recently a malaria case in the house?
- How did it start? Symptoms?
- What did you do first? And second?
- When did you start acting?
- Who decided what to do?
– Did you get any support (financial, advice, support for household activities)?
- Did the patient recover? How? After what time?
- Can he/she get malaria again?
- What do you plan to do against malaria?

5. Knowledge on malaria

- What is the cause of malaria? Prompt: dirty water
- What symptoms make you think that the child may have malaria?
- What other symptoms are possible? Prompt: anaemia, enlarged spleen, convulsions, *degedege*, *kifafa* (epilepsy)
- Who is more susceptible to malaria, children or adults?
- What is chronic malaria?
- When the child has malaria, what do you usually do?
- If you take the child to the hospital and they don't detect parasites, what do you do? Prompt: Do you go to the *mganga*?

6. I've heard that... questions

– About twins: If one has malaria, will the other one get it as well? How? Why?
- Is it possible that due to witchcraft, the parasites cannot be detected in the blood even if they are there?
- Can degedege be caused by a butterfly?

7. Mosquitoes

- Which mosquitoes can transmit malaria?
- When in the year can malaria be transmitted? Why?
– At what time of the day/night can malaria be transmitted? Differences? Why?
- Is it possible to get malaria when there are no mosquitoes? Why?

Appendix IIb

Question-guide for in-depth interviews (prospective study)

1. General information

Time and duration of the interview
Setting of the interview (who participates in the conversation, who is listening?)
Occupation of the household members
Who is present at the moment (today and at the time of the interview, including neighbours and friends)

2. Explanatory accounts for illness episodes

Recognition of signs and symptoms (how did the illness start, how did it develop? When do you have to start treatment? How do you recognize when the patient is cured?)
Knowledge of malaria/*homa/degedege* (seasonality, protection, cause, transmission, treatment etc.)
Perception of seriousness

Important: Accounts from different household members!

3. Protection and health-seeking behaviour (Logic behind it! Not only what do you do, but why do you do it!)

How do you protect homa/malaria/degedege? How many beds and how many with mosquito-net? Who sleeps under the mosquito-net?
Treatment at home (cooling down the body, herbs, tablets...)
Where do you get the medicine from? Do you have any medicine at home at the moment?
Treatment at health facilities (private, governm., waganga)
Parallel and sequential use of health services (private, governm., waganga)
Perception of health services (private, governm., waganga)
Compliance with treatment prescriptions (private, governm., waganga)

Important: Statements from different household members! What do you think you should have been done and what was really done?

4. Decision-making (importance of social networks)

Who cares for the patient?
With whom do you discuss the patient's condition?
Who gives advice for treatment seeking (family members, neighbours, relatives)?
Who makes decisions for what kind of health problem?
Where is the money from?
Who takes the patient to the health services?

Appendix IIc

Question-guide for in-depth interviews with “knowledgeable women”

Clients

How many clients come here per month?
Age of clients?
Where are they from? (community or far away?

Treatment

What illnesses do you treat?
How long does one treatment last?
Do you use spiritual power?
Can you treat witchcraft? Who can treat it?
Do patients come here or first attend the hospital?
Is your treatment better that hospital treatment? Why?
If your treatment fails, what do you advice clients to do?

Knowledge

Malaria:
What are the causes of malaria? Prompt dirty water
What are the symptoms?
Where is it best treated?
Who is more susceptible to malaria, children or adults? Why?
What is chronic malaria?
Can witchcraft cause the same symptoms?
Can witchcraft hide the parasites?

Degedege:
What are the causes? Prompt butterfly, spirits, witchcraft
What are the symptoms?
What is the treatment? Where best treated?
Who is more susceptible to malaria, children or adults? Why?
Can witchcraft cause the same symptoms?

Bandama:
What are the causes? Prompt eating dirty soil, spirits, witchcraft
What are the symptoms?
What is the treatment? Where best treated?
Who is more susceptible to malaria, children or adults? Why?
Can witchcraft cause the same symptoms?

Services
What other services do you provide? Prompt: deliveries, advice for mothers in child health care, protections, initiation of boys and girls.

Initiation
How did you become a mganga?
Why only old women?

Appendix III

Structured Questionnaire

Sub-Village:_____

Questionnaire on childhood illnesses

2. Today's date

¦____¦____¦ \ ¦____¦____¦ \ **19** ¦____¦____¦

First Part I: General Information

3. Your name_____ , _____
(first name) (second name)

4. Your age ¦____¦____¦ years or year of birth **19**¦____¦____¦

5. Your religion ¦____¦ , if 4_____
(1=Moslem, 2=Catholic, 3=Protestant,
4=others, 5=no religion)

6. Your ethnic group ¦____¦ , if 8_____
(1=Mndamba, 2=Mmbunga, 3=Mpogoro,
4=Mngoni, 5=Mbena, 6=Mhehe, 7=Mdwewe
8=others)

7. Your education ¦____¦ , if 5_____
(1=Std. four, 2=Std. seven,
3=secondary education, 4=no education,
5=others)

8. Your occupation ¦____¦ , if 6_____
(1=farmer, 2=business, 3=employed
4=casual worker, 5=teacher, 6=others)

9. How many children do you have? ¦____¦____¦

10. Among your children, how many live in your house? ¦____¦____¦

11. How many children under five live in your house? ¦____¦____¦

12.What are the three main childhood diseases in this village? ¦____¦ , ¦____¦ , ¦____¦

(1=malaria, 2=normal fever, 3=diarrhoea, 4=malnutrition, 5=degedege, 6=schistosomiasis, 7=bandama, 8=none, 9=others) if 9_____

_____

_____

Part II: Malaria

13. How can you know that this is malaria for a child?

(1=yes, 2=no, 3=I don't know)

01 fever or high fever or hot body	¦____¦____¦	¦____¦
02 vomiting	¦____¦____¦	¦____¦
03 diarrhoea	¦____¦____¦	¦____¦
04 cough	¦____¦____¦	¦____¦
05 convulsions	¦____¦____¦	¦____¦
06 child looks whitish (anaemia)	¦____¦____¦	¦____¦
07 one lung is swollen	¦____¦____¦	¦____¦

08 others_____

14. If malaria is not treated, can the child die? ¦____¦
(1=yes, 2=no, 3=I don't know)

*If 1, go to question **15**.*
*If 2 or 3, go to question **16***

15. If the child is not treated, how long can it take for him/her to die? ¦____¦ ,if 5_____
(1=hours, 2=two to seven days, 3=two to three weeks, 4=months, 5=others, 6=I don't know)

16. What are the causes of malaria?

(1=yes, 2=no, 3=I don't know))

01 mosquitoes ¦____¦____¦ ¦____¦

02 to drink or wade through dirty water ¦____¦____¦ ¦____¦

03 hot sun ¦____¦____¦ ¦____¦

04 fever or high fever ¦____¦____¦ ¦____¦

05 people's plays (witchcraft) ¦____¦____¦ ¦____¦

06 others_____

*If 05 is yes, go to question **17***
*If 05 is no/I don't know, go to question **18***

17. If malaria is caused by people's plays, is it real malaria or it looks like malaria, but it is not malaria?
(1=real malaria, 2=it looks like, 3=I don't know) ¦____¦

18. Before you take the child to the hospital or to the traditional healer, how will you help him/her at your home? ¦____¦ , ¦____¦
(1=give him/her tablets, 2=cool down the heat of the body,3=give him/her local medicine, 4=I don' treat him/her at home,5=others, 6=I don't know)

If 1, what tablets?_____
If 5_____

19. After the help you gave him/her yourself at home, what will you do? ¦____¦
(1=to the traditional healer, 2=to the dispensary or hospital, 3=others, 4=I don't know)

*If 1, go to question **20***
If 2, which hospital?_____*go to question **23***
If 3_____*go to question **23***
*If 4, go to question **23***

20. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

21. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

22. After attending the traditional healer, if the child does not get relief, what will you do? ¦____¦
(1=I stay at home, I take him/her to the dispensary or hospital, 3= I go to another traditional healer, 4=I don't know)

*go to question **31***

23. If the child does not get relief after the dispensary or hospital treatment, what will you do?
¦____¦
(1=to the traditional healer, 2=again to the same dispensary or hospital, 3=to another dispensary or hospital, 4=others, 5=I don't know)

*If 1, go to question **24***
*If 2 or 5, go to question **27***
If 3, which hospital?_____*go to question **27***
If 4,_____*go to question **27***

24. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

25. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

26. After attending the traditional healer, if the child does not get relief, what will you do? ¦____¦
(1=I stay at home, I take him/her to the dispensary or hospital, 3= I go to another traditional healer, 4=I don't know)

*go to question **31***

27. If after the treatment at the dispensary or hospital, the child still does not get relief, what will you do? ¦____¦
(1=to the traditional healer, 2=again to the same dispensary or hospital, 3=to another dispensary or hospital, 4=others, 5=I don't know)

*If 1, go to question **28***
*If 2 or 5, go to question **31***
If 3, which hospital?_____*go to question **31***
If 4,_____*go to question **31***

28. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

29. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

30. After attending the traditional healer, if the child does not get relief, what will you do? ¦____¦
(1=I stay at home, I take him/her to the dispensary or hospital, 3= I go to another traditional healer, 4=I don't know)

31. Is it possible to give Chloroquine and bitter traditional medicine

at the same time to the child? ¦___¦
(1=yes, 2=no, 3=I don't know)

32. Is it possible for bad people to prepare malaria parasites so that they cannot be detected at the dispensary or hospital? ¦___¦
(1=yes, 2=no, 3=I don't know)

33. Is it possible for bad people to prepare malaria symptoms but it is not really malaria? ¦___¦
(1=yes, 2=no, 3=I don't know)

Part III: Last experience

34. For the time being, has there been one of your children suffering from malaria who was treated at the dispensary or hospital? ¦___¦
(1=yes, 2=no, 3=I don't know)

*If 1, go to question **35***
*If 2 or 3, go to question **39***

35. When was this? ¦___¦
(1=less than 2 weeks back, 2=less than two months back,
3=more than two months back, 4=I don't know)

36. Which hospital or dispensary did you attend?_____

37. **Before** you attended the dispensary or hospital, did you give the child any tablets? ¦___¦
(1=yes, 2=no, 3=I don't know)

If 1, what tablets?_____

38.Before you attended the dispensary or hospital, did you give the child any local medicine?
(1=yes, 2=no, 3=I don't know) ¦___¦

Part IV: Degedege

39. How can you know that this is degedege?

(1=yes, 2=no, 3=I don't know)

01 fever or high fever or hot body ¦____¦____¦ ¦____¦

02 changing of eyes ¦____¦____¦ ¦____¦

03 stiffness ¦____¦____¦ ¦____¦

04 shivering ¦____¦____¦ ¦____¦

05 cough ¦____¦____¦ ¦____¦

06 child looks whitish (anaemia) ¦____¦____¦ ¦____¦

07 convulsions ¦____¦____¦ ¦____¦

08 diarrhoea ¦____¦____¦ ¦____¦

09 one lung is swollen ¦____¦____¦ ¦____¦

10 vomiting ¦____¦____¦ ¦____¦

11 others_____

40. If degedege is not treated, can the child die? ¦____¦
(1=yes, 2=no, 3=I don't know)

*If 1, go to question **41***
*If 2 or 3, go to question **42***

41. If the child is not treated, how long can it take for him/her to die? ¦____¦ ,if 5_____
(1=hours, 2=two to seven days, 3=two to three weeks, 4=months, 5=others, 6=I don't know)

42. What are the causes of degedege?

(1=yes, 2=no, 3=I don't know)

01 fever or high fever ¦____¦____¦ ¦____¦

02 malaria ¦____¦____¦ ¦____¦

03 mosquitoes ¦____¦____¦ ¦____¦

04 hot sun ¦____¦____¦ ¦____¦

05 big moth ¦____¦____¦ ¦____¦

06 spirits ¦____¦____¦ ¦____¦

07 people's plays (witchcraft) ¦____¦____¦ ¦____¦

08 others_____

*If 07 is yes, go to question **43***

*If 07 is no/I don't know, go to question **44***

43. If degedege is caused by people's plays, is it real degedege or does it look like degedege, but it is not degedege?
(1=real degedege, 2=it looks like, 3=I don't know) ¦____¦

44. Before you take the child to the hospital or to thetraditional healer, how will you help him/her at your home? ¦____¦ , ¦____¦
(1=give him/her tablets, 2=cool down the heat of the body,3=give him/her local medicine, 4=to urinate on him/her, 5=I don' treat him/her at home,6=others, 7=I don't know)

If 1, what tablets?_____
If 6_____

45. After the help you gave him/her yourself at home, what will you do? ¦____¦
(1=to the traditional healer, 2=to the dispensary or hospital, 3=others, 4=I don't know)

*If 1, go to question **46***
If 2, which hospital?_____*go to question **49***
If 3_____*go to question **49***
*If 4, go to question **49***

46. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

47. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

48. After attending the traditional healer, if the child does not get relief, what will you do? ¦____¦
(1=I stay at home, I take him/her to the dispensary or hospital, 3= I go to another traditional healer, 4=I don't know)

*go to question **57***

49. If the child does not get relief after the dispensary or hospital treatment, what will you do?
¦____¦
(1=to the traditional healer, 2=again to the same dispensary or hospital, 3=to another dispensary or hospital, 4=others, 5=I don't know)

*If 1, go to question **50***
*If 2 or 5, go to question **53***
If 3, which hospital?_____*go to question **53***
If 4,_____*go to question **53***

50. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

51. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

52. After attending the traditional healer, if the child does not get relief, what will you do? ¦____¦
(1=I stay at home, I take him/her to the dispensary or hospital,
3= I go to another traditional healer, 4=I don't know)

*go to question **57***

53. If after the treatment at the dispensary or hospital, the child still does not get relief, what will you do? ¦____¦
(1=to the traditional healer, 2=again to the same dispensary or hospital,
3=to another dispensary or hospital, 4=others, 5=I don't know)

*If 1, go to question **54***
*If 2 or 5, go to question **57***
If 3, which hospital?_____*go to question **57***
If 4,_____*go to question **57***

54. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

55. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

56. After attending the traditional healer, if the child does not get relief, what will you do? ¦____¦
(1=I stay at home, I take him/her to the dispensary or hospital,
3= I go to another traditional healer, 4=I don't know)

Part V: Bandama

57. How can you know that this is bandama?

(1=yes, 2=no, 3=I don't know)

01 fever or high fever or hot body ¦____¦____¦ ¦____¦

02 child looks whitish (anaemia) ¦____¦____¦ ¦____¦

03 one lung is swollen ¦____¦____¦ ¦____¦

04 child gets foamy or yellowish stool ¦____¦____¦ ¦____¦

05 others_____

58. If malaria is not treated, can the child die? ¦____¦
(1=yes, 2=no, 3=I don't know)

*If 1, go to question **59***
*If 2 or 3, go to question **60***

59. If the child is not treated, how long can it take for him/her to die? ¦____¦ ,if 5_____
(1=hours, 2=two to seven days, 3=two to three weeks, 4=months, 5=others, 6=I don't know)

60. What are the causes for bandama?

(1=yes, 2=no, 3=I don't know)

01 fever or high fever ¦____¦____¦ ¦____¦

02 mosquitoes ¦____¦____¦ ¦____¦

03 malaria ¦____¦____¦ ¦____¦

04 eating dirty soil ¦____¦____¦ ¦____¦

05 people's plays (witchcraft) ¦____¦____¦ ¦____¦

06 others_____

*If 05 is yes, go to question **61***
*If 05 is no/I don't know, go to question **62***

61. If bandama is caused by people's plays, is it real bandama or it looks like bandama, but it is not bandama?
(1=real bandama, 2=it looks like, 3=I don't know) ¦____¦

62. Before you take the child to the hospital or to thetraditional healer, how will you help him/her at your home? ¦____¦ , ¦____¦
(1=give him/her tablets, 2=cool down the heat of the body,3=give him/her local medicine, 4=I don' treat him/her at home,5=others, 6=I don't know)

If 1, what tablets?_____
If 5_____

63. After the help you gave him/her yourself at home, what will you do? ¦____¦
(1=to the traditional healer, 2=to the dispensary or hospital, 3=others, 4=I don't know)

*If 1, go to question **64***
If 2, which hospital?_____*go to question **67***
If 3_____*go to question **67***
*If 4, go to question **67***

64. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

65. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

66. After attending the traditional healer, if the child does not get relief, what will you do? ¦____¦
(1=I stay at home, I take him/her to the dispensary or hospital,
3= I go to another traditional healer, 4=I don't know)

end 1

67. If the child does not get relief after the dispensary or hospital treatment, what will you do?
¦____¦
(1=to the traditional healer, 2=again to the same dispensary or hospital,
3=to another dispensary or hospital, 4=others, 5=I don't know)

*If 1, go to question **68***
*If 2 or 5, go to question **71***
If 3, which hospital?_____*go to question **71***
If 4,_____*go to question **71***

68. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦____¦
(1=only treatment, 2=divination, 3=I don't know)

69. After attending to the traditional healer, if the child starts improving, what will you do?
¦____¦

(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

70. After attending the traditional healer, if the child does not get relief, what will you do? ¦___¦
(1=I stay at home, I take him/her to the dispensary or hospital,
3= I go to another traditional healer, 4=I don't know)

end 2

71. If after the treatment at the dispensary or hospital, the child still does not get relief, what will you do? ¦___¦
(1=to the traditional healer, 2=again to the same dispensary or hospital,
3=to another dispensary or hospital, 4=others, 5=I don't know)

*If 1, go to question **72***
*If 2 or 5, **end 3***
If 3, which hospital?_____***end 4***
If 4,_____***end 5***

72. If you take the child to the traditional healer, is it only for treatment or for divination first? ¦___¦
(1=only treatment, 2=divination, 3=I don't know)

73. After attending to the traditional healer, if the child starts improving, what will you do?
¦___¦
(1=I stay at home, 2=I take him/her to the dispensary or hospital, 3=I don't know)

74. After attending the traditional healer, if the child does not get relief, what will you do? ¦___¦
(1=I stay at home, I take him/her to the dispensary or hospital,
3= I go to another traditional healer, 4=I don't know)

end 6

Initials of theinterviewer ¦___¦___¦

Curriculum Vitae

Name	Susanna Hausmann Muela Ribera
Date and place of birth	2nd of March 1966 in Zürich, Switzerland
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Languages	German, English, Spanish, French, (Swahili)

Education

1983 - 1986	Secondary School Wohlen, Switzerland, Matura type B
1986 - 1991	Studies in Biology I, University of Basle, Switzerland
1991 - 1992	Master of Science (MSc) in Medical Parasitology. Master's dissertation (*Diplom*) titled "Chloroquine and lysed erythrocytes: two possible factors for stimulating gametocyte formation in *Plasmodium falciparum* parasites *in-vitro*. Supervision: Prof. M. Tanner, Swiss Tropical Institute
1991 - 1993	Courses on Didactics and Pedagogy, University of Zürich, Switzerland
1993 - 1994	Master of Science course in Medical Anthropology, Brunel University, Uxbridge, West London, England Master's dissertation titled "Antibiotics kill your red blood cells: perceptions of health and illness by Colombian immigrants in London and conflicts in the doctor-patient relationship." Supervision: Dr. Cecil Helman, Brunel University
1994 - 2000	Swiss Tropical Institute, Basle and Ifakara Health Research and Development Centre, Tanzania. PhD Thesis in Epidemiology titled "Community understanding and treatment-seeking for malaria in a holoendemic area of southeastern Tanzania"
1999	Teaching in the course on "Mediums y chamanes" (Mediums and shamans) of the Catalan Institute of Anthropology (ICA).

During my studies I attended lectures and courses given by the following lecturers:

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Publications

Hausmann Muela, S., Muela Ribera, J. & Tanner, M. (1998) Fake malaria and hidden parasites - the ambiguity of malaria. *Anthropology & Medicine,* **5** (1), 45-61.

Hausmann Muela, S. & Muela Ribera, J. (2000) Illness naming and home treatment practices for malaria - an example from Tanzania. *Proceedings of a workshop on "People and Medicines in East Africa" held in November 1998 in Mbale, Uganda,* Danish Bilharziasis Laboratory (dbl), Copenhague, in press.

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Mujinja Ph., Mushi A. & Hausmann, S. (1997) *Cost-Sharing impact analysis for St. Francis Designated District Hospital*, Health and Social Management Ltd., Dar-es-Salaam.