SITUATION ANALYSIS ON MALARIA CONTROL IN THE CONTEXT OF ONGOING HEALTH SECTOR REFORMS IN RUFIJI DISTRICT 2002

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PUBLIC HEALTH IN THE UNIVERSITY OF DAR ES SALAAM

2002

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the University of Dar-es Salaam a dissertation entitled: Situational analysis on malaria control in the context of ongoing Health Sector Reforms in Rufiji District, in fulfilment of the rerequirements for the degree of Master of Public Health (MPH).

Supervisor's Signature _____

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Date: 23/Sep/2002

DECLARATION

I hereby declare that this dissertation is my own original work and that it has not been submitted for a similar degree in any other university.

Candidate's signature _____

MTUMWA S. MWAKO (M B Ch.B)

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ACKNOWLEDGEMENT

I owe many thanks to my supervisor, Prof. Zul Premji for his continuous guidance, excellent advice and constructive criticisms right from the initial preparation of research proposal to the final completion of this dissertation. I wish to convey my sincere gratitude to GTZ for sponsoring me to undertake the Master of Public Health course, I am so grateful. I would like to give special thanks to GTZ Health team Leader Dr. Gorgen and also Dr. Kisanga, the District Health Support Project for their constant advice and support. Thanks to Prof. Leshabari and the whole university and GTZ for making all necessary arrangements for the execution of the research work. I am greatly indebted to Dr Don Savigny and Dr. Abdullah Salim of TEHIP for their continuous advice. Thanks also are extended to Mr. C. Makwaya, Mrs. Mpembeni for statistical expertise and Mr. Mayunga in data analysis. The high spirit displayed by the research assistants Mr. Kassim Swafi, Mrs.Hadija Mlanzi and Mr. Tukae during data collection is very much acknowledged. Thanks to Rufiji District Medical Officer (DMO) Acting District Executive Director (DED), District Engineer of water, Village leaders People of Utete, Ikwiriri and Kibiti for all the assistances and for participation in the survey. I wish to acknowledge the assistance of secretarial services provided by Mrs. Anna-Stella and all others. Really I find it hard to mention by names every individual who contributed in one way or another to the success of this work, but to all of them I say thanks.

DEDICATION

This dissertation is dedicated to my beloved husband Mr.Saad who took tirelessly care of the family during my long periods of absence from home. I have had the highest degree of moral support and encouragement from my dear loving husband and children Ali, Amina and my nephew Yunusu throughout my studies. Finally to my dear Parents, my father Mr. Simba Mwako for taking good care of me. To my dearest late mother, Mamboleo Ngemo and my late guardian, uncle Yunusu Mwachangare whose beliefs in importance of education have contributed much in me the way I am. May God rest their souls in eternal peace, Amen.

ABSTRACT

A cross-sectional situation analysis of malaria control activities was conducted in Rufiji District along Coastal Tanzania. Three divisions out of six were covered. The study involved four study populations comprising of Health care providers, District leaders including community PHC members and village leaders, community members and a retrospective analysis of in-patient records. The main objective was to assess the performance of malaria control activities. Specifically coverage / promotion of Insecticide Treated Nets, Malaria case management and knowledge, practices of health care providers including the community was assessed. In addition, the district health plan was reviewed to ascertain whether the goals and targets were evidence based. The District health plan was explicit about malaria as a public health problem and clearly defined its implementation strategies and targets. However, in practice, malaria control was greatly deficient. The ITNs coverage is below 20%, malaria case management is variable depending on availability of facilities, knowledge about malaria control amongst health staff is lacking and not uniform. Knowledge of the population about malaria is also flawed and their participation is questionable. This is reflected by 30% of the community respondents still seek traditional healers to treat their febrile children. Poverty was identified as a major constraint. The results of the situation analysis are discussed in the light of these constraints. Recommendations are suggested for the district as well the central Government.

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ACRONYMS AND ABBREVIATIONS

An	- Anopheles
ANC	- Antenatal Clinic
BC	- Before Christ
CBO	- Community Based Organization
COMM.	- Community
DDT	- Dichloro- Diethyl Tetrachloride
DHMT	- District Health Management Team
DHP	- District Health Plan
DED	- District Executive Director.
DMO	- District Medical Officer
DSS	- District Surveillance System
DALYs	- Disability Adjusted Lost Years
DYLG	- Discounted year of life gained
EDP	- Essential Drug Package
EPH	- Essential Primary Health
HCP	- Health Care Providers
HCW	- Health Care Workers
HSR	- Health Sector Reform
IMCI	- Integrated Management of Child Illness
ITN	- Insecticide Treated Nets

MCH	- Mother and Child Health
MOH	- Ministry of Health
MTUHA	- Mfumo wa Taarifa za uendeshaji Huduma za Afya.
NGO	- Non Governmental Organization
NMCP	- National Malaria Control Programme
NMMTSP	- National Malaria Medium Term Strategic Plan
PHC	- Primary Health Care
PSI	- Population Service International
RBM	- Roll Back Malaria
S/P	- Sulfadoxine/pyrethamine
TEHIP	- Tanzania Essential Health Intervention Project
TBA	- Traditional Birth Attendants
UNDP	- United nation Development Project
UNICEF	- United Nations Children's Funds
USD	- United States Dollars
WB	- World Bank
WHO	- World Health Organization

CHAPTER ONE

INTRODUCTION

Malaria is a significant public health problem. It is prevalent in more than 90 countries inhabited by a total of some 2,400 million people, 40% of world population (WHO 1998). The most affected are children under 5 years and pregnant women (WHO 1997). There are about 90% of global malaria deaths, out of which 80% of them are children under five years (RBM: WHO/AFRO 2000). Morbidity due to malaria cases alone in Africa is between 300 and 500 million clinical cases annually (WHO 2000, UNICEF 2000) resulting in about 1 million deaths (WHO 1998).

Malaria is a major factor contributing to poverty and absenteeism from work and schools in endemic areas. This brings loss of about, 1.3% of gross domestic product in African countries and 12 billion US dollars annually (WHO 2000). The situation of sub-Saharan Africa has been deteriorating since the 1980s. Sometime in the late 1990s, WHO formulated RBM initiatives and partnership to finance malaria control activities. Its objectives were: -

- To support endemic countries in developing their national health system.
- To encourage the needed human and financial investment nationally and internationally.

In 1998 WHO prioritized malaria because it was a political priority among African leaders and a major scourge in Africa and the world. So WHO resolved to find

means of focusing Worlds attention and support on renewed and redoubled efforts to beat this killer of young and poor.

In 2000 the Abuja declaration and plan of action for malaria control in Africa was established. Roll Back Malaria global targets were to reduce malaria morbidity and mortality in phases. The aim was that by the year 2010 morbidity and mortality should be reduced by 50%, while in 2015 reduction was proposed to be 75% followed by further reduction of 50% to 80% by year 2015 to 2030.

The Abuja declaration set the outcome targets to be achieved by year 2005 to be 60%. It was also targeted that 60% of the population in endemic areas should have access to appropriate treatment, 60% of pregnant women should have access to malaria prevention and 60% of children under five and pregnant women should sleep under insecticide treated nets (ITN). Its focus in Africa is aiming at: Upgrading health-delivering systems at both the local and national level in: -

- Intensifying the use of ITN
- Mapping of malaria regions and of medical facilities to better direct health recourses.
- Developing new drugs for victims already infected with malaria.
- Developing the new anti-malaria drugs and vaccines.
- Developing methods to address malaria in emergencies e.g. refugee and post war situations. Roll Back Malaria will create a network of teams to go into villages and analyze treatment and prevention practices at the household and community level. It will assess availability and quality of health care by public and private sector and potential local partners and provide technical

and financial support for analysis through this network at district level (Fact sheet No. 203, 1998)

- In Tanzania, RBM has selected seven districts including Rufiji, Morogoro Rural, Chunya, Tunduru, Lushoto, Magu and Muleba as pilot districts. Four of these were implementing IMCI and three have an existing demographic Surveillances system (DSS)

PROBLEM STATEMENT

The low Lands and coastal areas of Tanzania have geographical features, which are conducive for mosquito breeding. It is hot with high humidity, which causes abundance of vectors. This sustains malaria transmission for a long duration (Leeson et al 1931) Annual incidence of malaria in Tanzania is estimated to be 400-600 per 1,000 and 100,000– 125,000 people die of malaria. Out of which 70,000-80,000 are children under 5 years. About 2-3 children die after every 15-minute (NMCP, DSP, MOH 1997). Lushoto, Arusha, Kilimanjaro, Rungwe and Iringa, were formally malaria free zones but epidemiological reports shows that malaria is now present in these areas (Dahoma, 1983).

Malaria is the leading cause of out- patient attendance and in- patients admissions. About 38% of out patient attendance were reported to be children under five and 43% of annual admission respectively were children under five years suffering from malaria (MTUHA 1997). The first cause of death in all hospitalised children under five years is 31%. It is the most widely spread disease (MOH 1997) if not well controlled can lead to increase in morbidity and mortality especially in pregnant mothers and under five children. There are gaps of information and data, before the initiation of RBM. Generally, we do not find out the situation of malaria in this district. Therefore there is indication for doing analysis to find out the present malaria control status in Rufiji. This will enable appropriate planning; prioritize resource allocation and tailor implementation strategies.

RESEARCH QUESTIONS

- Will the results of situation analysis identify strength and weaknesses in malaria control?
- Further more, will these results enable Roll Back Malaria initiatives, to tailor control strategies appropriately?
- Does malaria measures currently implemented by TEHIP have any effect on the community?

RATIONALE

Malaria is number one among the top ten diseases in Rufiji District in terms of morbidity and mortality. Morbidity rate reported in 1998 was 31.5% and in 1999 was 36.9%. Mortality rate was 21% in 1998 while in 1999 it was 12.5% and in the year 2000 it was 18% (DHSP Rufiji 2001). The case fatality rate of under 5 year children was 6.8% and for above five years was 2.9% (RDSS 2001)

Since the initiation of Roll Back Malaria in the district, we do not know the situation of malaria in these pilot areas therefore there is a need to do situational analysis to find out the present situation of malaria and its control measures. The main focus will be to find out baseline data of information about, prevalence, morbidity, mortality, case fatality, funds allocation for malaria control activities, preventive measures like use of ITNs and environmental preventive measures present. The data obtained will useful in improving malaria control activities in Rufiji. Also, they could be used by RBM and the MOH in Planning strategies for malaria control in the country.

BROAD OBJECTIVE

To assess the current situation of malaria in terms of control strategies in place, resources available and knowledge of the health care providers and the community.

SPECIFIC OBJECTIVES

1. To determine current situation of malaria in Rufiji (Prevalence, case management).
2. To determine knowledge, attitudes and practice of health providers and the community on malaria control.
3. To determine current situation of malaria control measures the community is using (ITN, case management and environmental measures).
4. To determine coverage of interventions currently available and whether interventions are integrated into the primary health care.
5. To determine the use of data in planning at health facilities and community levels for prevention of malaria (IMCI, TEHIP, DSS).

CHAPTER TWO

LITERATURE REVIEW

Tanzania is a malaria endemic area. Most entomological studies, which were carried out in North Eastern Tanzania, showed mosquitoes transmitting malaria to be, *Anopheles gambiae s.l.* breeding in fresh or brackish water, ranging to very small temporary collection to large pools. Population of this species builds up rapidly during rain seasons.

A. Funestus breeds in shaded permanent water bodies specially the edges of slow moving streams, rivers lakes and swamps. It is present also during dry seasons. They can also be found at high altitudes near the coast 3000 feet on steeply slopping and heavily forested mountains like Usambara and Mbulu (Kihamia and Kilama 1991) Before World War II there was no malaria in Hanang and Arusha. But as the time went on in 1948 it was reported that Endasak had prevalence of 28% and Babati with prevalence of 19%. The disease declined and disappeared by 1963 without any intervention measure (Clyde 1967).

Increased agricultural activities changed pattern of malaria endemicity and transmission in some parts of Tanzania. This has been reported in study done in Amani where malaria was scarce until 1960s when the sporozoite rate increased from 0% in 1967/71 to 0.09% in 1973 May-June. While in August-December 1980 it increased to 11.1%. Prevelence rate of malaria infection in infants increased from 71.4% in 1980 to 80% in 1981 and 91% in 1992 (Kihamia and Kilama 1991).

The surge in malaria in Tanzania is clearly evident in most Tanzanian urban areas, which for decades had effective malaria control programmes. These started falling apart with decentralization in 1972 (Kihamia et al 1991).

Migration to other areas led to spreading of the malaria. While Agricultural activities like rice farming provided breeding sites due to accumulation of water for long time. Other human activities, like clothing and housing increases or decreases man contact with malaria vectors. Construction of dams, man made lakes, irrigation work aimed at generating electric power to improve agriculture but instead created mosquito-breeding habitat, especially when drainage was poor. Ditches were badly maintained and Rice field had no drainage, so water present throughout farming time created more breeding site. Road and railway construction left borrow pits and improperly built culverts left more breeding sites. Earth excavation for making mud bricks (Adobe) left ditches which increased the breeding sites.

There are many examples that encouraged man mosquito contact such as walls of human dwellings which easily allow mosquito entry and departure through gapping walls, lack of ceiling and louvered doors and windows. All these increased areas for mosquito entrence in the households. Unplanned villages and uncovered water wells around the houses provided breeding sites. While Seepage from community water supplies, reservoir, pipes, and barrels, empty cans, soak away pits cisterns, blocked drains, garden pools, flower vases and blocked gutters increased breeding areas (Kihamia & Kilama 1991)

Population at risk in various transmission zones

In Tanzania transmssion period and types has been classified into four areas: -

1. Over six months stable perennial, these are areas in coastal lakes and it has a population of about 14 million (42%)
2. Four to six months are stable seasonal, these covers central zones. It has a population of about 11.3% million (34%)
3. One to three months, these are strongly seasonal or epidermic season and it covers the fringe highlands and rift valley, it has a population of about 2.6 million (8%)
4. Less than one month epidermic or no malaria, this condition is present in Highlands, It coveres 5.8 million people (17%) (MTUHA, MOH 1997)

Public Health importance

Malaria affects all age groups in the transmission areas. Estimated population at risk is 31.7 million people, constituting 93.7% of the national population. The population groups most vulnerable to malaria are children under five years and pregnant women, due to low and decreasing immunity respectively. Malaria is a major cause for decreased learning capacity in children, students and trainees in age groups 5 to 25 years and for loss of economic productivity in the workforce aged 15 to 55 years. The cost for outpatient and inpatient care per case, has been conservatively estimated to be Tshs 1,600 and 20,000 respectively (MTUHA 1997).

On account of above effects and its other consequences, malaria has been demonstrated to account for over 30% of the national disease burden, and is therefore a top health priority for allocation of resources for its control (NMMTSP, MOH 2002).

Anti-malaria drug policy

The first line drug of choice for treatment of uncomplicated malaria is a sulfadoxine/pyrethamine tablet according to Ministry of health guidelines and the dose are given according to age and weight. However it should not be used in late pregnancy. The second line of treatment is amodiaquine while the third is quinine; these are also given according to age and weight.

Quinine can be given through intravenous and is safe in pregnancy when used in therapeutic doses (Malaria National guideline 2000).

Anti-malaria chemoprophylaxis: -

These are antimalaria drugs, which are supposed to be given weekly to pregnant women at Antenatal clinics. Previously chloroquine used to be given, but now it is no longer used due to its resistance, instead Salfadoxine/prymethamine or amodiaquine are used in its place. Larvicidal using Paris green in the breeding site was thought to be the best method for prevention of mosquitoes and malaria. This method was used in Cuba, and Panama and was reported to have been successesful. South Africa used pyrethrum spray in controlling malaria and it successfully reduced the mosquitoes. At the beginning of World War II many brands of insecticide spray were discovered, like Dichloro-diphenyl trichloroethane, hexachloro-ocylohexane and dieldrin. But these insecticides later on developed resistance and Italy and Greece

after using DDT to try to eradicate malaria, found that the house-to-house spray did not reduce much mosquito due to resistance. Other method used was based on concept of "Naturalistic Control" that was based on knowledge of breeding habits of mosquito.

Nevertheless, the eradication of malaria was then adopted by WHO 1955 and launched a global campaign, which gave excellent result, in Europe. Despite control of malaria in Asia, South America, and Central America in Turkey the epidemic of malaria erupted again. In Tropical Africa malaria situation has been static because most activities were going in urban areas only. There has been progress of scientific activity related to malaria when (UNDP/WB/WHO) tropical disease research and training programme increased its activities and widening the aims. Researches done in host parasite relationship had social economic impact on the development of drugs and vaccines.

Principally, control of malaria may be an individual matter. This may take short notice in the middle of epidemic or a long notice throughout the year using different tactics. Measures for prevention of malaria can be small scale like with individual or for large-scale control through: -

a) Measures designed to prevent mosquitoes from feeding on man.
b) Measures designed to prevent or reduce the breeding by eliminating collection of water or by altering environment.
c) Measure designed to destroy larvae or mosquitoes.

Strategies for prevention and control of malaria

The concept of malaria control replaces many national programmes. There is a reordering of priorities in the selection of control methods. The priority approaches must be based on epidemiological consideration, adverse effect on health economic, technical feasibility, functional human resources and community participation. Recently WHO stressed on number of parts relevant to future strategies of malaria control. The main emphasis is on need to base it on an epidemiological approach.

Basically there are two different approaches to malaria control: -

1. Malaria case management

This is a clinical management of malaria cases from diagnosis to treatment so as to reduce morbidity and mortality through early detection of the disease clinically and microscopically. Then early prompt treatment using antimalaria by "presumptive treatment" assuming all fevers is due to malaria. The treatment follows MOH guidelines. The other method is "radical treatment" where the treatment is done after a positive blood slide and is followed by prevention of the relapse. The treatment depends on species of the parasite. Usually the dose used is very high so care must be taken for drug toxicity (Park. K., 1997).

2. Active interventions measures

These can be planned after stratification of the disease and mapping. Dichloro-Diethyl Tetrachloride (DDT) Vector spray; can be used to kill adult mosquitoes. Large-scale intervention like Space application of insecticide is a major antiepidermic measure in mosquito borne diseases. It involves application of pesticide in form of fog or mist using special equipment. It is dispersed by air and on ground. But this procedure is very expensive Individual protection from vector

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contact can be reduced by other preventive measures such as repellent, protective clothing, bed nets, mosquito coils, and screening of the houses. But the most important is insecticide treated nets, which when used in large scale can reduce big amount of malarious mosquitoes.

Another preventive measure such as antilarval, oiling filling of standing water by sand and use of Paris green have proved success and some modern larvicide such as temophos, has long effect with low toxicity. Other techniques for reducing the sources of mosquito- breeding site, including draining or filling deepening or flushing management of water level. Also changing the salt content of water and intermittent irrigation are among the classic methods, which was advocated.

In order to reduce mosquitoes, too much weight was put on residual insecticide. Increasing emphasis is now being put on integrated vector control methodology, which includes bioenvironmental, and personal protection measures through multisectoral collaborations. That is collaboration through planning and working together with different departments like work, Town plan and water departments for improvement of housing and drainage systems in districts and regions at large.

In a study done (Tatiana et al 1999) in Colombo, on knowledge, belief and practice relevant for malaria control in an endemic urban area of the Colombian Pacific, they reported the outcome of knowledge attitude and practice about the use of protective and preventive measures against malaria was related to family income and consequently to the capability of purchasing bed nets. The success of the programme

depended on whether bed nets were subsidized or produced by income generating groups of the community.

The cost constraints of preventive measures were also documented from different parts of the world such as in Guatemala (Ruebush et al., 1992) Malawi (Ettling et al., 1994 Ziba et al., 1994) Zaire (Zandu et al., 1991) Cameroon (Desfontaine et al., 1990) and Tanzania (Stephen et al., 1995).

Knowledge of malaria transmission was related to the practice of preventive measures as had been shown in Guatamala (Vundule et al., 1993) and Ethiopia (Yeneneh et al., 1993) and it was also related to the severity of the infection in children according to mothers information on the issues (Koram et al., 1995).

Other investigators had reported that social and demographic factors were more influential than the compliance with control prevention procedures (Ager 1992). In the same study the prevalence study respondents were asked to identify specific interventions to control malaria transmission. Elimination of breeding sites was one way to avoid contracting malaria reported by 35.4% of interviewed people, 25.5% identified the use of bed nets and 17.2% spraying. Twenty-seven percent mentioned healthy behaviors not directly associated to malaria transmission such as good nutrition disposal of trash or cleaning everything. About 1.1% of the subjects mentioned vaccination as an effective method of prevention against malaria.

In this study, evaluation was done so as to find out reasons for the use or non-use of bed nets as specific intervention against malaria in urban Buena-Ventura. It was reported that there were average of two bed nets per household, especially for children.

Inhabitants attributed several positive characteristics to nets, such as protection against plagues and help in avoiding contagion of many diseases, bringing on sound sleep and giving the feeling of security and comfort as well as being hygienic. I quote, "Bed nets prevent us coming down with disease like malaria fever produced by mouse bite and skin infection." "It protect against noise and bite of the mosquito."

There were some disadvertages, which was reported by people, like bed nets were too warm, they deteriorate easily and must be repaired or replaced. All these made them costly. Price per unit was between 3.75-11.25 US dollars. On practice, the study reported the usage of bed nets to be 58%, insecticide 56.5%; use of coil (*saumerio*) 60%, use of petroleum derivatives 22% cleaning and use of bleaches 12%, repellents 4% and about 70.6% people used these things for less than once a week.

In another study done (Collins in 1997) in Ghana, on Malaria related beliefs and behavior in Southern Ghana: implications for treatment, prevention and control, which was done after MOH of Ghana had launched five year malaria control programme action plan in 1992. Its objectives were to reduce morbidity and mortality rate through prompt diagnosis and adequate treatment in context of primary health care.

This study was done in Dodowa and Prampram both in Dangme West district of the great Accra Region of Ghana. It was reported that malaria could be prevented by avoiding mosquito bites through use of bed nets, spraying rooms by insecticide, burning of coils and cassava chip such as *gari* and *konkonte* and certain herbs in the room others including fanning with cloths or using fan. Use of bed nets was low in both communities. Some respondents said they had used bed nets long time ago but now they cannot afford to replace them.

Some interviewee complained that, they felt uncomfortable sleeping under the nets as they made them sweat a lot and when mosquito entered the net, the nuisance was rather worse. The cost of nets was high about 8,000 and 10,000 cedis (US dollars 5.3-6.7). Many of the community members would like to use nets especially during rain seasons if they had money. The study demonstrated (Alonso et al 1991) that bed nets provide a barrier to nuisance from mosquito and insecticide treated nets had shown to be effective in preventing malaria. It also had added advantages of reducing the number of mosquitoes (Lindsay et al., 1989). The researcher pointed that policy makers should realize that shop operators were ignored in malaria control action plan. These shopkeepers were likely to continue as a major source of antimalaria drug in the communities. So they must be made partners in malaria control programmes and efforts should be made to improve the services they could offer.

In a survey done (Athuman et al., 1996) at Korogwe about Malaria situation analysis in Korogwe district, the researcher looked at malaria parasites infection in man, malaria vector species in the district, malaria morbidity and mortality through

determining prevalence, drug resistant, diagnosis criteria for illness, knowledge, altitude and practice of the community affected by malaria.

They also looked at vector control measures, current control activities and availability of antimalaria control measures and drug availability. It was found that there was no organized malaria control programme in Korogwe. But there was a community runs initiatives in control of malaria. The survey, which was done in 1995, showed 6750 nets were found in 3300 households, which comprised of 68% of total bed nets expected. So District health officer trained and supervised the community in impregnating all those nets. Areas, which used ITN, reported less mosquito bites and few episodes of fever.

In another setting after it was found that 90% of the community could not afford buying the ITN then the project provided them free of charge but after 14 months when follow up was done, it was found that they were not retreated. Maloriometric survey showed that species-specific rate was 43.5% for *Plasmodium falciparum,* 10.9% of *Plasmodium malariae.*

It was also found that 40% of parasite was cleared on the day two after using chloroquine while using salfadoxine / pyrethamine 69.2% parasite were cleared. In Magunga district hospital treatment of malaria was conducted according to national Guideline malaria treatment. Complicated cases were taken to Tanga Regional hospital.

At Magunga there was no microscope as it was stolen in around 1995. Hence malaria was diagnosed clinically also personnel were inadequately trained, reagents (e.g. giemsa stain) and running water were lacking (tap water) in the laboratory and there were no gloves.

At Kwamdolwa sister dispensary run by Roman Catholic church, malaria specific treatment was given after laboratory confirmation. The dispensary had two microscopes and laboratory assistant is running that laboratory. Here the patients were paying and those who could not afford were exempted. In Magoma health center there was no laboratory services and no laboratory assistant. Malaria was diagnoses clinically through case definition of fever, vomiting and splenomegaly.

Chloroquine chemoprophylaxis was given to pregnant women in the MCH clinic. In pharmacies, private clinics and retail shops, many types of antimalaria drugs were found like chloroquine tablets and injections. Salfadoxine/pyrethamine, quinine tablets and injection and artemisin tablets were sold without prescription. Also other different trade mark of antimalaria like malaraquine and Dawaquine with different base weight. Most of the shopkeepers did not know the recommended dosage. Children dose was calculated by age.

In another study (Linus et al., 1996) about analysis of malaria situation in Babati district in Tanzania. The researchers looked at history of the problem, current malaria problem, and current malaria control activities.

Survey was done in Bonga dispensary, Magugu health center, Babati town and Gallapo by interviewing health providers and assessed splenic and parasite rate among children from 5 to 8 years old. While in Babati they did entomological survey and looked at knowledge attitude and practice of the community.

Also ITN were introduced at Bonga, Magugu and Gallapo. Comprehensive malaria survey in 14 villages in the district rated malaria as meso to hyperendemic with parasite rate of 42% with *Plasmodium falciparum* being main parasite 97% followed by *Plasmodium malariae* 2% and *Plasmodium ovale* 0.9%.

In vivo studies on school children showed resistance rate of 27, 12% and less than 1% to chloroquine, amodiaquine and fansidar respectively. Main vectors of malaria in the district were *An. funestus*, 61.2%, *An. Arabiensis* 38.8%; other anopheles species discovered were *An. Pharoesis, An. Coustani* and *An. Rufipes*. The main vectors were fully sensitive to DDT and dieldrin.

Entomological survey showed almost 90% of man landing catches was between 6.30pm and 8.00pm. Chloroquine was given to pregnant women but in times of shortages, mothers were given prescription to purchase the drug out of the health facilities. In case they had less money, they bought few tablets and used them while waiting to get more money to buy the remaining lot so as to complete the dose. For those who had no money ended up using *muarubaini* leave or *mujohoro* roots.

Most of the people were aware of ITN and were currently using them but they experienced mosquito bites before retiring to bed at 9.00pm. Researchers also reported that disease management in Babati did not appear to have received attention. There were shortages of resources needed to manage malaria control. In Bonga there was no microscope, reagents or blood slides. While in Babati district hospital there was no intravenous fluids or anticonvulsants.

In Magugu there was a vehicle for transferring referred patients but they had no funds for fuel. Few people bought ITN. Among those who bought, few re-impregnated the nets. Adults instead of under 5 children and pregnant women used those ITN.

In review article which assessed range of quality of evidence based on the cost effectiveness of malaria prevention and treatment in sub Sahara Africa, 14 studies were reviewed covering insecticide treated nets, residual spraying, chemoprophylaxis for children and pregnant mothers and changing first line of treatment. The study made conclusion that, ITNs are highly cost effective use of resources, but several questions remain unanswered about their cost-effective in practice. The compliance encompasses of both regular net re-treatment and correct use.

The estimate for residual spaying was not a predictor of cost-effectiveness in that programme. In a contemporary operational setting people might object to the spraying, because of the inconvenience. The residual left on the walls, the smell, or fear about the health effects of inhaling the fumes.

For example in Namibia household refused entry of spraying teams in their houses, and in Zimbabwe 21% of the villages refused to have their rooms in their homes sprayed (Oxford University Press 1999) Thirdly, underlying mortality rate in Sub Sahara Africa have fallen dramatically over the last 30 to 40 years, which may reduce the absolute number of lives saved by the intervention. Finally, WHO now recommends spraying only in certain circumstances like in control of epidermics and ares of econoic importance. No estimates were identified for such targeted approches (Goodman et al 1999)

Finally WHO recommended spraying only in certain circumstances, (for control of epidemics, areas of economic importance, refugee camps and initial protection of non-immune settlers in development areas) where, both cost and effectiveness are likely to differ from those, for more general use. Chemoprophylaxis appeared to be more cost effective in The Gambia although its maintenance needed substantial investment. Therefore the authors noted that wide scale chemoprophylaxis was not generally recommended due to dangers of accelerating the growth of drug resistance and impaired acquired immunity (Goodman et al 1999)

Potential malaria vaccines

On malaria vaccine, WHO estimated the cost per Discounted Year of Life Gained by a vaccine under a variety of assumptions about the duration of protection the price per child and whether the strategy could be delivered within the existing EPH schedule. While with chemoprophylaxis for pregnant women, no studies identified full costing to have direct comparison with cost effectiveness ratio, to other malaria

control strategies. Moreover the analysis was based on the assumptions that Antenatal Clinic services were already in place. No cost effective of treatment were identified with full costing and no evaluation were found on the interventions other than changing the first line of drug or on any intervention to improve the case management of severe malaria (Oxford University press 1999)

Two analyses have modelled the potential cost-effectiveness of malaria vaccine. It was reported that Graves assumed that a vaccine could be given in three doses before the age of six months through the expanded Programme on immunization (EPI). It would remain effective up to the age of five years and it would reduce all causes of mortality by 20%. Costs were based on estimates for delivering hepatitis B vaccine in The Gambia assuming a price per malaria vaccine of 1.17 US dollars (Oxford University Press 1999)

In a report on malaria situation in Arumeru district (Ndeezi et al., 1996) The malariometric survey was done in Patandi and Mbuguni primary schools, Usa River. The children were examined for parasites and splenic rate. Moreover, Larval survey in rice field swamps, ponds and stream was done. While mosquito sampling was done from indoors and outdoors of different households. The main vector species were *An gambiae sl,* which are endophylic and endophagic. The survey also looked at the quality of health care services and how the reports were kept. It was reported that most of the health facilities diagnosed malaria clinically. There were few microscopes and some of them were very old. There was no electricity in some areas. Blood slide were also old and chipped. There were shortages of trained laboratory technicians and other staffs in general. This report showed that 95% of the

children were reported with fever for 12 months in Mbuguni but prevalence of malaria was 24.8% not proportionately high. The splenic rate was 24.8%. There were no drugs in the hospital so patients were getting prescription to buy drugs from shops and drug stores.

In a study (Premji, 1996) done about malaria control measures, impact on malaria and anaemia haloendemic areas of rural coastal Tanzania in 1996, among the reasons put forward for rarity of effective control programme in areas of highest malarial risk are largely economical and lack of sustainable measures. Insecticide Treated Nets provided for the first time, methods of malaria prevention, so simple and safe, that could be organized and conducted locally by non-specialist personnel (Premji et al 1996). The Researcher suggested that ITN technology was a very efficient use as scarce health resource for malaria (Premji et al 1996). Perhaps with operational research the ITN strategy could be incorporated in the integrated management of the sick child initiative. Tropical Africa was not part of the global malaria eradication efforts in the 1950s due to may be non-availability of an effective and economic method. Control strategies had some constraints. The four basic elements of the global strategy for malaria control (WHO 1993) were as follows: -

- To provide early diagnosis and prompt treatment.
- To implement selective and sustainable prevention measures including vector control.
- To detect and prevent epidemic at early stage.

- To strengthen local capacity in basic and applied research to permit and promote the regular assessment of a country malaria situation in particular the ecological social and economic determinants of the disease.

Most of the studies done in Africa have documented a reduction in malaria disease rate between 20-60% following the introduction of ITN (Snow et al., 1987 & 1988., Sexton et al., 1990, Beach et al., 1993, Jaenson et al., 1994, Marbiah et al., 1995). Severe life threatening malaria, in one study showed reduction by 44% (Neville et al., 1995). Overall, the finding had shown a disease impact on ITN, to reduce the number of disease episodes in a community with stable malaria transmission.

Malaria control campaign

The campaign started in urban areas in Zanzibar and Pemba in 1958, using DDT and chemotherapy. It was stopped due to technical problems connected with spraying, economical problem, health infrastructure that does not meet with the needs of specialized health problems. Network was not wide and rural health centers and dispensaries were understaffed (Malaria in Tanzania by David F Clyde 1967).

Tanzania health policies aimed at reducing morbidity and mortality due to malaria among the most vulnerable group and people with low immunity through chemoprophylaxis drugs like proguanil and cloroproguanil, which are also suitable for pregnant women (Mutabingwa 1995).

The policy talks about, reduction of vectors through improving the environment, improving referral system, advocating in personal protection from mosquito bites, using effective measures and appropriate costs. In addition to this there should be joint hands in solving of most of these problems through multisectoral collaboration and health sector reforms.

Advantages of malaria control

There are many advantages, which were obtained following proper application of Tanzania health policy and guidelines like in case management, for management of severe malaria cases in health centres and dispensaries. About 50% of children under 5 years with uncomplicated malaria and 54% with severe malaria cases are correctly treated in health facilities. The Integrated Management of Childhood Illness programme has also improved case management. Chloroquine failure was detected and the drug now has been removed from the market while sulfadoxine/pyrethamine has been introduced instead.

Vector control has been so much emphasized in malaria control activities, so Tanzanian policy has adopted implementation strategies to promote national wide usage of insecticide treated mosquito nets. It also removed taxation on nets and lowered so as to encourage increased production. Some net manufacturing factories are willing to increase quality and quantity of nets production in the country. While private sector (shopkeepers NGO CBO) have shown interest to carry out commercial distribution of ITN utilization. There is wide use of mosquito nets and about 12%

households have at least one ITN. It is reported that there is significant increase in coverage of ITN but not retreated (MOH 2002).

The policy recommends that all pregnant women should attend clinic and receive a full dose of sulfadoxine/pyrethamine, twice during the course of their pregnancy. One dose administered during the second trimester and one dose in third trimester of pregnancy as intermittent presumptive treatment (IPT). Communities and health providers are aware of availability of malaria preventive measures in pregnancy. Antenatal attendance is high more than 80% (MOH 2002).

The Ministry of Health has established training re-tooling so as to strengthen emergency preparedness and to improve infrastructures. Mechanism of multisectoral collaboration in an event of an epidemic has been established. This programme is new and nothing so far has been documented. Supportive or complimentary strategies like operational research have been implemented and the government is committed to undertake health research, including malaria for improving health care delivery, in order to improve decision making on bases of research results. Between 1982-1995 researches and small-scale implementation projects were conducted in various parts of Tanzania and gave good results.

In another study in Burkina-Faso showed that insecticide treated curtains reduced prevalence of malaria infection and reduced parasite density almost by half among the children protected by them (Curtis et al 1996, 1998 and 1999.)

While a study in Kenya working with insecticide treated nets in low transmitted areas showed substantial reduction of 40% of number of severe cases with reduction of 33% mortality rate over the same period (Nevill et al 1996).

In another study done in Kenya the participants considered bed nets more effective than curtains in both preventing and reducing mosquito nuisance (Kachur et al 1999). In Tanzania there has been chloroquine treatment failure averaging 52% (28-72%). Ministry of Health replaced it with sulfadoxine/pyrethamine. Also the government has established a laboratory for drug quality assurance at Pharmacy Board.

Disadvantages/Weaknesses in malaria control

Globally there have been many constraints, which contributed to slowness of malaria control programme as follows: -

- **Political constraints: -**

The gain achieved during malaria control programme could not be maintained while there was reluctance to promote new strategies with long-term continuous commitments. Some programmes were carried out without realistic objectives and without selected national strategies and targets according to available local resources.

- **Administrative constraints:**

There was a tendency to neglect malaria control programmes relative to other projects, which get government support. Chronic administrative deficiencies prevailed in many parts of the world, instability of some government and frequent

changing of personnel at Ministry of Health, unrealistic planning, delays in allocation of funds in procurement of drugs, inadequate training of personnels and poor communication, worsen the conditions.

- **Financial constraints: -**

Funds allocation for malaria control was not enough to sustain the programme. It is fallacious to assume that the disease can be controlled with little investment, whatever the level of malaria is to be reduced (Onori, 1980). When malaria eradication was converted to malaria control funds from interventions and bilateral agencies reduced drastically.

- **Operational constraints: -**

Advisory service of WHO were cut by 34% at country level, 42% at regional level and 33% at the headquarters respectively. During 1967- 1977 and key personnel were transferred to other division at WHO headquarters and regional offices. Many governments dismantled malaria organization. Therefore technical guidance promotion, coordination of antimalaria work was deteriorated. International malaria eradication-training centres were closed while few institutions were left for postgraduate courses. Two decades past without training this led to shortage of specialists.

Due to gross errors in programme implementation most commonly encountered, such as spraying operation carried out without house coverage. Time of application was not in accordance with season of transmission. Quality of operation was below

standard due to insufficient training. While supervision procedures was inadequate and instruments were not maintained. Insecticide formulation was defective and there was no adequate planning for space spraying in relation to climate and larviciding using larvivorous fish was done incorrectly without proper mapping of breeding sites and entomological evaluation.

Environmental management was left, to the initiative of few individuals who although well motivated but often lack necessary training and experience, in most malaria control. Surveillance was considered expensive and luxurious. The designed programme for malaria control was not integrated with health service and supervision and insufficiency of epidemiological follow up.

- **Social and ecological constraints: -**

Population shifted from rural to urban looking for employment were responsible for re-introduction of malaria in areas, or countries, where the disease had already disappeared or had been greatly reduced. The rise of urban malaria in Tropical Africa was largely ascribed to phenomenon of Epidemic Explosion due to population movement (Onori and Grab 1980). There has been marked increase of international travel to malarious tropical resorts. Massive movement from endemic malarious areas has created opportunities for importation of malaria into countries where the disease has never existed. Indiscriminate use of insecticides in agriculture and forestry lead to vector resistance, further increased number of mosquitoes, while development projects such as dams and irrigation scheme improved socially and economically, but increased mosquito breeding sites.

There has been a spread of chloroquine resistance to *Plasmodia falciparum* in the last decades. Insecticide resistance to organophosphates chlorinated hydrocarbons, carbamates and synthetic pyrethioid. For effective malaria control the right tools need to be delivered at a right place. Limited resources need to be targeted appropriately. Mapping malaria risk zones has to be done so as to know where exactly to put more efforts. Unfortunately there is no reliable information about where, why and who is affected. (De Savigny R, et al 2000)

The ecological advantage by mosquito vector in sub Sahara Africa has rendered the control difficult in terms of technical operation and financial constraints (Wernsdorfer et al 1988). This led to small-scale programmes being carried in sub Sahara Africa. People in rural areas have been experiencing poor health and some of them were treated by traditional healers due to ignorance and poverty. Some people in Ghana thought that, working under the sun or eating unripe mangoes caused malaria. While convulsions due to malaria was thought to be due to bad spirits (Collins K. et al 1997).

Poverty made people also resort to self-medication, as sick people travel for long distance to health facilities. In a study done in Morong Badan in Philippines it was reported that traveling from house to health facilities coasted half days wage. There were also some shortages of instruments and unavailability of microscopes in rural and remote areas which led to drop outs. So people resorted to herbs and self-medication. By doing so they did not buy full dose depending on the money they had

(Fe Espino Lenore 2000). In another study done in The Gambia it has been found that cheap Fansidar brought drug resistance. But in another study it was reported that, when antimalaria was combined with Artesunate it delayed or even prevented resistance (Lorenz et al 2000).

Even though malaria is number one leading cause of death, it is often under diagnosed (Kihamia and Kilama 1991) and not confirmed microspically. But prophylaxis is better in prevention of malaria. Administering chloroquine or Salfadoxine/ pyrethamine could prevent malaria to pregnant mothers.

As reported in study done in Tanzania that rate of admission due to malaria in hospital fluctuated from 10% in 1960s raised throughout 1970s, 1980s also up to 1985 where it was 22.56% (Kihamia and Kilama 1991) so it shows that the prevalence malaria has been increasing. The level of endemicity is among the factors mostly determined by those factors that influence mosquito vectors. These include human habits, parasites characteristic, climate, and topography such as vegetation land use. Some health providers have some weaknesses in malaria control planning and implementing and so is the community in cases of health seeking behavior. About 56-80% of people attend to formal health center during their final illness.

Since the founding of health services in Tanzania, malaria has been a leading cause of morbdity and mortality in Tanzania. Even though malaria is number one leading cause of death in Tanzania it is often overdiagnosed (Kihamia and Kilama 1991) and not confirmed microscopically. There is frequent antimalaria stoke outs of drugs 71% in public health facilities at least one week in three months. The rate of

admission due to malaria in hospital fluctuated from 10% in 1960s raised throughout 1970s, 1980s up to 1985 it was 22.56% (Kihamia and Kilama1991).

There are few trained staff like laboratory technician hence laboratory services and transfusion are inadequate so, malaria parasitological confirmation occurred only in 5-7% of total malaria cases. Shopkeepers and kiosk attendant who have no knowledge about malaria management sell antimalaria drugs almost everywhere in the town and villages in this country. Traditional healers, village health workers and Traditional birth attendants have no knowledge of malaria management, while they are the first group to be consulted by the community before they make decision to go to health facility The uptake of malaria chemoprophylaxis was 29% and use of ITN 8% was among pregnant women even though antenatal attendance was 80%.

There are no mechanisms and facilities for detecting malaria epidemic in a timely manner. Only limited resources was put for malaria intervention, and research findings were underutilized. The knowledge of the community about malaria was small and large proportions of population in rural areas have no access to information about malaria. Village health workers are not functioning adequately there was no multisectoral collaboration in malaria prevention and every sector has got its own budget and programmes.

CHAPTER THREE

METHODOLOGY

Study design

A cross- sectional study was conducted to determined current situation of malaria, knowledge, attitudes and practice on malaria control activities of health care providers and the community, the current situation of malaria control measures, coverage of interventions currently available and use of data in planning at health facilities community levels in Rufiji ditrict.

This study was conducted in the month of May 2002. This was at the time of the peak rainy season and Rufiji District has perennial problem of floods at this time of the year. There were areas along the river, which were not reachable like Nyaminywili, Muhoro, Mkongo and some parts of Ikwiriri. Health facilities in the flooded areas were not visited; instead I gathered information about these facilities from the DMO's office.

1. Health Care Providers: -

   A structured questionnaire was administered to 62 health care providers. These included health care workers from public as well as private health facilities.

2. The Community: -

A structured questionnaire was administered to randomly selected 250 people from the community.

3. The Observational checklist: -

A total of 92 in-patients records obtained through systematic sampling were reviewed.

4. Key Informants

In-depth Interview was done with 10 Key leaders. Four were district leaders while the remaining 6 were village leaders.

Study area

Rufiji is among 6 districts in coastal region. It is situated in southern part of the region. It covers an area of 13,339 square kilometers. Out of that, about 7,782 square km is covered by forest (Forest reserve 1,524 sq km) and the Selous game reserve 6,258 sq km). Administratively the district is divided into 6 divisions, 19 wards, and 94 villages. A river Rufiji intersects the district into east and west. This river drains into Indian Ocean. Under three geographical zones, which, characterize it basically into: -

a) Flood plains, which are situated on either side of the river ranging between 10-25 km wide. The zone broadens more as it approaches the outlet of the river.

b) Rufiji Delta and Coastal belt zone. The area is characterized by sand alluvial soil, which is very suitable for mangrove tree vegetation. There are about 20 islands with 23 villages in this zone.

The plateau, which extends from Rufiji flood plains to the border with Mkuranga and Kisarawe district in the north and Kilwa and Liwale district in the southern area, called Matumbi mountains. It has 800 -1000mm of rain and average temperature of 28 degrees centigrade. It has the population of 186,644 people, 99% are peasants.

Literacy rate: -

Male 66% and female 34% (Bureau of statistics 1999).

Health facilities: -

The district has 2 hospitals, Utete district hospital run by the government. Mchukwi is run by Pentecost church. There are 4 Health centers and 49 dispensaries run by government and private. The district is supposed to have 490 Health workers. But at the moment there are 270 staffs only. This is due to retrenchment and unemployment.

Social services: -

The district has 98 primary schools and four secondary schools run by the council. One secondary school is a private it offers vocational training to farmers and primary school leavers.

Vertical programmes: -

There are many vertical programmes in Rufiji. TEHIP is financing activities like IMCI, research, DSS, Water, education and food. UNICEF is sponsoring child survival and child promotion development. While PHAST deals with health, water

enviroment, capacity building to DHMT members and training. Roll Back Malaria is doing advocacy on malaria controlactivities such as sensitisation of the community on ITN, training workers from peripheral health centres and dispensaries on IMCI, sexual transmitted infections, HIV, TB and DOTS and laboratory skills which are DOTs based.

Malaria is number one in Rufiji. The Trent of mortality due to malaria shows decrease of mortality from 27% in 1998 to the decrease of mortality rate from 21% in 1998 to 12.5% in 1999. This is due to introduction of IMCI. But in 2000 mortality rate increased to 18%.

Study population

The study population consists of 62 health workers, four District leaders that includes of DMO, DED, district water engeneer and Medical officer in-charge six community PHC members and village leaders. In addition to this, there were 250 from the community.

Sampling methods

Stratified samples was obtained from District leaders simple random sampling was done, out of 15 leaders only 4 were selected. One division was selected out of six divisions, and six division leaders were selected from the selected division. The remaining 250 people were selected from the community, as seen in the population sample size.

Sample size

The sample was chosen through systematic sampling, of files and compiling data of case management and usage of ITN by the community. The sample size n was determined by using the single proportion formula by Kish and Leslie, used in the EPI-INFO Version 6 calculator programme using the following formula: -

Calculation

1. For files

   $n = z^2(1-p)/d^2$

   z = z value corresponding to the confidence level for 95% confidence= 1.96

   d = absolute precision taken to be 5%

   p = expected proportion in the population taken to be 36.9% malaria prevalence in Rufiji (DHSP Rufiji 2001)

   n = minimal required sample

   1.962x36.9(1-36.9)/100 =90 files

2. For usage of ITN by the community.

   $n = z^2p(1-p)/d^2$

   z = z value corresponding to the confidence level for 95% confidence= 1.96

   d = absolute precision taken to be 5%.

   p = expected proportion in the population taken to be 27% (ITN coverage in Rufiji 2001)

   n minimal required sample size Minimal required sample is 303

   $n = z^2\ p(1-p)/d^2$

   $n = 1.96^2x27(1-27)/25$ =303 people

From a sample size of 322 people obtained. There were 4 district leaders, 6 village leaders, 62 providers and 250 people from the community.

Research team

Pilot study was done on 10 members of the community outside the research area. Researcher and Research assistants did this. The result of the testing was not included in final result. Researcher and three research assistants were involved in collecting data and manual analysis at the field. These assistants were trained on how to administered the questionnaire before they started the fieldwork.

Data collection procedures

1. Structured interview through open and close-ended questionnaire was prepared and administered to 62 the health workers and 250 from the community.
2. In-depth interview was done to 10 Key informants, 4 district leaders that included DMO, Acting DED, Medical officer in-charge and District Water Engineer and 6 village leaders.
3. Checklist of 92 in-patients records to find out mobility, mortality, case management, funds allocation, and policy books for IMCI, malaria guidelines, leaflets billboards ITN malaria drugs in ANC.

Data processing and analysis

Data collected from the field were checked mainly at the field for accuracy and completeness every evening. Secondary data management and computer entry by using EPI INFO 6 was done at IPH institute and later on the data was analyzed.

Ethical consideration

The study clearance was obtained from College's Ethical committee of the University College of Health Sciences, University of Dar es Salaam. Further, the author was granted permission from the Regional and District authorities before the research was done. The aim / rationale and how the outcome of the study will be used was explained to each selected participants. They were informed that the participation was voluntary and they provided informed verbal consent. They were assured of confidentiality and anonymity

Study limitations

Rain reduced most activities due to bad roads and floods in some areas. The choice of health center and dispensary was taken in considerations to convenient areas of fewer floods within the district. There were few men who initially refused to participate in the community survey. The refusal was based on emands for payment in cash or provision of ITNs. However, when the divisional leaders were made aware of the problem, they were able to persuade them and all agreed to be interviewed.

CHAPTER FOUR

RESULTS

Four study populations were involved and data collection techniques included were interview and observation supported by a checklist. The total sample size was to get information from 322 individuals. Of these 62 were health-care providers who were available to fill the questionaire. Key informants available were 10. The remainder questionaires were administered to the households in the community survey.

The demographic characteristic of the study population of all the above methods is summarized in the table 1 below.

TABLE 1: Demographic characteristics of the study population.

	HCP	Comm. survey	Key informants	In -patient records
	n =62 (%)	n =250 (%)	n=10 (%)	n =92 (%)
AGE IN YEARS				
Min	22 years	13 years	30 years	1 year
Max	55 years	73 years	70 years	70 years
Mean	39.9	30.4	50	14.4
GENDER				
Female	42 (67.7)	162 (64.8)	0 (0)	53 (57.6)
Male	20 (32.3)	88 (35.2)	10 (100)	39 (42.4)
MARITAL STATUS				
Married	45 (72.6)	162 (65.1)	10 (100)	30 (32.6)
Single	9 (14.5)	65 (26.1)	0 (0)	59 (64.1)
Divorced	1 (1.6)	17 (6.8)	0 (0)	3 (3.3)
Widow	7 (11.3)	3 (1.2)	0 (0)	0 (0)
Cohabiting	-	3 (0.8)	0 (0)	-
EDUCATION:				
University	-	-	2 (20)	0
Paramedical college (CO)	14 (22.5)	9 (3.6)	1 (10)	0
Paramedical school (RMA)	9 (14.5)			
Secondary education	39 (63)	26 (10.4)	1 (10)	5 (5.4)
Primary education		186 (74.4)	6 (60)	87 (94.6)
Non formal education		38 (15.2)		
OCCUPATION:				
Medical officer		-	1 (10)	-
Assistant medical officer		-	1 (10)	-
Planning officer		-	1 (10)	-
Water Engineering		-	1 (10)	-
Clinical Officer	14 (22.5)	-	-	-
Rural Medical Aid	9 (14.4)	-	-	-
Peasant		147 (58.8)	6 (60)	82 (89.1)
Business		53 (21.2)	-	10 (10.9)
Fishing	-	10 (4)	-	-
Others	39 (63)	40 (16)	-	-
RELIGION				
Christian	34 (54.8)	23 (9.2)	1 (10)	15 (16)
Moslem	28 (45.2)	224 (89.6)	9 (90)	77 (84)
Pagan	-	3 (1.2)	-	-

Table 1 shows that, among the health care providers there were more females (67.7%) than males. Majority of these health care workers were married (72.6%) and their mean age was about 40 years, none of the health care providers had attained university education. The level of education attained was at a paramedical college. There were 14 clinical officers (who under go a three-year programme post secondary school) and 9 rural medical aids (who undergo three-years study post primary or secondary school). Others in the group composed of mainly nurses, health officers and pharmaceutical assistant. In the community survey, out of the 250 participants (65%) were female. Majority of the participants (74.4%) were primary school levers and (15.2%) had non-formal education, i.e. Islamic religious studies in madrasa). Majority were involved in farming (58.8%), while some were dealing with petty businesses and 4% were fishermen. Majority of the people are Moslems (89.6%).

In-depth interview was done with 10 key informants. Table 1 shows that, all of them were married 100%. Two had university education 20%; these were the Medical Officer and planning officers. The rest 80% had primary education. More than half 60% of the participants were peasants.

Among the 92 in-patients records checked, as observed in table 1, most of the patients were females (57.6%). Out of those patients (64.%) were unmarried. In this group, children below 5 years were (52%). Majority in this group had no schooling (65.2%) and they were peasants. Strikingly the mean age of hospitalized patients was

about 14 years and more than half were below 5 years. It is the younger age group that is most at risk from malaria fevers and its associated morbidity and mortality.

The burden of malaria in Rufiji District: -

Malaria morbidity and mortality was determined using the Health Information Management System (MTUHA) in table 2.

Table 2: Hospital data showing malaria morbidity.

Total OPD attendance	1998 n=337960	1999 n=717311	2000 n=1352232	2001 n=974350
Total malaria cases	107,289	264688	477388	689738
Malaria diagnosis <5 year	45,900 (13.6%)	152225 (21.2%)	258550 (19%)	364750 (37%)
Malaria diagnosis 5+ years	61389 (18.2%)	112463 (15.7%)	218788 (16%)	689738 (33.4%)

Malaria is number one out of the top ten diseases. Table 2 shows that, malaria in 1998 affected about 32% of the population. Out of which 13.6 % were children under five years. In 1999 the total people affected with malaria were about 37% and under five children affected were 21%. In 2000 the total people affected were 35% and chldren under five years, affected were 19% and in 2001 the people who were affected were 70% out of which children under five were 37%.

Table 3: Hospital data showing malaria mortality

Total in-patient deaths	**1998 n=143**	**1999 n=128**	**2000 n=182**	**2001 n=275**
Total malaria deaths	30	26	33	53
Malaria deaths <5 years	22 (15%)	13 (10%)	20 (11%)	32 (12%)
Malaria deaths 5+ years	8 (5.6%)	3 (2.3%)	13 (7.1%)	21 (7.6%)

Table 3 shows the total deaths due to malaria in 1998 was 20% out of which 15% were children under five years. In 1999, the total malaria deaths were 12.3% and children under five years were 10%. In year 2000, the total death due to malaria was 18% out of which 11% were under year children. While in 2001 the total was 19% out of which 12% children were under five years.

According to the top diseases, malaria was ranked as the first disease for out patient attendance, in patients and deaths occurring in the hospital as shown in table 2 and 3.

There is an ongoing demographic surveillance system in place in the District managed by a research team from TEHIP. Annual mortality rate is estimated by quarterly household visit. The mortality data from DSS was available from 1999 to 2001 and is summarized below table 4.

Table 4: Malaria mortality in the community

	Under 5 years			**Above 5 years**		
	1999 n=410	2000 n=397	2001 n=329	1999 n=653	2000 n=666	2001 n=626
	(%)	(%)	(%)	(%)	(%)	(%)
Malaria specific mortality	73 (18)	102(26)	64 (19)	89(14)	127(19)	103(16)
Non-malaria mortality	337(82)	295(74)	265(81)	564(86)	539(81)	523(84)

The malaria specific mortality in the community as assessed by DSS is not different from the mortality rates as reported by MTUHA. Furthermore the MTUHA data was verified from the 92 in-patients records. In this mini-survey about 98% of the hospitalized patients had the diagnosis of malaria and were treated with an anti-malarial.

Diagnosis of malaria was done mainly by combination methods using IMCI and microscopy. From the records it appeared that clinical examination was poorly done. Four important clinical parameters elicited are shown in the table 5 below.

Table 5: Recorded Clinical Parameters in hospitalized patients: -

	Checklist n=92
Patients weighed	15 (20.5%)
Palpation done	21 (22.8%)
Auscultation done	22 (24.4%)
Percussion done	32 (34.8%)

Also haemoglobin was done by taliquist method in about 55 % of the patients and blood transfusion was given to 6.7 %. Post-transfusion haemoglobin was done in all the patients. Eliciting vital signs like pulse rate was recorded in 75% of the patients however treatment charts were found in about 90% only. The remaining 10% had no treatment charts. Perhaps this reflects under reporting of medication used.

Malaria Case Management: -

Health care Workers were asked about Malaria Control management in terms of diagnosis and treatment available as shown in table 6.

Table 6: Knowledge of Health Care Providers about the diagnosis of malaria.

Diagnosis	HCP n=62	Checklist n=92
Clinical only (IMCI)	10 (16 %)	35 (38 %)*
Combination	52 (83.9 %)	90 (98 %)
Availability of anti-malaria treatment		
Anti-malaria availability	57 (91.9 %)	82 (89.1 %)
Anti-malaria not available	5 (8.1 %)	10 (10.9 %)

*38 % is a combination of symptoms and signs elicited

In the checklist the cards found with patients examined through IMCI were 38%, while those cards with examined through combination of signs and symptoms and microscopic were 98% as recorded inthier files. Moreover, the cards, which had the prescription of antimalaria drugs, were 89% while those with diagnosis of malaria but no presription of antimalaria drugs were 10.9%.

Malaria as perceived by the community

To mount a successful District Malaria control program, it is absolutely essential that the community participates and extends its co-operation. The community should not be a passive actor but actively engaged in all control activities i.e. from planning to implementation. It is the responsibility of health care workers and District leaders to solicit such participation.

Before soliciting community participation an attempt should be done to understand the communities level of knowledge, their attitudes, perception and malaria related practices especially prevention. An attempt was thus made to collect information on the above aspect in the community using a structured questionnaire. Results on malaria causes, symptoms and prevention are summarized in the table below 7.

Table 7: Community perception regarding malaria.

Causation	Respondents (n=250)
• Mosquito bite	213 (85.2 %)
• Working under the sun	6 (2.4 %)
• Drinking dirty water	10 (4 %)
• Eating excessive food	1 (0.4 %)
• Working under the rain	4 (1.6 %)
• Don't Know	16 (6.4 %)
Awareness of mosquito breeding sites	
• Standing water	17 (6.8 %)
• Ponds only	54 (21.6 %)
• Dry areas only	2 (0.8 %)
• Standing water and ponds	164 (65.6 %)
• Don't know	13 (5.2 %)
Symptoms	
• High temperature	43 (17.2 %)
• Headache	60 (24 %)
• Nausea	6 (2.4 %)
• Vomiting	69 (27.6 %)
• Others	72 (28.8 %)
Health seeking behaviors	
• Treatment options	
• Anti-malaria from hospital	198 (79.2 %)
• Anti-malaria from shops	9 (3.6 %)
• Self-medication with anti-malarial drugs.	5 (2 %)
• Traditional healer	38 (15 %)
Local terminology	
• Msuba	
• Likala	12 (4.8 %)
• Manyaria	2 (0.8 %)
• Likupikupi	1 (0.4 %)
• Inyonko	1 (0.4 %)
• Swiza	1 (0.4 %)
• Chipinda	1 (0.4 %)
• Manyawa	1 0.4 %)
	1 0.4 %)
Preventive knowledge practice	
• Cleaning environment and filling ponds	174 (69.6 %)
• Government is responsible	8 (3.2 %)
• Health Department is responsible	34 (13.6 %)
• It is our responsibility	5 (2 %)
• I don't know	29 (11.6 %)
Personal protection using ITNs	
• Using ITNs	158 (63.2 %)
• Has used ITN in the last 6/12 months	117 (46.8 %)
• ITN observed in the household	40 (16 %)
• ITN usage for under 5 years	82.5 (33 %)
• ITN usage by women	71 (28.4 %)

Knowledge of Health Care Providers regarding malaria activities: -

As part of the situation analysis, it was important to assess the knowledge of health care providers. Information on how the Health Care Workers manage malaria cases, their knowledge about community prevention was determined using a structured questionnaire, which was administered to 62 health care providers. In addition, the HCW were asked about the malaria initiatives in the District. The responses are as seen in table 8.

Table 8: Responses about malaria activities.

Malaria activity	HCP n=62
Malaria diagnostic practices	
IMCI	10 (16 %)
Blood Examination	42 (67.7 %)
Combinations	52 (83.9 %)
Knowledge about chemotherapy	
Aware of the new policy	57 (91.9 %)
Treatment for severe malaria	23 (37 %)
Chemoprophylaxis in pregnancy	23(37 %)
Availability of anti-malaria.	
All the time	57 (91.9 %)
Periodic	5 (8.1 %)
Availability of ITNs	
Availability at health care facility	54 (87 %)
Usage by community	17 (27.4 %)
Preventive Practices	
Environmental cleaning	24 (38.7 %)
Draining standing water	30 (48.3 %)

Human resources available for malaria activities as seen in table 9.

Table 9: Status of staffing in the Health Care Facilities

Cadres	Staff present	%	Staff required	Deficiency %
Doctors (MD and AMO)	2	15	13	84.6
Clinical officers	27	25	107	75
Nurses	38	22	172	78
Medical attendants	116	100	116	0
Laboratory staffs (Technician and assistants)	1	12.5	8	88
Pharmaceutical staffs	1	12.5	8	88
Administration staffs	12	28	42	71
Health Officers	13	43.3	30	57
Total	**210**		**496**	**58**

Current malaria control activities.

Malaria is regarded as number one health problem in the district. The district health plan endorses this fact and there are planned control activities. Their objective was to reduce malaria prevalence through the following ways; through launching of ITN, which was performed by Mandela theater group, and PSI in March 2000 at Bungu, Utete centers. About 12,000 people attended the show. A total of 50 ITNs were issued to 4 health centers as a promotional activity for ITN use in the community. About 6,000 Nets and 12,000 ngao sachets were taken to the celebration. About 4500 ITN were bought by A-Z Arusha and distributed to some selling points. All were sold and the money banked by District Health to consolidate the ITN revolving fund.

It was also intended to conduct sensitization meeting to 91-village health committees on promotion of the use of ITN. The District Health bought a number of ITNs materials from PSI these included 250 T-shirts, caps and leaflets. Appropriate anti-malaria drugs were bought too through EDP Kits, EDP supplement, IMCI package and were distributed to health facilities.

The District Health Management Team had planned to train 10 Health care providers on IMCI, 35 staffs on malaria adult case management and 20 nurses from Health Center, on nursing care for severe malaria. It also planned to do and follow-up after training on supportive supervision and previously IMCI trained staffs, all these were not done.

Full anti-malaria drug consignment was not procured for 54 health facilities as planed. There have been shortages of anti-malaria drugs and equipment in some health facilities. Sensitization of the community on prevention of malaria to 30 villages from DELTA and flood plains were not done. ITN revolving fund was maintained but follow-up of 94 villages in promoting ITN were not done and outreach and mobile services to the DELTA, Utete Hospital, Kibiti and Mohoro Health center was done successfully as observed in the following table 9 below.

Table 10: Achievement obtained

Achievement	Percentage
Procurement of IMCI drugs	50
Strengthening outreach	80
Mobile services	100
Maintenance of ITN revolving funds	40
Procurement and distribution of anti-malaria drugs	50

In this District there are some Government and Non-Governmental Research activities going on and also participating in malaria control activities as shown the table 11 below.

Table 11: Information about Health Initiatives in the District

HCP with knowledge on malaria control programmes	HCP n=62
TEHIP	35(56.5%)
Roll Back Malaria	12(19.3%)

Use of data in planning at health facilities and community

From the records (MTUHA), for the DHMT to institute malaria control measures in their District Health Plan, The District health management Team had planned to use district health problems and needs which was obtained from health care providers from all health facilities in the district and the community health problem and needs.

It was observed that there was high under 5-mortality rate, High prevalence of malaria and high maternal mortality rate among other problems.

District Health Management Team, then planned to reduce the under 5 years mortality rate from incidence rate of 191/1000 by 40% through training 10 health workers on IMCI, to procurement of IMCI drugs and equipments. They also planned to reduce prevalence of malaria by 30% by the year 2001 through promotion of ITN and follow-up of 94 villages and promoting the use of ITNs. Also it was planned to maintain ITN revolving funds and procurement of ITN sachets, it also planned and to procure anti-malaria drugs for case management for 54 health facilities and train 35 health workers on malaria control and adult case management. It was also planned to train nurses from health centers and hospital on nursing care for severe malaria. Also included in the plan was follow-up and supportive supervision.

The District Health Plan.

The District health plan indicated appropriate strategies to combat malaria. The plan was specific and targeted the initiatives in the District. There is substantial support from TEHIP in planning which is evidence based. There is an intentional move to institute a plan, which is not disease specific but intends to manage the health care system. TEHIP invests in Health. It provides about 35 million Tanzanian shillings quarterly to Rufiji District Health Department for promoting and supporting various activities, such as: -

I. Training

- To train Health workers on IMCI
- To train MCHAs to become TBA Trainers
- To do workshop with DHMT for preplanning 2001-2002

II. Procurement, repair and distribution.

- To procure IMCI drugs
- To procure Anti-malaria drugs for case management for health care facilities
- To procure communication facilities, like computers, two way Radio call and E-mail radio call.

III. Follow-ups and supervision

- To do follow ups for promotion of ITN
- To supervise the villages and wards on proper management on maternal complication.

IV. Maintenance

- To support ITN revolving funds
- To do renovation and maintenance of Health facilities
- To renovate X-ray room

V. Support and strengthening activities

- To provide funds for allowances, for maintenance of boats, procurement of Stationeries and sundries in addition to training the DHMT members and supporting staffs.
- To support an intersectoral and multisectoral collaboration monthly and DHMT meetings.
- To construct health facilities.

DISCUSSION

The aim of this situation analysis was to describe specifically malaria control activities that are currently practiced in the district. The report of this study wills thus enable District Health Management Team to revisit their plans and focus their efforts in areas where the activities are deficient.

From the demographic characteristics of the population a number of risk factors can be identified that promote malaria disease. The population mainly comprises of peasants involved in subsistence farming. There are no other means of earning and the majority are on the brink of abject poverty. According to the report of population division of United Nation Economic Commission for Africa (UNECA 1981) identified five social and economic variables that influence malaria, these are as follows:-

- The proportion of population in Agriculture.
- Per capita and Gross National Product (GNP).
- Literacy.
- Proportion of population living in urban areas.
- Infant mortality rate.

Along the same lines Wernsdorfer et al (1988) also identified five social and economic variables that have direct impact on malaria mortality. These variables are:

- Morbidity, loss of working capacity and wages during acute, illness, reduction working capacity following acute attack.
- Loss or reduction of production (agriculture, mining) due to worker absence or reduced output.

- Individual expenditure on anti-malaria drugs and private treatment.
- Cost of treatment and hospitalization borne by the community.
- Pressure on health services.

Poverty was the risk factor identified in this community. Majority of people (60%) in this community are peasants involved in subsistence farming while few (21%) are doing petty business and (4%) are fishermen. They plant domestic crops in their farms. They neither have modern faming skill nor modern farming equipments. The yield from their farms is low in quantity and poor in quality leading to poor marketing of their products.

Though the analysis did not specifically assess economic status, however the general impression obtained indicates that the population in Rufiji District is poor, as majority of them are peasants and there are no factories in the area. In addition the surface topographic of the area coupled with high rainfall and humidity appear to highly encourage mosquito breeding.

The other factor identified is the high illiteracy rate. Only half of the people had primary school education. The remaining have no schooling or they go for religious classes popularly referred to as Madrasa. Education can help people to have better understanding of the different types of diseases. Their awareness on malaria will enable them to participate in activities related to prevention and control of malaria. Literacy enables to mount effective communication campaign using various media channels.

Ingegerd Rooth et al (1992) while working in the same area reported that literacy was strongly associated with knowledge of malaria and bringing the child to the clinic rather than to the traditional healers. In the same study it was reported that, literate individuals were found to be significantly more knowledgeable in several aspect of malaria. The study also pointed out that literate people relied less on the traditional healers than illiterates. In this study majority of the people in the community have primary school education (74.4%) and (11.6%) have no formal education. Also 60% of the Key- informants have primary school education. In the study in Philippines with higher rates of formal education in the whole population, women seemed to be slightly more knowledgeable than men (Lariosa 1986)

The community survey reveled gender imbalance. There are more females than males. The District plan indicates that females are (67%). Decision making for social welfare of a household in the traditional African setting, is usually made by males (head of house hold). Therefore malaria preventive practices like purchase of ITNs will largely depend on priorities set by "husbands" and heads of the families like fathers in case of single mothers. Even community participation for control activities will depend on how males take their decision. However, the responsibility of a sick child especially during the acute stage of the illness is to a large extend the onus of mothers. During this acute illness, health-seeking decisions are again taken either by the "husbands" or by the therapy management group which excludes the mothers (Winch P. et al 1997).

The decision on where to go for care when a member of household is suspected to have malaria was in most cases influenced by perceived availability of resources in the household. About 73% of respondents from Mbarali district gave ability to pay as a criteria on the decision to be taken. Less than 17% of household in Magu district gave a similar reason (Premji Z., Leshabari M. T. 1999)

In this study it was found that females were more (64%), than males According to the Tanzania Bureau of statistics and macro International inc 1997 estimate that along the coast of Tanzania including Rufiji there are about 10% pregnant womenPregnancy is a risk factor of malaria as reported by Wernsdorfer et al (1988). Pregnant women especially primigravidae show an increased susceptibility to malaria, especially *P. falciparum*.

Pregnant women have increased prevalence and parasite density especially in the second trimester accompanied with anaemia (Wernsdolfer et al 1980). Pregnancy outcome, i.e. in terms of decrease birth weight, increased risk of abortion, stillbirth and possibly also risk of early infant death. (Rasmussen. 2001., Mc Gregory et al 1983., Brabin 1983., Mc Gregor et al 1984) have been documented. The percentage of pregnant women is (9%). This group is thus at a higher risk from malaria. This is also reflected by the higher maternal mortality recorded 209/100,000 (D. H. Plan 2001-2002) hospital based and 393/100,000 community based (Rufiji DSS 1999).

In this study despite TEHIP, DSS and other NGOs, in Rufiji Hospital and DSS mortality data show malaria is still a major health problem. More than half of the

health workers did not know about these initiatives possibly these initiatives are implemented as project and not as programmes. The wider population perhaps does not feel the benefits and not all health care workers are aware of these initiatives.

The Global strategies for malaria control WHO (1993) explicitly spells out that collaboration is imperative and should extend from individual and community to the national or international institutions that guide policies and help provide the means to implement them. Successful of implementation of global strategy will be accelerated where all interested parties are able to exchange and profit from each other's experiences. The main roles of national governments are to ensure that effective and sustainable malaria control programmes are established in all areas where the population is at risk. This will require that:-

- A political commitment is made to malaria control, not only by ministries of health but also by parts of the private sector whose activities may direct or indirectly affect the malaria situation.
- A sound legislative foundation is established for the prevention and control of malaria.
- The division of responsibility between the general health services and any specialized malaria control services is clearly defined and the resources available to them are used to the best effect.
- All possible intersectoral linkages are established to ensure the avoidance of malaria resulting from human activities and the use of malaria-safe practices in individual and community activities.

- All existing or potential resources for the planning, implementation and continuous evaluation of the malaria control programme are mobilized, including those derived from private and non-governmental organizations, and effective coordinating mechanisms are developed within countries as a responsibility of the national a responsibility of the national authorities.

Community knowledge about malaria

The community is well versed as far as mosquitoes being the transmmitor of malaria. The relationship between environment and malaria is poorly understood therefore any strategies for vector reduction need education (Winch P., et al 1996)

Premji et al (1999) in their survey on community believes on causes of malaria, it was found out that slightly over half of the community attributed the cause of malaria to be mosquitoes and 18% attributed the cause of the disease to living in dirty environments. It was not clear whether the respondents were aware of types of environmental condition, which facilitate transmission of the disease. In the same survey majority of people 94% of head of households were aware of common symptoms of the disease to be fever, headache, vomiting, joint pains, loss of appetite and general body malaise. They pointed out that about two third of the community sought medical care when they were sick and 27% consulted traditional healers (Premji et al 1999).

The symptoms of malaria are not well known by the population. Therefore home-based malaria treatment may be a problem. Majority of the people do not know malaria treatment. Still 15% of the community believes in traditional Healers. This

contributes to high mortality in the community. Therefore district Health Management Team may wish to take Traditional Healers as partners in treatment of malaria.

Due to social marketing of the ITN, there has been high awareness. But actual observed usage was below 20%. This indicates fundamental problem, which need to be addressed.

About 30% of people still think that control of malaria is not their responsibility but that of the government and health workers. The existing Health Care Workers who would form the team to control malaria in the district need retraining.

It appears that half of Health care workers are not aware of IMCI or diagnostic methods. Their knowledge about new health policy is strikingly low especially in treating severe malaria and chemoprophylaxis of malaria in pregnancy i.e. 25%. They require training in prevention of malaria so as to contribute effectively in treatment of malaria. Malaria is major Public health problem, even if strategies are available, and external aid is present but human resources available is significantly deficient.

The district has a shortage of health care workers by about 60%. It is the responsibility of Central Government to ensure that they try to solve unemployment problem. In view of the HSRs all community -based interventions will gradually be decentralized. Success of these programmes will depend on the ability of the districts to implement these programmes. In light of the considerable staff shortage noted in

the district it is very likely that not only malaria control activities will be compromised but the entire HSR initiative may be jeopardized.

In addition to lack of human resources, key anti-malaria measures are not implemented. Anti-malaria drugs are not always available, the actual usage of ITN is below 20% and at this coverage, and malaria transmission will not be reduced. There is little than is being done to manipulate the environment, so that it is unfavorable for mosquito breeding. Also health information education is deficient.

Though the District Health Plan is comprehensive and the top management in the District is knowledgeable about the malaria control measures, however implementation is greatly deficient. The actual litmus- test for malaria control measures is the reduction of malaria morbidity and mortality. This still is high and remains unabated.

CHAPTER SIX

CONCLUSIONS

There is renewed interest globally to control malaria in sub-Saharan Africa. This is reflected by a number of global initiatives recently formulated and resources made available for malaria control. However in rural areas such as Rufiji District the existing infrastructure and logistic may not be able to absorb all these initiatives resources effectively. Whereas good planning, priority setting, and commitment are necessary for an intervention programme, it should also be important to look into the existing infrastructure and support it in order to enable it in turn to lend support for malaria control activities.

This situational analysis has identified a weak infrastructure, shortage of qualified staffs as important factors that need addressing. A favorable global environment with opportunities has been created and rural Districts like Rufiji should be supported more to take advantages of these opportunities

RECOMMENDATION.

I. For the central Government.

- To employ the well qualified trained health care workers, at various level so as to fill the existing vacant positions at the Health Care Facilities in the Districts.
- Modify the Health curricula in the training institutions so as to equip graduates to address public Health problems like malaria, HIV in the community.
- Facilitate the Global initiatives to channel the available resources to reach the districts and divisional health facilities.

II.District Health Team.

- To do on job training regularly especially to the staff from Health centers and Dispensaries including the staff from private health facilities.
- Emphasize should be put on planning activities which can be implemented
- Education in the clinics should be to the two genders instead of educating the female as it used to be before.
- Malaria week for the District, so as to discuss many issues of malaria and to inform the community the achievements and weakness and further plans to be taken.
- To let the community buy the ITN by installments.

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