UNIVERSITY OF NAIROBI

School of Journalism

FACTORS INFLUENCING THE EFFICACY OF IEC INTERVENTION STRATEGIES IN PUBLIC HEALTH: THE CASE OF A BILHARZIA INTERVENTION PROJECT IN MWACHINGA VILLAGE, KWALE DISTRICT

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DECLARATION

I, David Gikungu Irungu, do hereby declare that this thesis is my original work and has not been presented for a degree in any other university.

Signed ..... Date 18 November 2005

This thesis has been submitted for examination with my approval as University Supervisor:

Signed: ..... Date 28/11/05

Kamau lYlubuu

School of Journalism,

University of Nairobi.

DEDICATION

This work is dedicated to my wife Mary, and children Samuel, Mark and Ruth. These dear ones willingly sacrificed their most valued leisure time to allow me time to read.

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I am greatly indebted to my supervisor, Mr. Kamau Mubuu, for his encouragement throughout this work. He constantly told me it was possible, even when it looked to me like I was venturing into an impossible mission.

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ABSTRACT

This study assesses the efficacy of an Information, Education and Communication (IEC) intervention project initiated in Mwachinga Village, Kinango Division. Kwale District in 1996 - to control the spread of schistosomiasis (Bilharzia) in the area. The study was prompted by the fact that, like many other public health intervention projects in Kenya, the project may end up having had little or no impact on the target communities. Secondly, there seemed to have been information gaps as the place has high prevalence of the disease in Mwachinga village. Bilharzia is a human disease caused by parasitic worms called *schistosomes.* It is common in the tropics where ponds, streams and irrigation canals harbour bilharzia-transmitting snails.

The study was therefore, an attempt to determine the factors responsible for the sustained high prevalence of the disease. It focused specifically on community knowledge levels, perceptions and attitudes pertaining to the disease and intervention work, as well as behaviour change among the residents of Mwachinga village. One of the major observations was that the presence and spread of bilharzia have largely been attributed to poor knowledge of the disease and the inappropriate behaviour towards it.

Through a questionnaire administered on a random stratified sample of 200 respondents (50 men, 50 women, 50 schoolboys and 50 schoolgirls), information was collected and analyzed by statistical methods. The questionnaire administration was preceded by focus group discussions with key informants (opinion leaders) of the community in the village, which has about 200 homesteads.

The results manifest widespread knowledge of bilharzia and infection prevention methods amongst all the categories interviewed. It was concluded therefore, that the sustained prevalence of bilharzia in the village is attributable to other factors other than lack of knowledge. These factors include the community's attitudes towards blood in urine - the cardinal symptom for bilharzia. There are also other unavoidable circumstances that make it difficult for the residents to keep off river water.

The study recommends that Mwachinga village residents be taught to view the symptom of blood in urine (haematuria) with the gravity of the danger it portends, and not as a way of life. Health education lessons should be regular so as to create the community's understanding of the factors underlying the dynamics of bilharzia infection. To help the community stay away from the infested river water, the Government should revive the water kiosk system by pumping safe water from the main water pipe that runs across the village into the old kiosks, since they are still intact. The number of kiosks should also be increased to say. 10, for more effective service.

CHAPTER ONE

1.1 Introductory Background

This study assessed communication aspects of an Information Education and Communication (IEC) project initiated in Mwachinga Village. Kinango Division, Kwale District in 1996 - to control the spread of schistosomiasis (Bilharzia) in the area. Bilharzia is a human disease caused by parasitic worms called *schistosomes.* It is common in the tropics where ponds, streams and irrigation canals harbour bilharzia-transmitting snails.

According to the World Health Organization (WHO, 2001), schistosomiasis is presently endemic in 76 developing countries, ranging from the Arabian Peninsula, numerous countries in Africa, the Indian Ocean islands to South America and the Caribbean. More than 200 million people worldwide are infected. Of these, 20 million suffer severe consequences from the disease and 120 million have symptoms. In many areas, schistosomiasis infects a large proportion of children under the age of 14. An estimated 500-600 million people worldwide are at risk from the disease. (WHO, 2001). Two of the major forms of schistosomiasis (intestinal schistosomiasis and urinary schistosomiasis) are endemic in 54 countries in Africa. (WHO, 1996).

In East Africa, bilharzia is common among people living around water masses such as lakes, rivers, irrigation schemes and swamps, where the snails which spread the bilharzia-

causing parasites (schistosomes) thrive. In Kenya, bilharzia is found in three areas, the Coastal region, the Lake Victoria region, and the Central districts.

Kwale District in the Kenyan South Coast, is known as an endemic area for schistosomiasis haematobium (Katsivo *et aL* 1994). Medical records depict the district as one of the areas with the highest prevalence of bilharzia in Kenya. The prevalence among school children, for example, has for a long time ranged between 60 and 70%. This is alarming, for it is way ahead of malaria, whose prevalence in the area is about 30%.

In an effort to contain the disease in Mwachinga Village, a team of health officers from Kenya Medical Research Institute (KEMRI), and with funding from a Japanese agency, initiated a project aimed at educating the local community on methods of preventing infection. The project team, under the aegis of KEMRI, has also been administering chemotherapy to the entire community oi about 200 documented homesteads. 1 he prevalence of schistosomiasis is, however, still high, due to re-infection, which occurs about six months after treatment.

Efforts by KEMRI/JICA to provide safe water include installation of water kiosks in four strategic places within Mwachinga village: Kibaoni, Kibanda Hasara, Maili-Nane and at Ng'onzini Primary School. Each kiosk has a drawing point and at least one bathroom (the one at the school has five bathrooms) beside it. This ensures availability of safe water for domestic use and also deals with the ever-present urge to bathe or swim (especially for children) owing to exposure to humid weather that characterizes the area. Swimming or

bathing in the river exposes them to infection - hence the safe water bathroom alternative.

This study was an attempt to examine the impact of the project on the local community focusing on the project's effectiveness, efficiency, relevance, impact and sustainability.

1.2 The Problem Statement

More often than not, many health intervention projects end up having little or no impact on their target communities. Examples of such projects include the much hyped *Tumechill* (no sex for us). An observation by Franklin Awori (2004) shows that, contrary to the teenage targeted campaign, the words "don't match their actions and lifestyle." Awori found that, contrary to what the campaigns would have everybody believe, "sex rules their (teenagers) lives ...They (girls) come back from school sex starved and go flat out to get guys."

Other unsuccessful projects include the *Nyanza Latrines* campaign against the spread of cholera, and *Safe Sex* in the on-going fight against HIV/AIDS. In the latter case, the campaign seems to have overlooked the role of religion. Faith-led groups (particularly Christians and Muslims) shot down the campaign, arguing that advertising condoms in the name of safe sex was promoting immorality.

Since most of these campaigns are channeled through the same system (Ministry of Health), it is possible that the problem may largely be attributable to lack of

standardization and control of the quality of IEC messages and materials being used, as well as lack of coordination of IEC activities among the various institutions working in the domain.

In order to be effective, IEC messages must first be accurate, and second, must reach and be understood by target audiences. "Bad" IEC can lead people to make ill-informed decisions that can be damaging to their health and well-being, just as "good" IEC can help them make well-informed decisions that can positively influence their lives. (Barker, **2003).**

If the IEC package is effective, members of the target group can begin to take control of their own behaviours, based on a radically altered assimilation of information about the possible consequences.

The Mwachinga project, as a case study of IEC health interventions in Kenya, may not be exempt of problems that have dogged other health intervention campaigns, leading to their failure. The evaluation was intended to find out what impact the intervention efforts may have made on the local community.

On one hand, a decrease in prevalence levels suggests a measure of success. It is therefore important to find out what odds there were and how they were overcome to attain the appreciable result. Sustained prevalence would, on the other hand, be attributed to weaknesses in the IEC design.

Was any behaviour change detectable at the end of the intervention? Would the change be attributable to the IEC campaigns? How does the Mwachinga community perceive the disease, in light of the intervention efforts? These questions are pertinent to the study, not only to inform future similar interventions, but also to devise other ways of controlling the spread of such diseases.

The continued use of, and contact with river water at Mwachinga village are indicative of an information gap between the project team and the residents. What is this gap and why does it persist, in spite of intervention efforts (which include a dispensary, provision of safe water, and regular health education sessions) at the school and in the homesteads? It was hoped that the study would shed light to the above questions and help pave the way forward for future health interventions at Mwachinga village as well as other parts of the country that are endemic for bilharzia.

1.3 Objectives

1.3.1 Main objective

The main objective of the study was to determine the factors that are responsible for the sustained high prevalence of bilharzia in Mwachinga Village.

1.3.2 The specific objectives of the study were to:

1. Assess the knowledge of the local residents on bilharzia.
2. Assess their perception of bilharzias and how they perceive the IEC intervention efforts of KEMRI. JICA and Ministry of Health.

3. Determine the influence of the IEC intervention efforts on the local residents' practices as far as prevention of bilharzia is concerned; and.
4. Make appropriate recommendations on how the interventions on the disease could be improved for effective control of bilharzia.

1.4 Hypotheses

1. The prevalence of bilharzia in Mwachinga village remains high due to insufficient knowledge about the disease.
2. The study assumes that the prevalence of bilharzia in Mwachinga village is a result of poor knowledge of the disease and therefore inappropriate behaviour towards it.
3. The prevalence of bilharzia in Mwachinga village is sustained by an apparent information gap between the residents and the intervention teams. The resident's perception of the disease as a way of life makes them view other problems in the village, such as poverty, as more serious than bilharzia.
4. The IEC intervention efforts by KEMRI and JICA have had little influence on the local residents' knowledge, attitudes and practices, as far as prevention of bilharzia is concerned.

1.5 Justification of the study

The high prevalence of bilharzia in Mwachinga village is bound to have devastating long-term effects such as bladder cancer and mental retardation. There is, therefore, need to give priority to further intervention campaigns to control or eradicate bilharzia.

It is important that relevant knowledge be imparted on the community, if bilharzia is to be controlled, or even eradicated. The knowledge thus imparted should be two-pronged, with one aspect detailing various prevention methods, while the other one spells out the consequences of failure to put them into practice. The consequences include:

- *Long-term effects.* In children, bilharzia inhibits growth and retards mental development unless treated. Because of loss of blood though urine, bilharzia weakens an infected person, often contributing to anaemia. Infected people are more susceptible to any outbreak of disease, such as tuberculosis, meningitis, or cholera, because the immune system is weakened.

- *Cancer.* The cardinal symptom of bladder cancer is haematuria, i.e. blood in urine (Wambani, 2005). There seems to exist a consistent association between the presence of schistosoma haematobium and bladder cancer. Schistosomal bladder cancer occurs in an age group significantly younger than that in which cancer occurs in non-schistosomal areas. (Cook *et al,* 2003)

The prevalence of 35% (as indicated by surveillance results for March 2005) is alarming, and poses a community problem. The study has attempted to unearth that problem.

Mwachinga village is just one out of many communities in the country that are burdened with bilharzia and (by extension) inadequate IEC intervention efforts. Any weakness thereby unearthed by this effort may help formulate policy for the fight against bilharzia, and also for similar health interventions.

1.6 Definition of key terms

Bilharzia	Infection of the human body by schistosomes from contact with infested water. (Also schistosomiasis)
Bulinus africanus	The snail species that serves as intermediate host
Cercariae	Blood fluke in the form just released by the snail host. The free-swimming stage that seeks the definitive human host
Haematuria	Blood in the urine
Helminthiasis	Condition resulting from infestation with worms
Kichocho	Kiswahili translation for bilharzias or schistosomiasis
Kisonono	Kiswahili translation for gonorrhoea
Miracidia	Mobile organisms hatched from the larva (eggs) deposited in water by the infected human host. The form that seeks the intermediate snail host
Schistosomes	Blood flukes. A genus of trematode worms which infect the human body
Schistosomiasis	Infestation of the human body by blood flukes (schistosomes)
Schistosomiasis Haematobium	Urinary schistosomiasis

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

Bilharzia is one of the most widespread parasitic infections among human beings. It is second only to malaria in terms of socio-economic and public health importance in many tropical and subtropical areas. It is second to none among water-borne diseases.

Bilharzia is grouped under helminthic infections (helminthiasis is the condition resulting from infestation with worms). It is more specifically referred to as human schistosomiasis - a complex of acute and chronic parasite infections caused by mammalian blood flukes (schistosoma). (Cook *el al*, 2003)

Schistosomiasis is also known as bilharzia, in honour of Theodore Bilharz, who first identified the aetiological agent for schistosoma haematobium in Egypt in 1851.

The disease is most common in the rural areas of developing countries. It is endemic in 76 developing countries, infecting more than 200 million people in rural agricultural and peri-urban areas. An estimated 500-600 people worldwide are at risk from the disease (WHO, 2001). Africa bears the brunt of the disease, since 85% of the infected people are from the continent.

In East Africa, an estimated 30 million people living in the Lake Victoria littoral are vulnerable (IRIN, 2002). Lake Victoria, around which Kenya, Uganda and Tanzania converge, occupies 69,485 square kilometres and is drained by the River Nile.

Some 3.5 million people in Uganda are reported to be at risk from bilharzia infection. Between 31 and 67 percent of all school-going children along the waters of River Nile, and Lake Victoria are infected with bilharzia (IRIN, 2002).

In Kenya, the areas where bilharzia is most prevalent are the Lake Victoria region in Nyanza Province, Kwale, Tana River and Taveta districts in the Coast Province, Mwea in Central Province and Machakos and Kitui districts in Eastern Province. (Karama. 2002).

2.2 Bilharzia Transmission

The parasite is transmitted by specific aquatic or amphibious snails in a wide variety of fresh water habitats. Of all the mammalian blood flukes, the genus schistosoma is the most widespread and diverse. It has sixteen species, five of which are responsible for the overwhelming proportion of human infections (Cook *et aL* 2003). The five are *schistosoma haematobium, schistosoma mansoni, schistosoma intercalatum, schistosoma japonicum* and *schistosoma mekongi.*

Schistosoma haematobium, which is also referred to as urinary schistosomiasis, is endemic in 53 countries, mainly in the Middle East and most ot the African countries

(WHO, 1996). In 40 countries, double infections with schistosoma haematobium and schistosoma mansoni are endemic. The Coastal region of Kenya, particularly Kwale district in the south coast, has long been known as an endemic area for schistosomiasis haematobium (Katsivo, 1994).

The life cycle of all species of schistosomes that infect human beings has a common pathway, from a sexual generation of adult schistosomes within the vascular system of the **definitive** human host, an asexual phase in the fresh water **intermediate** snail host and a return to the human host via cercarial invasion of the skin or mucosa on a host's exposure to cercarial-infested water (Cook *et al*, 2003).

The excreted schistosome eggs get into fresh water by direct deposition or by being washed in from a neighbouring site in suitable warmth and light. The larvum within each egg hatches a miracidium. Miracidia are mobile organisms swimming actively by means of ciliary movements.

Miracidia are infective to snail intermediate hosts for some eight to twelve hours, and must find a suitable freshwater snail for continuance of their life cycle. The penetration of miracidia into the soft tissues of the snail is influenced by such variables as chemical stimuli, relative number of larvae and snails within a water body, length of contact time, physical characteristics of surrounding medium, i.e. water temperature, velocity of flow, turbulence, and the presence of ultraviolet light.

The incubation period within snail varies with species and surrounding environment. The cercariae escape from snail under suitable conditions of temperature, light and pH. In schistosoma haematobium, and schistosoma mansoni. the main stimulus for the release of the cercariae is light, usually at temperatures between 10 and 30°C. Depending on snail species, cercarial outputs range from 500 to 3000 per day.

The life span of cercaria is short: 36 - 48 hours. Being non-feeding organisms dependent on their large glycogen reserves, the cercariae are vulnerable to adverse environmental variables that stimulate glycogen usage, thereby reducing their viability. Cercarial invasion can occur in less than 15 minutes. The signs following infection are rashes or itchy skin lasting 24-48 hours. Two months after infection, fever, chills, cough and muscle aches may occur, as the parasites mature. Clinical manifestations occur after 2-16 weeks.

The free swimming fork-tailed cercariae, less than 1 cm in length, penetrates the human skin or mucosa when a person is exposed to infested water and, after passage through the tissues, lymphatics and venules will develop into a male or female schistosome.

The intermediate snail host for schistosoma haematobium is almost exclusively *Bulinus africanus,* especially in Africa, South of the Sahara (Cook *et uL* 2003).

2.3 Knowledge about bilharzia

Knowledge about illness influences social behaviour. In the case of bilharzia, one is expected to be conversant with self-examination, which entails being on the look out for any or all of the following symptoms:

- Blood in urine
- Pain during urination
- Heat sensation during urination
- Lower abdominal pain

In a study to determine the reliability of self-diagnosis in estimating the prevalence of urinary schistosomiasis in school-aged children in Kwale district before and after treatment, Karama (2002) found that almost all the children who participated in the study were aware of the disease. The knowledge level was found to be about 98.5% in one examination and 99.8% in another.

Self-examination has limitations. For example, symptoms of venereal infection among sexually active children and adults could be assumed to be schistosomiasis - and subjected to the same attitudes and health-seeking behaviour common to debilitating illnesses (Karama, 2002).

Bilharzia is associated with low socio-economic status and is largely based on poverty and ignorance, poor housing, lack of portable water, inadequate hygienic conditions and tew, if any, sanitary facilities. There are a multitude of activities that will bring a

population into contact with water into which eggs are passed and in which are found intermediate snail hosts.

Controlling bilharzia-related illness with drug treatment has been found to be a feasible and effective strategy provided funding is available, while other major interventions are health education and the provision of safe water. (IRIN, 2002)

A study of the impact of health education in the control of bilharziasis in Mwachinga and Mtsangatamu by Katsivo *et al* (1994) found that certain constraints can easily cause people to disregard preventive measures. The constraints include:

a) *Education.* Inability to grasp basic scientific concepts since their academic knowledge is low
b) *Distance.* The nearest safe water was farther than the river.
c) *Cost.* The safe water is not free. Inability to purchase adequate amounts for the whole family would lead to a visit to the cercariae infested river.
d) *Famine.* Wild animals, especially elephants, have been destroying crops, leading to a virtually permanent famine in the village.
e) *Sexuality.* There is a confusion between gonorrhoea and schistosomiasis haematobium. Attempt to explain the difference would be tantamount to discussing sex, a sensitive subject in this Muslim-dominated community.

The disease is variously referred to as *kisonono* by some and *kichocho* by others. *Kisonono* is the Kiswahili term for gonorrhea while *kichocho* is the more appropriate term for schistosomiasis.

In a study on heavy schistosomiasis associated with poor short-term memory and slower reaction times in Tanzanian school children, Jukes *et al* (2002) found that children with a heavy schistosoma haematobium infection had significantly lower scores than uninfected children on two tests of verbal short-term memory and two reaction time tasks. This team concluded that children with heavy worm burdens and poor nutritional status are most likely to suffer cognitive impairment, and the domains of verbal short-term memory and speed of information processing are those most likely to be affected.

In a similar study on the effects of parasite infections on cognitive processes in children, Kvalsvig *ct al* (1991) found that the pattern of results was consistent with the hypothesis that parasitic infections combine with nutritional deficits to impair the efficiency of cognitive processes.

Kimura *et al* (1992), in a study on the effects of schistosoma haematobium infection on mental test scores of Kenyan school children, observed that test scores became worse as egg counts of children increased. This study showed that even the light infection caused adverse effects on mental activities, which were detectable using simple mental tests.

In Mali, de Clercq *et al* (1998) detected a significant decline in academic performance and in school attendance with increasing intensity of infection. This study also found that the rates of school attendance were low in some areas and that it was the absentees who appeared to be at relatively high risk of ill health.

In two cross-sectional studies with a six-year interval to determine the prevalence of schistosome and soil-transmitted helminth infections before and six years after treatment in two Tanzanian primary schools, Poggensee *et al* (2005) detected a decrease in the proportion of the number of children heavily infected with schistosoma haematobium. The reduction of prevalence was attributed to health-related interventions. In an earlier study, Poggensee (1998) had found that female genital schistosomiasis frequently exists in women with scanty or no egg excretion in the urine.

Obel (1994) reports a peculiar case in which numerous schistosoma haematobium eggs were demonstrated in sperm, even though repeated examination of urine and rectal biopsies had been futile. It is concluded that the case presented demonstrates the importance of using sperm as an alternative sample material when schistosoma eggs are not found in conventional sample materials from male patients suspected of being infected with schistosoma haematobium.

On re-infection, Dabo (2000) found that children between the ages 7 and 10 years were at a higher risk than those between 11 and 15 years. Karama (2002) found that in spite of appreciably high prevention knowledge levels in Kwale district, the infection dynamics were such that within three months, some of the initially egg-free children had become egg-positive.

2.4 Attitude towards infection

The right perception towards health intervention is as fundamental as health education and chemotherapy, if behaviour change is to be achieved. Many patients have non-specific symptoms and many are symptom-free or ignore their symptoms, and infection is discovered only on purposive surveys or during investigation for some unrelated complaint. This is due to the biological phenomenon of the over-dispersed distribution of parasites within hosts; this aggregated distribution means that, in any population of hosts, there exists only a small proportion of heavy infections with typical symptoms and the majority of cases are moderate or light infections with a corresponding freedom from symptoms - or even a complete lack of symptoms (Cook *et uL* 2003).

In many countries in Africa, in the young age groups and early teenage, macroscopic haematuria may be virtually universal; in boys it provokes little comment and is regarded as a natural sign of puberty and an approach to manhood (Cook *et aL* 2003).

2.4.1 Attitude towards Poverty

Bilharzia has of late been considered together with other intestinal parasites, which are all regarded as diseases of poverty (Waddington, 2001). Poverty not only increases the risk of being exposed to health-adverse conditions, but also reduces the opportunity of having adequate coping resources at one's disposal. (Siegrist, 2000)

2.4.2 Attitude towards need for care

According to Judith Kasper (2000), the end result of various 'calculations' that a person undertakes to form a decision to change behaviour or seek treatment could be characterized as a determination of need for care. Such 'calculations', Kasper observes, include "Am I at risk? What are the consequences of inaction? How effective is the course of action being considered? How difficult will it be to implement?" Is the behaviour (willingness to act) driven by illness or poor health, or by the desire to avoid these states? (Kasper, 2000).

2.4.3 Does religion influence attitude?

Katsivo *et al* (1994) found religion to be a limiting factor in the transmission of health education especially in matters touching on sexuality. It was indeed found that the Muslim residents of Mwachinga and Mtsangatamu did not know the difference between gonorrhoea and bilharzia even after health education.

2.4.4 Attitude towards Intervention

On the perception of intervention efforts, in particular the provision of safe water, the study (Katsivo, 1994) shows that only 50% of the people saw the efforts in the light of prevention of bilharziasis haematobium. In his study, Karama (2002) cites an earlier field study where more than half of the community in an endemic area continued to use river water despite the provision of a clean water supply.

2.5 Practice

The success of any intervention campaign is measured by how readily the recipients adopt the change that is being promoted. With bilharzia, the change involves human-water contacts. Obligatory human-water contacts may be of domestic, hygienic, occupational or religious origin. Crossing the river on bare feet, swimming (or bathing), fishing and irrigation are common channels that may predispose residents to infection.

Children are important reservoirs of infection because of their indiscriminate excretory habits, especially urination when swimming. Some 5-25% of the infected population excretes at least 50% of the total number of eggs contaminating the environment, and the majority of heavily infected children lie in the 10-14 years age group.

Katsivo's study (1994) shows that users (both adults and children) of safe water before health education rose from about 55% to over 80% after health education. Following the inauguration of health education, use of latrines is reported to have increased. The number of latrines rose from 30 to 54 in Mwachinga village. Health education in the

village also resulted in an increase in the number of households using scoops (kata) for fetching river water for those who have to use it.

It is against the backdrop of these studies and interventions that the evaluation has been carried out, and with the assumption that the spread and prevalence of schistosomiasis are largely influenced by social behaviour.

2.6 - Theoretical Framework

Theorizing should start with the patient's understanding of the symptom's meaning. Health-related behaviour can be linked to a patient's cognition or lay explanatory models of illness (Armstrong, 2000). As will be seen in Chapter 4, understanding of bilharzia symptoms among the Mwachinga community is not in doubt; as it stands at 84%.

2.6.1 Attitude

According to Fishbein *et al* (1975), attitude is a disposition. It is typically viewed as a latent or underlying variable that is assumed to guide or influence behaviour. The usual assumption is that by means of changing the attitudes of individuals it is possible to influence their behaviour, to improve social relations, or to produce social change.

The attitude questions in this study were set up with the assumption that knowledge of a person's attitude permits the prediction of one or more specific behaviours. A person holding a favourable attitude towards an object would be expected to perform any

favourable behaviour and not to perform unfavourable behaviours. The reverse is true for a person holding an unfavourable attitude. (Fishbein *et al,* 1975).

For purposes of this study, contact with river water as a choice represents unfavourable behaviour, while the choice to use safe water represents favourable behaviour. The study has attempted to evaluate attitudes towards bilharzia, its symptoms and intervention efforts, that is behaviour change campaigns as well as prioritization.

Possible beliefs include:

- The river is the only source of *mboga*
- Stepping on the water while crossing is not harmful
- Blood in urine is a way of life
- Blood in urine is the only symptom of bilharzia infection
- It makes no difference whether one uses river water or piped water
- Blood in urine is harmless so long as there is no pain
- Bilharzia affects those who frequently come into contact with river water
- The dispensary (at Mwachinga) is not sufficient for such a serious disease as bilharzia
- People who get infected with bilharzia are just weak
- Non-infection with bilharzia in this area is just a matter of good luck
- Poverty in this area is a more serious problem than bilharzia
- My spouse and I are not at risk since we are not sexually promiscuous

2.6.1.1 Attitudes are learned

Past experience can influence or modify behaviour. Predispositions to respond in consistently favourable or unfavourable ways are assumed to be the result of past experience. Those who have suffered from bilharzia in the past are keen to adopt the preventive measures offered. They can easily differentiate between the experience before and after health education (Katsivo et al, 1994).

As Fishbein (1975) states, an attitude represents a person's general feeling of favourableness or unfavourableness towards some stimulus object. As a person forms beliefs about an object, he or she automatically and simultaneously acquires an attitude toward that object. Each belief links the object to some attribute; the person's attitude toward the object is a function of these attributes. People learn to like (or have favourable attitude toward) objects that they associate with "good" things, and acquire unfavourable feelings toward objects that they associate with "bad" things.

Some of the adult men and women who had received health education from the JICA and KEMRI personnel refer to the river as "dangerous" and "bad". Safe water is "good" and is attributed to these public health visiting teams.

Fishbein (1975) says that on a day-to-day basis, people automatically acquire an attitude toward some new object when they learn its associations with other objects, attributes, or qualities toward which they already have attitudes. These attitudes (i.e. attitude evaluations), he says, are themselves a function of these characteristics. Thus the

dispensary was well received in Mwachinga because it was linked to the people who brought "liberation" from bilharzia in the village.

The formation of one belief, such as the one attributing infection to weakness, may lead to the development of other inferential beliefs; a person with such an attitude will step on the water while crossing the river even when alternatives are available.

A person's attitude is determined by his or her salient beliefs about the attitude object; beliefs about a given behaviour and about the expectations of relevant others vis-a-vis that behaviur determines a person's intention to perform the behaviour and thus also influence the overt behaviour itself. Understanding of this concept may help press for the change of behaviour especially in the use ot the river as toilet among the boys and girls.

Failure by some of the residents to change behaviour totally may probably find explanation in their inability to discard salient beliefs about river water. The effort may not have been strong enough to influence the intentions of the individual to avoid contact with river water.

2.6,1.2 Changing attitude

According to Fishbein (1975), attitudes can be changed by changing one or more of the existing salient beliefs, or by changing the person's evaluation of the attribute. Beliefs about the object and attribute evaluations can therefore be viewed as two different determinants of attitude at which an influence attempt can be directed.

2.6.1.3 Changing beliefs about an object

It may be assumed that change in certain beliefs that the subject holds, will be followed by a change in the subject's attitude towards an object, person, concept, or behaviour. If we take bilharzia as the object, and consider the attitude towards seeing blood in urine, information on the fact that loss of blood leads to the reduction in the amount of blood circulation in the brain and hence, less oxygen in the brain and may lead to poor performance in class, may result in favourable behaviour.

2.7 Change of Behaviour

It is generally assumed that a person's behaviour with respect to an object is in large part determined by his attitude toward that object. A person's behaviour is determined by his intention to perform that behaviour. To change a person's behaviour, it is therefore necessary to change his or her intention to perform that behaviour.

Behaviour change should be seen as a process - demanding that community health workers "stay on the beat" at all times - to monitor intentions so as to counteract them as necessary. This is in line with the fact that between the influence attempt and the behaviour may be some intervening events.

In the Mwachinga case, the intention to change behaviour may be there; but perhaps the pressure to change does not equal the urge to get into the water to fish (*kuvua mboga)* for the next meal. After all, some may argue, the only risk is contracting a disease that has a cure [anyway].

2.8 Causes and Treatment of Disease

It is not lost on the investigator the fact that the causes and treatment of disease can be set within a sacred framework in which the ultimate explanations of illness are sought in non-natural causes (such as divine punishment). For this reason, data on gender, age, occupation, education levels and religion form part of the questionnaire.

2.8.1 Morals

Being sick may also be seen in moral terms, where human beings are held responsible for their illness. To find out whether falling ill is in any way viewed as a sign of moral failure - and therefore a source of blame, the investigator poses the question (No. 17 in questionnaire): *Are you concerned about the number of times you have had to visit the dispensary for bilharzia treatment?*

The health education does not seem to have dealt with the end result - cancer of the bladder. The individual should be helped to visualize himself/herself suffering from a self-inflicted terminal ailment. There is need to help them see that they will suffer the guilt of responsibility ..."Could I have wished this on myself? ...What did I do wrong? Can I make up again?" (Lupton, 2000). Failure to change from unfavourable behaviour to favourable behaviour has the likely event in which the subjects reckon too late that they played a part in bringing the illness upon themselves.

Searching their hearts to identify what might have caused the disease won't help. This view is supported by David Armstrong (2000), who cites Parson's famous essay on the sick role. The essay describes the damage caused by a lesion as dichotomous, in that it

destroys the biological integrity of the patient and also compromises the patient's social status.

2.8.2 Health education and facilities

Human illness may also be explained in natural terms by reference to causal agents such as germs or viruses, and individual humans are not held responsible for viral infection.

Causes of human suffering and disease may also be explained in collective terms by reference to poor environmental conditions, low educational provision, poverty and so forth. (Turner, 2000).

As Turner (2000) observes, health is improved by personal hygiene, isolation from germs and viruses, and the presence of a highly trained cohort of professional doctors with the support system of universities, medical faculties and general hospitals.

This is not lacking in Mwachinga village, for there is a dispensary within the village, while Kwale sub-district hospital and Kinango district hospital serve as referral hospitals. The KEMRI laboratory within the precincts of the Kwale Sub-district hospital and the close supervision of Prof. Moji of Nagasaki University (Japan) and Dr. Mohammed Karama of KEMRI complete the ideal picture painted by Turner (2000).

2.8.3 Adoption delay

A gap exists in the transition between health behaviour advocacy and community based health promotion practice (Prohaska *et aL* 2000). Researchers in the behavioural sciences assume that the individual has some volitional control over health risk behaviours, and that the adoption or cessation of behaviour is a product of subjection perceptions and rational decision making.

There is also recognition that health-risk factors have multiple environmental and contextual determinants. As argued earlier, the issue of available options militating against hostile environmental conditions makes rational decision-making rather tricky.

On personal hygiene, one could also apply the ecological approach so as to address the need for a deeper understanding of the interaction between individuals, their families, communities, and the environment, so that there is a clearer understanding of how health can be achieved and maintained over time (Prohaska *et ai* 2000). This, in essence, emphasises the need for multiple types of interventions to address the complex issues facing at-risk communities such as the Mwachinga villagers.

2.9 Relevance of the theoretical framework to the study

Without the theoretical framework, formulation of the attitude questions for this study would have been difficult. For a disease like bilharzia, whose spread is so dependent on choice of behaviour, defining the distinct variables such as knowledge, attitudes, intentions and behaviour is imperative.

On attitude, for example, once it is established that the behaviour of an individual or group of individuals is governed by their attitude about a given object, it is only change of that attitude that would ensure change of the behaviour. A continuous supply of information concerning the object about which an attitude has been formed facilitates change or strengthening of attitude, depending on whether the information is favourable or unfavourable. This argument supports the theory that attitudes are learnt.

It is also assumed that by means of changing the attitudes of individuals, it is possible to influence their behaviour, to improve social relations, or to produce social change. To change behaviour, an influence attempt should be directed at the intention to perform that behaviour. To change that intention, however, it will be necessary to focus on attitude toward the behaviour or subjective norms.

When the dependent variable is the attitude toward an institution, for example, beliefs about that institution's attributes or characteristics are some of the primary beliefs at which the primary attempt can be directed. Based on this, the intervention activities in

Mwachinga village and at the school, the campaign teams and the role of the dispensary have been querried.

Attempts to induce change in a given belief, attitude, intention, or behaviour must take into account the relation between the variable that is to be changed and the beliefs that are affected most immediately by the influence attempt (Fishbein et al, 1975).

When the dependent variable is attitude toward a behaviour, primary beliefs associate the behaviour with attributes such as costs or consequences. Attitude towards the behaviour, or any other attitude can be changed by influencing primary beliefs about the attitude object or the evaluations of its attitudes.

An influence attempt must be directed at one or more of the individual's beliefs. A person can be placed in a situation where he can personally observe that an object has a given attribute; and second, the person may be told by an outside source that the object has the attribute in question. For purposes of this study, the KEMRI public health personnel may be regarded as that outside source.

CHAPTER THREE

METHODOLOGY

3.1 Site selection and description

Mwachinga Village is in the hinterland, some 15 kilometres to the northwest of Kwale town. It is in Kinango Division of Kwale District. Kwale district is situated in the Southeastern part of Kenya in the Coast Province. Bordering the district to the west is Taita Taveta, Kilifi and Mombasa to the north, and the Republic of Tanzania to the south. It is along the coast, with the Indian Ocean to the east.

The district covers a total area of 8322 km , of which 65 knr is water. Kwale district has a monsoon type of climate, which is hot and dry from January to April. The rainfall is bimodal, with Long rains starting around March/April and continuing until end of May or early June. The Short Rains start in October and may continue until early December.

Mwachinga village is semi-arid, with River Marere running through it. The land is hilly, with homesteads spread out. The main crops grown here are maize, cassava and coconuts. Some of the residents fish in the river for trade as well as domestic consumption. There is an elephant orphanage (Mwaluganje) in the area, which is registered as a tourist site. The animals often stray off the orphanage, destroying crops and often posing a danger to the residents.

There is safe water in some parts of the village. However, some of the residents depend on the river as a source of water for all their water needs.

3.1.1 The population

The village has about 200 homesteads. The only school in the area, Ng'onzini Primary School has about 400 pupils. The main ethnic groups are Digo, and Duruma. They are predominantly Muslim (95%).

3.1.2 Education

Education levels in the village vary. The majority of the women (68%) are illiterate while (50%) of the men have primary education. Only 28% of the women have primary education. Only 2% of the men have attained university education while 24% of them are illiterate. Among the women, 2% have attained secondary education and another 2% have reached tertiary level.

3.1.3 Occupation

Most of the residents are resident farmers: Men - 42%; Women - 78%. Among the employed, only 4% are women, compared to men (30%). Some are in business: Men - 16%; women - 4%. While 14% refer to themselves as housewives, 12% of the men are jobless.

3.2 Sample Design and Sampling Procedure

A Knowledge. Attitude and Practice (KAP) survey was conducted on a sample of 200 of the local community (there are about 200 homesteads in Mwachinga village). This number comprised 50 adult men. 50 adult women, 50 boys and 50 girls, all drawn at random (stratified random procedure) from the village population register.

From the KAP survey came the data that was used to help compare changes in knowledge about bilharzia, attitude towards bilharzia (schistosomiasis) symptoms and practice levels.

3.3 Data Sources and Data Collection Methods

3.3.1 Primary and Secondary Sources - Key Informant and Focus Group Interviews

This exercise sought to find out what specific issues may have influenced the adoption of the measures put up by the project. A few key informants (see Appendix II) were selected and interviewed. This group was constituted by Ng'onzini Primary School headteacher (who has headed the school since its inception in 1965), the immediate former village chairman, a former village women group leader (who was also in charge of the now defunct water-kiosk system), the current women group leader, the field officer in charge of the dispensary, laboratory assistants and dispensary staff.

The KAP survey was carried out through a questionnaire (see Appendix I). The questionnaire carries knowledge, attitude and practice questions. It also has investigative questions on the effectiveness of various intervention campaigns.

On knowledge, the questionnaire seeks to find out what the respondents know about bilharzia and the preventive measures they need to take. This entails interrogation into self-examination.

The attitude section investigates the respondents' perception of the infection and intervention efforts. The questionnaire also captures the intervention campaigns carried out at the school so as to determine their effectiveness.

The practice questions attempt to weigh how readily the respondents have been applying the health education they have received so far. The aim of the practice questions was to help determine the impact of the measures taken to control bilharzia in the village. This section also seeks to find the various modes of communication by which the respondents received the information.

The questionnaire was administered with the help of six assistants from the village. The investigator took the assistants through some training sessions, which included a pre-test of the questionnaire before sending them to the field. The team was also instrumental in validating the sample, since, being conversant with the village, they knew who had relocated or was unavailable. They were therefore able to replace such, following the sampling formula provided by the investigator. [The investigator learnt that some of the residents who have property elsewhere keep moving in and out of the village.]

3.4 Data Analysis

The data obtained through the survey questionnaire were coded and analysed manually, using statistical procedures. For the open-ended questions, all possible responses were listed and then coded. After coding, the data in the questionnaires were recorded in a tabular format for analysis. Results and discussions are presented in Chapter 4.

3.5 Problems, constraints and limitations of the study

Low academic knowledge makes it difficult for most of these people to grasp the scientific concept behind the health education that they have received. This limitation makes it difficult for them to sustain behaviour change.

Engaging local assistants in administering the questionnaire was an advantage only in so far as fluency in the native language and understanding of cultural values. There is a possibility, however, that their familiarity with the respondents may have influenced the flow of information, especially in the questions dealing with deeply personal matters that were likely to expose them as ignorant.

The interchangeable use of the terms *kichocho* and *kisonono* is confusing, and may contribute to errors. Some of the sexually active respondents who used the term *kisonono* may have been referring to gonorrhoea, although the questions were on bilharzia infection.

CHAPTER FOUR

THE FINDINGS

4.1 Introduction

The following tables, figures and discussions are based on the information obtained from the questionnaire administered in Mwachinga village in April 2005. The respondents' answers have been coded, and the frequencies expressed as percentages. The respondents are grouped into four categories: A - Adult Men; B - Adult Women; C - boys; D - Girls. Overall, 200 people were interviewed, 50 in each category.

4.2 Socio - Demographic Background of the Respondents

The village has about 200 homesteads and are all documented. The only school in the area, Ng'onzini Primary School has about 400 pupils. The school was founded in 1965. The main ethnic groups are Digo, and Duruma. They are predominantly Muslim (95%).

4.2.1 Age

A few of the elderly women interviewed did not know their ages. Their ages were therefore entered as "A". Most of them are estimated to fall under the "71-80" category. While the adults (men and women) are expected to have all witnessed and participated in the intervention campaigns, the lower primary school pupils were either very young at the time, or were not yet born.

Table 4.1(a) Distribution of the Respondents by Age (Adults)

Age Limits	Adult Men (%)	Adult Women (%)
20 and under	10	4
21 -30	12	24
31-40	32	16
41 -50	20	28
51-60	14	6
61 -70	6	4
71 - 80	4	18
81 and above	2	0

Table 4.1(b) Distribution of the Respondents by Age (Boys and Girls)

Age Limits	Boys (%)	Girls (%)
10 and under	26	20
11-15	56	62
16-20	18	18

4.2.2 Education

Table 4.2 Distribution of the Respondents by level of Education

Education	Adult Men (%)	Adult Women (%)
None	24	68
Primary School	50	28
Secondary School	10	2
Tertiary level	6	2
University	2	0
Other training	8	0

Education levels in the village vary. The majority of the women (68%) are illiterate, while (50%) of the men have primary education. Only 28% of the women have primary education. Only 2% of the men have attained university education while 24% of them are illiterate. Among the women, 2% have attained secondary education and another 2% have reached tertiary level. All the boys and girls who were interviewed were pupils at the local primary school (Ng'onzini Primary School.)

4.2.3 Occupation

Table 4.3 Distribution of the Respondents by Occupation

Occupation	Adult Men (%)	Adult Women (%)
Peasant farmer	42	78
Employed	30	4
Business	16	4
Jobless	12	14

Most of the residents are peasant farmers: Men - 42%; Women - 78%. Among the employed, only 4% are women, compared to men (30%). Some are in business: Men - 16%; women - 4%. Of the jobless, 12% are Adult Men. while the Adult Women category comprise 14% (preferring to refer to themselves as housewives).

4.2.4 Religion

Table 4.4 The Population by Religion

Religion	Adult Men (%)	Adult Women (%)	Boys (%)	Girls (%)
Islam	94	96	98	94
Christian	4	4	2	6
Other	0	0	0	0
None	2	0	0	0

The predominant religion in Mwachinga village is Islam. The alternative religion is Christianity, professed by eight percent of the population.

4.3 Knowledge

Table 4.5 Distribution of respondents by awareness of water-borne diseases.

Code	Disease	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Yes	100	94	90	92	94
2	No	0	6	10	8	6

According to these responses, awareness of water-borne diseases is not in doubt. What may not be certain is whether the knowledge of how to prevent infection is as widespread, and if so, whether the residents have such intentions. Questions abound as to why the prevalence of bilharzia is so high in a community where the knowledge of risk is fairly high.

Table 4.6 Distribution of respondents by list of water-borne diseases known.

Code	Disease	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Tota (%)
1	Bilharzia	94	92	88	90	91
2	Malaria	36	20	10	26	23
j	Cholera	34	18	22	16	22.5
4	Dysentry	24	10	4	4	10.5
5	Typhoid	22	2	4	4	7.5
6	Diarrhoea	6	0	0	0	1.5
7	Filariasis	4	2	0	0	1.5
8	1 don't know	2	0	0	0	0.5

Table 4.6 shows that bilharzia is at the top of the list of the water-borne diseases that the residents know. It is instructive to note that while the respondents were free to name as many diseases as they knew, some mentioned only bilharzia. This then renders support to the hypothesis that the prevalence of bilharzia in Mwachinga village remains high due to insufficient knowledge about the disease.

Table 4.7 Distribution of respondents by knowledge of bilharzia.

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls [%)	Totals (%)
1	Blood in urine	68	70	37	62	68.5
2	Pain during urination	18	10	12	12	13
3	Disease that destroys urinary bladder	2				
4	Disease caused by contaminated water	20				**11**
5	Just a disease	8			16	8.5
6	Disease caused by snails	8			6	5.5
7	I don't know	0				4.5

On average, 68.5% of the respondents associate bilharzia with haematuria (blood in urine); 3% define it according to the damage it causes. The bulk of those who see it as just a disease are girls. Those who cannot define bilharzia constitute 4.5%. This gives further proof that bilharzia and its symptoms are not unknown. The variety of answers largely conform to the clinical definitions.

Table 4.8 Distribution of respondents by perception of the causes of bilharzia.

Code	Respondents' perceptions	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Contact with river water	90	90	94	94	92
2	Drinking river water	14	2	0	0	4
3	Through sexual intercourse	2	0	0	0	0.5
4	Use of communal water	2	0	2	0	1
5	1 don't know	0	8	0	8	4

In this question, which also allows more than one answer, the respondents almost invariably agree that river water contact exposes one to the risk of contracting bilharzia. Those who do not know how people get infected with bilharzia constitute 4%. This number may contribute to the sustained high prevalence of the disease, which stood at 35% in March 2005.

Table 4.9 Distribution of respondents by ability to recognize bilharzia infection (Self-diagnosis).

Code	Symptoms	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Blood in urine	86	84	84	82	84
2	Pain and heat sensation during urination	74	48	44	30	49
3	Lower abdominal pain	4	10	0	0	3.5
4	Frequent urination and sense of remaining urine	18	2	18	8	1 1.5
5	Rashes and itchy skin	0	0	2	0	0.5
6	I don't know	0	2	2	4	2

Blood in urine seems to be the universal symptom for self-diagnosis. The investigator's discussions with residents during the KII exercise, however, revealed that some of the patients do not present with the symptom. Such patients have been seen to present to the dispensary with other ailments, only to be diagnosed with bilharzia. Rashes and itchy skin within 24-48 hours of contact with infested water is an additional symptom, though captured among only 0.5% of the respondents.

Table 4.10. Distribution of respondents by what should be done to prevent bilharzia.

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Avoid contact with river water	96	94	88	88	91.5
2	Avoid promiscuity	2	0	0	0	0.5
j	Wear shoes to the toilet	2	0	0	0	0.5
4	Treat or boil river water before use	4	10	6	10	7.5
5	1 don't know	0	4	2	8	3.5

Here again we see that the bulk of the population knows how to prevent bilharzia infection. Among the girls, eight percent do not know how to avoid contracting the disease. But 10% of them know that they can either boil or treat river water before use. Two percent of the men associate it with sex and believe that the promiscuous are at risk. The question of why they do not avoid what they know to be harmful and adopt the harmless arises. Further insight shows that there are a multitude of activities that will bring a population into contact with water into which eggs are passed and in which are found intermediate snail hosts. Mandatory and routine activities such as crossing the river on way to school or shopping center; or fishing as the only alternative to starvation are examples.

Table 4.11. Distribution of respondents by knowledge of time of day when it is safe to get into contact with river water (Risk avoidance).

Code	Timing	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Before sunrise and after sunset	38	26	22	8	23.5
2	During daytime	6	8	4	14	8
J	After boiling or treating it	4	2	2	2	2.5
4	Never	16	26	34	14	22.5
5	During rainy season or when water is running	16	16	14	14	15
6	During dry season	2	2	0	2	1.5
7	I don't know	16	22	22	48	27

As taught during the health education campaigns, 23.5% believe river water is safe if drawn early in the morning, or after sunset. This is based on the fact that the main

stimulus for the release of cercariae from the intermediate snail host is light, usually at temperatures between 10° and 30°C. The number of those who follow the timing concept is largely constituted by adults - who had attended the campaign sessions. Some 22.5% of them believe that the water is never safe. Some (15%) believe that river water is safe during the rainy seasons, or when the water is running. Experts view the velocity of flow as a limiting factor to the miracidia-snail contact and suggest that it may interfere with the life cycle of the schistosome. Those who hold this belief are well represented in all categories. Twenty-seven percent of the respondents do not know whether river water is ever safe. The number here is largely constituted by girls (48%). It is possible that, in their apparent ignorance, they continue using river water.

Table 4.12. Distribution of respondents by knowledge of what to do if they must use river water (Risk reduction).

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Boil it	94	96	76	80	86.5
2	Treat it	12	10	14	12	12
J	Filter it	0	4	4	2	2.5
4	Mix with clear water	0	0	0	2	0.5
5	Fetch with handled tool	8	2	0	2	j
6	Step but don't bathe in it	2	0	0	0	0.5
7	Nothing	2	2	4	2	2.5
8	Store for two days before use	0	0	0	2	0.5
9	1 don't know	0	0	10	6	4

While boiling of river water as a safety measure is known to 86.5% (mainly adult men and women), 4% of the respondents do not know whether there is anything they should do to the river water. The boys and girls in this group (pleading ignorance) are probably not bothered about the safety of the water they use. It is also baffling to note that users of protective implements, such as handled tools for drawing water, are quite few. There is also no mention of shoes as a protective measure. Treating of the water is an option - but apparently not popular - perhaps because of the cost aspect. This question invited more than one answer. Some 0.5% gave the option of storage for two days as a safety measure. Being in a non-feeding phase, it is expected that the cercariae would have exhausted their glycogen reserves and died, rendering the water safe for use.

Table 4.13. Distribution of respondents by knowledge of the options to take if one suspects that he/she has bilharzia.

Code	Options	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	See a doctor	98	90	84	84	89
2	Take drugs	2	6	10	12	7.5
3	Sleep	0	0	2	0	0.5
4	Pray	0	0	0	2	0.5
5	I don't know	0	2	0	2	1

There is general appreciation of the dispensary as a solution to all medical problems. The effective manageability of bilharzia at the dispensary has brought hope to the community. The stage of disease at which a patient would decide to visit the dispensary has, however, not been determined.

4.4 People's Attitudes towards Bilharzia

Table 4.14. Respondents' response to the view: "It makes no difference whether one uses river water or piped water."

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	1 strongly agree	2	4	2	4	3
2	1 agree	0	8	8	10	6.5
3	I am not sure	4	10	10	8	8
4	I disagree	46	46	56	56	51
5	I strongly disagree	48	32	24	22	31.5

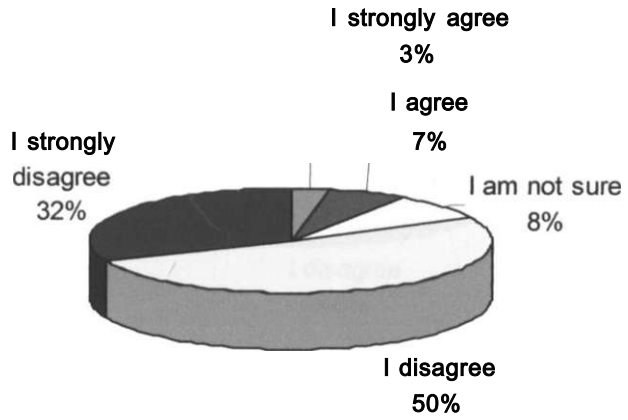

Figure 4.1. Respondents' response to the view: "It makes no difference whether one uses river water or piped water."

The fact that the respondents perceive river water as harmful is not in doubt. This view is represented by 82.5% of the respondents. The 9.5% who hold the opposite view could as well be grouped with the unsure lot who might not even be bothered about the safety of the water they use. The informed seem to be well distributed among all categories - men, women, boys and girls alike.

Table 4.15. Respondents' response to the view: "Blood in urine is harmless so long as there is no pain."

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	1 strongly agree	2	2	4	0	2
2	I agree	14	12	16	18	15
3	I am not sure	0	8	8	16	8
4	I disagree	40	48	54	44	46.5
5	I strongly disagree	44	30	18	22	28.5

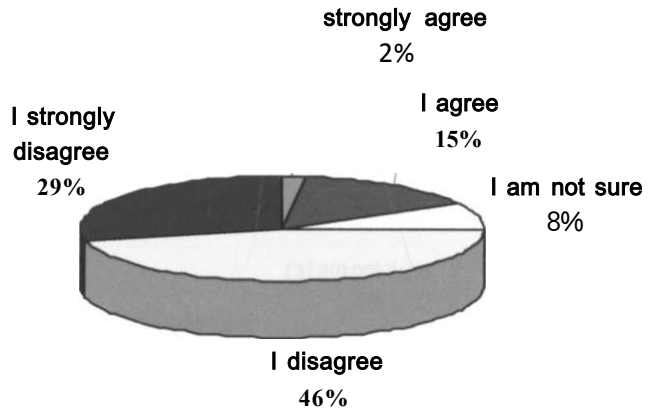

Figure 4.2. Respondents' response to the view: "Blood in urine is harmless so long as there is no pain."

The respondents' attribution of haematuria to bilhar/ia is strong. However, the fact that 17% of the respondents hold the view that appearance of blood in urine is harmless so long as there is no pain may mean that they would do nothing about the symptom. There is also a possibility that the other 8% who say they are not sure share in this attitude. Cook (2003) observes that, in many countries in Africa, macroscopic haematuria is

universal and, in boys, provokes little comment - for it is regarded as a natural sign of puberty and an approach to manhood.

Table 4.16. Respondents' response to the view: "Bilharzia affects those who frequently come into contact with river water."

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	I strongly agree	44	30	14	28	29
2	1 agree	24	46	42	42	38.5
3	I am not sure	0	4	6	4	3.5
4	I disagree	26	12	32	20	22.5
5	I strongly disagree	6	8	6	6	6.5

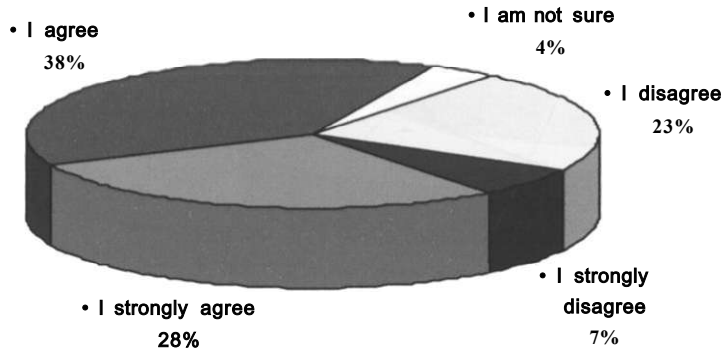

Figure 4.3. Respondents' response to the view: "Bilharzia affects those who frequently come into contact with river water."

This statement tends to separate "one-ofT users from "habitual" users. The responses suggest that 67.5% of the respondents do not know that they have to keep off unsafe water completely, if they are to avoid bilharzia infection. It is noteworthy that this number is largely boosted by the female categories. Those who step on water while

crossing the river may not regard themselves as users of river water. The same may apply, to some extent, to those who indulge in fishing.

Table 4.17. Respondents' response to the view: "The dispensary is not sufficient for such a serious disease as bilharzia."

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	I strongly agree	4	4	4	4	4
2	I agree	28	26	18	36	27
3	I am not sure	6	12	10	8	9
4	I disagree	52	46	64	38	50
5	I strongly disagree	10	12	4	14	10

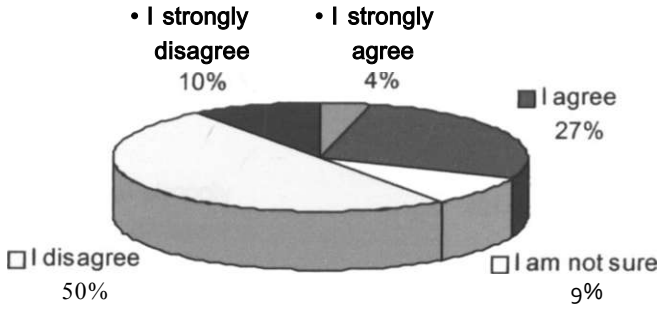

Figure 4.4. Respondents' response to the view: "The dispensary is not sufficient for such a serious disease as bilharzia."

Sixty percent of the respondents believe that all bilharzia cases can be managed at the dispensary; but 31% are not as confident with it. Just as the adoption or cessation of behaviour and rational decision making, so is the option to seek medical help. The

perception of the dispensary as inadequate may lead some residents to either seek medical help from Kinango District Hospital or Kwale Sub-district Hospital, or just stay sick at home for long periods.

Table 4.18. Respondents' response to the view: "People who get infected with bilharzia are just weak."

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	I strongly agree	24	24	20	26	23.5
2	I agree	32	30	28	22	28
3	I am not sure	8	10	14	22	13.5
4	I disagree	20	26	24	26	24
5	I strongly disagree	16	10	14	4	11

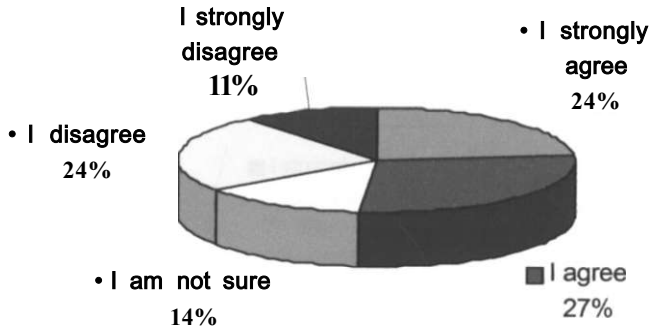

Figure 4.5. Respondents' response to the view: "People who get infected with bilharzia are just weak."

This question exposes a category of people who see the infected as disposed to it - more because of their physical weakness than their behaviour (river water contact). This attribution category is represented by 51.5% of the respondents. This reasoning is probably based on lack of obvious bilharzia symptoms. Thus, a person with such an attitude will indiscriminately step on the water while crossing the river, regardless of alternatives that may be available. Thirty-five percent of the respondents disagree. They do not support the notion that those who get infected are just disposed to it.

Table 4.19. Respondents' response to the view: "Non-infection with bilharzia in this area is just a matter of good luck."

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	1 strongly agree	28	22	20	24	23.5
2	I agree	32	34	36	42	36
3	I am not sure	2	10	18	12	10.5
4	I disagree	28	28	20	18	23.5
5	I strongly disagree	10	6	6	4	6.5

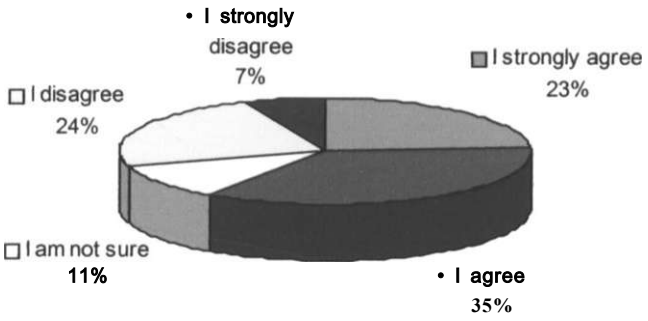

Figure 4.6. Respondents' response to the view: "Non-infection with bilharzia in this area is just a matter of good luck."

Agreeing with this statement suggests that one perceives bilharzia as widespread in the village - perhaps even regarding it as a way of life. This is a dangerous standpoint. Almost 60% of the respondents are in this category. They have lived with it and it will probably not stop them from going about their daily chores - some of which involve unlimited contact with river water. Even though further development of the disease may lead to cancer of the bladder, the need to seek medical help does not seem urgent. Some of them, especially the children, may not even be aware that, by urinating and defecating in the river as they swim or fish, they help maintain the life cycle of the schistosomes.

Table 4.20. Respondents' response to the view: "Poverty is a more serious problem in this area than bilharzia."

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	1 strongly agree	38	42	28	42	37.5
2	1 agree	26	24	36	20	26.5
3	I am not sure	0	4	10	8	5.5
4	1 disagree	24	18	18	18	19.5
5	I strongly disagree	12	12	8	12	11

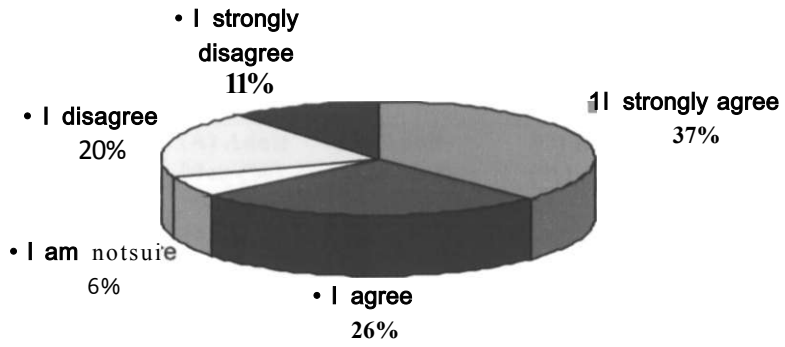

Figure 4.7. Respondents' response to the view: "Poverty is a more serious problem in this area than bilharzia."

Priorities here come to the fore. Sixty-four percent of the residents view bilharzia in the short-term perspective. They do not perceive it as being as serious as the problem of poverty - whose eradication they feel should be given priority. To many in this category, poverty eradication compares to increase in food supplies. It must not be lost on us that poverty is directly linked to the sustained high prevalence of bilharzia. Some of the residents cannot afford shoes - so they cross the river on bare feet. Most of those who engage in fishing (for commercial purposes or domestic consumption) cannot afford protective gear. These factors render credence to the notion that bilharzia is a "disease of poverty."

Table 4.21. Distribution of respondents by whether they are concerned about the number of times they have had to visit the dispensary for bilharzia treatment.

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Yes	56	44	32	42	43.5
2	No	44	56	68	58	56.5

While 56.5% of the respondents do not seem to be bothered by the frequency of their presentation at the dispensary with bilharzia, 43.5% are either shy about it or are concerned about the cost of medication (at the dispensary they pay half fee while the other half is met by the project). Further revelations from the KI1 exercise indicate that some, especially girls, will not readily present themselves for bilharzia treatment. They are often discovered when they present with other ailments. These are some of the issues that Kasper (2000) refers to as calculations that an individual may have to deal with in order to determine whether he or she is at risk and in need of medication.

Table 4.22. Distribution of respondents by concern about the number of times they have had to visit the dispensary for bilharzia treatment.

(a) The Concerned

Code	Reasons for concern	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Self-esteem	75	87.5	75	47.6	73.6
2	Expensive	25	12.5	25	52.4	26.4

Those who are bothered by bilharzia infection will avoid it for self-esteem constitute 73.6%. They want to stay healthy. Some find it embarrassing and demeaning to keep on seeking treatment for an ailment that results from avoidable behaviour. Fear of the ultimate condition - cancer of the urinary bladder was not cited.

(b) The Not Concerned

Reasons for not feeling concerned.

Code	Reasons for lack of concern	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Symptom response	77.3	53.6	70.6	89.6	72.6
2	Free	22.7	46.4	29.4	10.4	27.4

As seen earlier, the majority of the residents know what causes bilharzia - and even how to prevent it - but will not readily quit certain practices simply because they have been exposed to bilharzia for so long that it no longer bothers them. Among those who are not bothered. 27.4% see the half rate that they pay for medication as virtually free service. Since it is available any time they need it, they reason that they don't have to change any of their practices involving use of river water. But their response may also suggest that they do not go to the dispensary unless they are very ill.

4.5 Practice

Table 4.23. Distribution of respondents by whether or not they had visited the dispensary (with bilharzia) within the previous six months (to the interview).

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls [%]	Totals (%)
1	Yes	18	22	34	16	22.5
2	No	82	78	66	84	*11.5*

Only the proportion of the boys' category comes close to the official prevalence rate for March 2005 (which was given as 35%). Overall, only 22.5% have sought medication in the past six months. Taking into account the earlier observation that some people may harbour the infection and not necessarily present with the "blood-in-urine' symptom, it is

possible that the numbers here may largely represent those who were at an advanced stage of the infection. It is also possible that the sensitivity of the question may have tempted some respondents to withhold information. This assumption is based on the fact that all the "Yes" answers appear only on the questionnaires administered by the chief investigator (a stranger) and one assistant who, by virtue of being a boarding school student, was less familiar among the respondents.

Table 4.24. Distribution of respondents by frequency of hospital visits for bilharzias treatment within the previous six months (to the interview).

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Once	22.2	27.3	41.2	25	31.1
2	Twice	22.2	27.3	23.5	25	24.4
j	Thrice	22.2	27.3	29.4	37.5	28.9
4	>/= 4 times	33.3	18.2	5.9	12.5	15.6

The fact that about 33.3% of the adult men have sought treatment more than four times in the last six months may render credence to the notion that some of the residents do not seek treatment until they are very sick. Although the boys' category takes the lead among those who have sought treatment at least once, it is noteworthy that the frequency of visits among the other categories is quite high. This suggests that the rate of re-infection is also high. This can be associated with continued use of river water in spite of the knowledge of the danger it poses. This observation may also suggest that continued contact with river water only helps sustain re-infection and prevalence of bilharzia; immunity is not assured.

Table 4.25. Distribution of respondents by health institutions where they sought treatment for bilharzia.

Code	Health institutions	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls <%)	Totals (%)
1	Dispensary	88.9	100	88.2	100	93.3
2	Kinango	11.1	0	0	12.5	4.4
3	Kwale	0	0	11.8	12.5	6.7
4	Mombasa	11.1	0	0	0	2.2
5	Chemist	0	0	5.9	0	2.2

Apart from the requirement to change from unfavourable to favourable behaviour, subjects are advised to seek treatment from the nearest suitable health center when symptoms of disease are observed. Proximity to most of the residents and availability of an effective drug (praziquantel) and care makes Mwachinga dispensary their health centre of choice. Some of those who sought treatment elsewhere are on record as having started with the dispensary, from where they were referred to a bigger hospital (in Kwale town, where there is a sub-district hospital, or the district hospital in Kinango town).

Table 4.26. Distribution of respondents by symptoms that made them seek medication.

Code	Symptoms	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Blood in urine	62	52	56	28	49.5
2	Pain and heat sensation during urination	44	30	32	12	29.5
3	Lower abdominal pain	8	8	0	0	4
4	High frequency of urination and sense of remaining urine	12	8	12	8	10

The bulk of this group were symptomatic with haematuria (blood in urine). Some report a combination of some or all the symptoms (as coded 1-4). Haematuria is the cardinal symptom of schistosomiasis (Wambani, 2005). Apart from the possibility of menstrual flow (among girls), or gonorrhea (among the sexually active) being mistaken for bilharzia, haematuria is well recognized in Mwachinga as a symptom for *kichocho.*

Table 4.27. Distribution of respondents by knowledge of how they contracted bilharzia.

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Gil Is (%)	Totals (%)
1	Contact with infested river water	66	48	66	46	56.5
2	Bilharzia	6	6	2	2	4
3	Drinking river water	4	0	10	0	3.5
4	Snails	2	2	2	0	1.5
5	Eating sugarcane	0	2	2	0	1
6	I don't know	22	36	22	52	

The responses here differ from those represented by Table 8, in that here the respondents take responsibility for their ailment. The proportion of those who know that their plight is related to contact with river water constitute 56.5%, while 33% plead ignorance. The bulk of those in the latter group are girls (52%). Knowledge of the causes, coupled with their water contact practices helps them recognize the symptoms.

Table 4.28. Distribution of respondents by knowledge of how to avoid re-infection.

Code	Re-infection avoidance	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals <%)
1	Use safe water/avoid river water	62	66	58	54	60
2	Boil or treat river water before use	8	4	16	8	9
ĵ	Before sunrise and after sunset	2	0	0	0	0.5
4	Avoid sex with infected partner	2	0	0	0	0.5
5	Wear shoes	2	2	0	0	1
6	1 don't know	24	28	24	40	29

About 70% of those who have suffered from bilharzia seem to have a clue about how to prevent re-infection while 29% plead ignorance. Two percent of the men suspect that they may have contracted bilharzia from their infected wives or sex partners. If the cause of disease is associated with domestic matters such as fishing (*kuvua mboga),* behaviour change is likely to be influenced by the degree of suffering during previous infections. Pleading ignorance to methods of avoiding infection are 29% of the respondents. Although the figures representing each category are high, it is instructive to note that the girls category has 40%. This may probably be attributed to the girls' domestic roles, which include washing, fetching water and fishing. This level of ignorance should be addressed, perhaps through further interventions.

Table 4.29. Distribution of respondents by sources of water for:

a) Drinking

Code	Water sources	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
I	Tap/leakage	96	98	98	100	98
2	River or dam	0	2	0	0	0.5
3	Both 1 and 2	4	0	2	0	1.5

b) Cooking

Code	Water sources	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys <%)	(D) Girls (%)	Totals (%)
1	Tap/leakage	94	98	96	100	97
2	River or dam	0	0	2	0	0.5
J	Both 1 and 2	6	2	2	0	2.5

c) Bathing

Code	Water sources	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Tap/leakage	86	96	88	92	90.5
2	River or dam	4	4	8	8	6
3	Both 1 and 2	10	0	4	0	3.5

d) Washing clothes

Code	Water sources	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Tap/leakage	90	96	88	96	92.5
2	River or dam	4	2	8	4	4.5
3	Both 1 and 2	6	2	4	0	3

Although the majority of the residents use safe water for all the listed purposes, it is evident that they are keen to use it mainly for cooking and drinking. Some 7.5% to 9.5% of them use river water for bathing and washing of clothes.

The kiosk water programme is no longer operational. The KII exercise indicates that there arose a dispute between the women group (which was managing the drawing points) and the Ministry of Water over monthly returns. As a result, three of the kiosks were closed down while one (situated at *Kibcincia Hasara)* started running as a private business concern. Water here (and in all the other private water taps) sells for Ksh3 per 20-litre container. The other alternative for safe water is leakage water from various breakage points on the main water pipe, which traverses the village. The residents who find the river more accessible than the other alternatives draw water from there, boil or treat it before use, or just use it as it is.

Table 4.30. Distribution of respondents by timing and frequency of river water use.

Code	Time/Frequency	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls [%]	Totals (%)
1	Early in the morning or after sunset	32	10	18	20	20
2	Daytime	28	30	34	26	29.5
3	Never	32	50	36	42	40
4	I cannot remember	6	10	8	8	8
5	Sometimes	2	0	4	4	2.5

While it is heartening to note that 40% of the respondents firmly state that they do not use river water, it is of concern to note that the converse is true of the other 60%. The idea of drawing of water early in the morning or after sunset is in line with the health education given to the residents earlier on. The theory of safe hours is based on the fact that warmth and sufficient lighting are important conditions for the snails to release cercariae into the water. The accuracy of the timing is, however, uncertain. Some 29.5% of them either lack

this education or are in circumstances that demand that they use river water. This number perhaps contributes to the 35% prevalence reported in March 2005.

Table 4.31. Distribution of respondents by whether they do anything to river water before they use it.

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Yes	90	98	76	82	86.5
2	No	10	2	24	18	13.5

From the KII and FGI, the investigator managed to gather that the residents had been taught how to convert river water into safe water. The question therefore aims to find out how many of them still remember the lessons. From the health education campaigns they had learnt that they could (a) boil the water (b) treat the water with chlorine or (c) store it for two days before use. Some 86.5% of the respondents remember the lessons, while those who have no clue about what to do to river water constitute 13.5%. The majority of those who do not know are boys (24%).

Table 4.32. Distribution of respondents by what they do to river water before use.

Code	Respondents' answers	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Boil the river water before use	95.6	100	100	92.7	97.1
2	Treat with suitable chemical	8.9	10.2	7.9	12.2	9.8
3	Store for at least two days before use	2.2	2	2.6	0	1.7
4	Sieve it	0	0	0	2.4	0.6

Among those who do something to river water before use are 97.1% who boil the water, and 9.8% who treat the water with a suitable chemical. Some can remember more than one protective measure (the total is therefore more than 100%). Some 2.4% of the girls sieve the water - though this is not part of the health education imparted by the JICA/KEMRI team. Boiling is expected to destroy any foreign bodies in the water, and especially cercariae. Storage for at least two days would also kill the cercariae since their life span is short: 36-48 hours.

4.6 Interventions

Table 4.33. Distribution of respondents by knowledge about public health *barazas* in the village.

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Yes	82	68	30	32	53
2	No	18	32	70	68	47

The negative answer from the boys and girls may be understood to mean that the *barazas* (public meetings) were held while most of them were at school. Others may just be disinterested or unbothered whether or not such meetings are held. The KAP survey revealed that the residents had received health education at various levels: person-to-person, house-to-house, groups, school, and in *barazas.*

Table 4.34. Distribution of respondents by attendance at the public health *barazas.*

Code	Attended	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Yes	92.7	79.4	66.7	93.7	84.9
2	No	7.3	20.6	33.3	6.3	15.1

This table (Table 4.34) represents the action taken by those were aware of public health ***barazas*** in the village. Among those who knew about the ***barazas***, 84.9% attended them, while 15.1% did not. For information, this latter group could either rely on those who attended, or remain uneducated as far as prevention of bilharzia is concerned.

Table 4.35. Distribution of respondents by the intervention groups they can recall.

Code	Intervention groups	(A) Adult Men (%)	(B) Adult Women <%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	JICA	88	26	10	10	33.5
2	KEMRI	38	24	8	12	20.5
ĵ^	MOH	18	14	4	12	12
4	Local Authority	18	20	12	4	13.5
5	Dispensary Staff	8	4	2	0	3.5
6	Parents	0	0	0	2	0.5
7	Kinango Youth for Development	2	0	0	0	0.5
8	Plan International	4	0	0	0	1
9	Teachers	0	0	6	10	4
10	I can't remember	6	16	10	2	8.5

The respondents here were free to name as many health educators as they could remember. JICA and KEMRI rank highly and are regarded as having brought liberation from the bondage of bilharzia in the area. They are remembered for (a) treatment (chemotherapy) (b) provision of safe water kiosks (c) Dispensary (d) medicine at subsidized rates and (e) health education. All the same, 8.5% of the respondents could not remember any of the intervention groups. There is a possibility that these people would not also remember the message.

Table 4.36. Distribution of respondents by how they learnt about the ***barazas.***

Code	Source of information	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Chief or Village Chairman's announcements	24	16	2	0	9.5
2	Neighbours	6	4	8	4	5.5
j	Students	14	20	2	2	9.5
4	Mail	28	6	2	0	9
5	Teachers	4	2	12	10	7
6	Dispensary Staff	4	2	0	4	2.5
7	Parents	0	0	2	4	1.5

It is evident that virtually all categories of people in the village participate in the communication of vital messages. The chief, village chairman, students, mail and teachers top the list.

Table 4.37. Distribution of respondents by recall of what was taught at the *barazas.*

Code	Lessons learnt	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Effects, causes and how to prevent bilharzia	46	24	16	28	28.5
2	Use safe water for all purposes	6	6	0	0	J
j	Draw river water early in the morning or early evening	2	0	0	0	0.5
4	Boil or treat river water before use	6	2	2	2	ĵ
5	Not to defecate or urinate in river	2	2	0	0	1
6	Difference between gonorrhea and bilharzia	2	0	0	0	0.5

The respondents remember the message content. Some 28.5% of them can summarize what they learnt about the effects, causes, and how to prevent bilharzia. Three percent of them can remember the emphasis placed on the importance of using safe water. Katsivo *et al* (1994) had earlier on observed that 50% of the residents in this area had been using tap water without even associating it with the campaigns to eradicate bilharzia. Only 0.5% are aware of the safety in timing (early morning or after sunset, when temperatures are too low and the lighting insufficient for the release of cercariae). About 3% of them know that boiling or treating the water destroys the parasites.

On defecating or urinating in the river, it is surprising that only a small percentage (1%) of the respondents are keen to mention this aspect ol their lives. Yet this is a basic component in the life cycle of bilharzia. If people would stop using the river as toilet, the cycle would sooner or later be broken.

The interchangeable use of the terms *kichocho* and *kisonono* (for bilharzia) notwithstanding, the sexually active in the community are likely to mistake bilharzia for gonorrhea. Surprisingly, only 0.5% of the respondents remember this distinction as having been made during the health education sessions. Karama (2002) had also observed the likelihood of menstrual llow among young school girls being confused for bilharzia infection. But this issue does not arise here as a health education factor.

Table 4.38. Distribution of respondents by whether they changed any practices after attending the meetings.

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys <%>	(D) Girls (%)	Totals (%)
1	Yes	82	62	24	36	51
2	No	8	8	2	0	4.5
3	Not sure or N/a	10	30	72	64	44.5

That only 51% can confidently talk about changed behaviour is significant. This figure is largely constituted by adult men. However, it is not lost on the investigator that most men in this community do not engage in domestic affairs. Those who practise fishing (only a small percentage) do it for commercial purposes. Fishing for domestic consumption, like most of the other chores that demand contact with river water, are mainly carried out by women and the children. High percentages representing uncertainty among boys and girls is not significant, since not many of them attended the village health education meetings. It becomes significant only under the school interventions campaigns study. The 4.5% who confess to having not changed their behaviour probably contribute to the sustained high prevalence of bilharzia in Mwachinga village.

Table 4.39. Distribution of respondents by specific changed practices.

Code	Changed practices	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	1 stopped bathing and swimming in the river	19.5	6.5	16.7	5.6	12.7
2	I stopped defecating and urinating in river	2.4	3.2	0	5.6	2.9
3	I stopped using river water; I use safe water for all purposes	46.3	38.7	16.7	61.1	43.1
4	I stopped fishing in the river	7.3	3.2	0	0	3.9
5	Now I boil or treat river water before use	31.7	38.7	58.3	33.3	38.2
6	I dug a pit latrine	2.4	3.2	0	0	1.96
7	1 draw water early morning or early evening	2.4	0	0	0	0.98
8	1 stopped being promiscuous	12.2	9.7	8.3	5.6	9.8
9	I draw river water using handled containers	2.4	3.2	0	5.6	2.9
10	Basic hygiene	0	9.7	0	11.1	4.9

Considering that the water kiosk system is no longer operational, it is noteworthy that the leading practice change involves switching from use river water to safe water (43.1%); or treating river water to make it safe for domestic use (38.2%). It is not possible to tell how many are only keen to boil the water but not as keen to protect themselves when drawing the water. For example, the ratio of those who boil it before use (38.2%), to those who use handled containers when drawing the water (2.9%) is quite high.

Some of those who associate bilharzia with sex say they have stopped being promiscuous. The investigator thinks this emphasis may have been made by community health workers in relation to the prevention of HIV/AIDS.

Areas near some of the cracks on the main water pipe are used by the residents as bathing sites. Few of the residents own up to the habit of using the river as toilet. But 2.9% admit to having engaged in the habit and have now stopped it. The community lives as one family in many aspects. One pit latrine may serve many homesteads. All the same, there is need for more pit latrines.

Safety hours observance has some risk to it, as not all residents may be as keen to observe the timing. As pointed out earlier (discussion under Table 30) the theory of safe hours is based on the fact that warmth and sufficient lighting are important conditions for the snails to release cercariae into the water, and that the cercariae die within a short time if they don't find a definitive human host.

However, the evening drawing time may find some cercariae still active - thus exposing the drawer to infection. Besides, the residents are normally afraid of elephants, which start roaming about at dusk. They may therefore choose to risk contracting bilharzia by drawing water earlier, rather than face the elephants menace.

On fishing, only 3.9% of the respondents have stopped fishing in the river. But it is instructive to note that the boys and girls do not mention it as a stopped practice. Yet they

are often the ones who are sent by their parents to engage in the task, locally referred to as *kuvua mboga.*

Table 4.40. Distribution of respondents by whether they would recommend the meetings to other people.

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Yes	88	64	24	34	52.5
2	No	0	0	0	0	0
ǰ	N/a	12	36	76	66	47.5

This question largely borders on attitude. Virtually everyone who attended these meetings would recommend them to others. The investigator's aim here was to gauge what value those who attended attached to the meetings. The 'Not applicable' (N/a) response is entered against those who had not attended the meetings, as they could then not qualify to recommend to others meetings that they themselves knew nothing about.

Table 4.41. Distribution of respondents by list of the diseases they consider to be most serious in the area.

Code	Perceived Serious diseases	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(I)) Girls (%)	Totals (%)
1	Bilharzia	58	56	54	62	57.5
2	Malaria	72	70	62	80	71
j	HIV/AIDS	34	38	38	32	35.5
4	Cholera	16	26	12	6	15
5	Mshipa	12	2	4	0	4.5
6	Elephantiasis	6	8	2	0	4
7	Typhoid	6	6	4	14	7.5
8	Hernia	14	4	2	4	6
9	Tuberculosis	14	8	14	6	10.5
10	Filariasis	20	6	8	0	8.5

Among the diseases that the residents perceive as most serious, malaria takes the lead, followed by bilharzia and HIV/AIDS, in that order. *Mshipa*, variously referred to as hernia or filariasis takes the fourth place (19%). The fact that bilharzia ranks second to malaria renders credence to the hypothesis that bilharzia is probably perceived by some of the residents as a way of life. They believe they can endure bilharzia more than they can malaria.

Table 4.42. Distribution of respondents by list of the problems they consider to be most serious in the area.

Code	Perceived serious problems	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Hunger	54	62	58	58	58
2	Poverty	48	36	42	36	40.5
5	Joblessness	28	32	22	26	27
4	Wild animals	50	46	22	26	36
5	Harsh weather	24	10	6	10	12.5
6	Diseases	36	26	16	24	25.5
7	Transport	8	6	4	0	4.5
8	Water taps	4	4	20	14	10.5
9	Security	2	6	6	2	4
10	Foot bridges	0	2	4	0	1.5

Hunger is the leading felt need amongst all the respondent categories. It is followed by two interrelated conditions: poverty and joblessness. The little of crops that the residents could grow in their farms are either destroyed by rogue elephants at night, or dry up owing to harsh weather conditions.

Bilharzia in this area is, to a large extent, sustained by poverty. From lack of shoes for those who have to regularly cross the river, to lack of fishing gear, to lack of money for purchasing safe water for domestic use. Poverty stretches its tentacles in all directions. Even though drugs at the dispensary are offered at half rates, there still are some members of the community who cannot afford them. They are therefore forced to endure pain and the risk of the diseases developing into debilitating levels.

Transport to the market, administration centres or to referral hospitals poses the other problem. The residents have to walk about three to five kilometers to the main road (though even on the main road transport is not guaranteed). Insufficiency of water drawing points was mentioned by 10.5% of the respondents, while footbridges were mentioned by 1.5%. Footbridges could easily be a community effort under improved economic conditions.

4.7 Interventions at School

Table 4.43. Distribution of respondents by whether they are aware of health education lessons taught at Ng'onzini Primary School.

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	Yes	38	18	80	66	50.5
2	No	62	82	20	34	49.5

This question was designed for boys and girls who are in school but was open to all categories because some of the adults are former students of Ng'onzini Primary School - the only school in the village. The figure of 50.5% would have therefore been higher if

one were to analyse responses from only the boys and girls. The investigator expected more affirmative responses since, besides the ordinary academic lessons on health, the school observes a monthly procedure where a message on how to prevent bilharzia is conveyed to the pupils as they each receive a bowl of porridge from the school administration and teachers.

The respondents include Standard 1 pupils, who may not have fully grasped the monthly message by the time of the interview. The huge figure for "nays" among the Adult Women category may be attributed to the fact that most of them have not been to school (See Table 4.2 which depicts some 68% of the women in Mwachinga village as illiterate).

Table 4.44. Distribution of respondents by recall of the intervention teams that conducted the health education lessons.

Code	Intervention teams recalled	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(I)) Girls (%)	Totals (%)
1	JICA	31.6	11.1	10.0	6.1	12.9
2	KEMRI	21.1	22.2	17.5	9.1	15.8
J	MOH	36.8	44.4	30.0	15.2	27.7
4	Local Authority	0	11.1	0	0	0.99
5	School teachers	31.6	22.2	65	75.8	58.4
6	Dispensary Staff	15.8	0	12.5	6.1	9.9
7	Others	5.3	0	0	0	0.99
8	1 have forgotten	0	11.1	5.0	3.0	3.96

Taking the lead in the exercise of imparting health education are teachers (58.4%), followed by officials from the Ministry of Health. The elderly folk who remember the initiators of the project (JICA) may have been students at the time. The input and impact

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of KEMRI also are recognized by all categories. It is noteworthy also, that 3.96% (largely contributed by adult women) of the respondents cannot remember who conducted the lessons. The investigator notes that 68% of the women are illiterate while only 4% have gone beyond primary school education.

Table 4.45. Distribution of respondents by recall of the diseases the health officers and teachers talked about.

Code	Diseases talked about	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals <%)
1	Bilharzia	74.7	77.8	62.5	69.7	68.3
2	Malaria	26.3	44.4	30	30.3	30.7
3	HIV/AIDS	47.4	55.6	17	48.5	46.5
4	Nutrition and personal hygiene	15.8	0	10	18.2	12.9
5	Tuberculosis	10.5	11.1	0	0	2.97
6	Elephantiasis	10.5	0	2.5	0	2.97
7	Mshipa	5.2	0	2.5	0	1.98
8	Cholera	5.2	11.1	7.5	3.0	5.9
9	Drug abuse	0	11.1	2.5	0	1.98

Bilharzia takes the lead (68.3%) among the diseases the respondents can remember the groups addressing. Here also, the figures represent those who said "Yes" to the question represented by Table 43. The health education campaign in question was about bilharzia. It is therefore not surprising to see that the respondents' answers rank bilharzia at the top, even though they perceive malaria as a more serious disease than bilharzia. In terms of prevalence, bilharzia is often ahead of malaria in the area.

It is noteworthy that bilharzia has not been addressed in isolation. Table 45 shows that the respondents are aware of other important diseases like HIV/AIDS and malaria. It is also

evident that the recall of highly esteemed organizations such as JICA and KEMRI matches the recall of the diseases they addressed. The attitude towards the intervention campaign personnel may therefore influence the attitude of the respondents/recipients towards the subject they address. This is in agreement with the theory that attitudes are learned (Fishbein, 1975).

Table 4.46. Distribution of respondents by what they learnt from each group.

Code	Lessons learnt	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	How to prevent bilharzia	84.2	33.3	50	48.5	54.5
2	Use safe water for all water needs	0	22.2	10	3.0	6.9
j	Draw water early in the morning or early evening	0	0	2.5	0	0.99
4	Boil river water or treat it before use	0	11.1	2.5	6.1	3.96
5	Use of pit latrines instead of river	5.3	0	2.5	0	1.98
6	Clean environment and personal hygiene	5.3	11.1	7.5	12.1	8.9
7	Don't bathe or swim in river	5.3	0	2.5	3.0	2.97
8	1 cannot remember	0	0	2.5	15.2	5.9

The general message of how to prevent bilharzia infection is remembered by 54.5% of the respondents. Some are keen to mention the key factors that one needs to consider in order to prevent bilharzia. However, 5.9% of them (mainly girls) cannot remember the health education lessons, though they can remember attending. It is hard to determine whether those who forgot what was taught exercise any preventive methods.

On the use of pit latrines instead of the river, only 1.98% are keen to mention that they learnt something about it. This figure is largely constituted by the male categories: men (5.3%) and boys (2.5%). These are also the categories that would most likely swim in the river.

Table 4.47. Distribution of respondents by whether they changed any practices after attending the health lessons.

Code	Responses	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
I	Yes	94.7	100	95	93.9	95.9
2	No	5.3	0	5	6.1	4.1

It is noteworthy that 95.9% of the respondents who attended the school intervention programme changed some practices following the health education lessons. However, it is still the same group of respondents that seem to be entangled in water contact practices - as in Table 4.30. Total avoidance of river water contact is the desired practice change. Partial practice change only helps sustain high prevalence rates.

Table 4.48. Distribution of respondents by what practices they changed.

Code	Practices changed	(A) Adult Men (%)	(B) Adult Women (%)	(C) Boys (%)	(D) Girls (%)	Totals (%)
1	I stopped using and stepping on river water	50	33.3	23.7	16.1	27.1
2	1 started using safe water for all purposes	33.3	22.2	13.2	16.1	18.8
j	1 stopped bathing and swimming in the river	11.1	0	21.1	9.7	13.5
4	1 draw river water using handled containers	0	0	0	3.2	1.0
5	Now 1 boil river water before use	16.7	33.3	21.1	25.8	22.9
6	I stopped fishing in the river	5.6	0	2.6	0	2.1
7	I dug a pit latrine	5.6	0	0	0	1.0
8	1 stopped using river as toilet	0	0	2.6	0	1.0
9	Clean environment and personal hygiene	11.1	11.1	15.8	16.1	14.6

Most of the factors cited in the responses are related to contact with river water. Those who must use river water know that they should boil it before use. This group is represented by 22.9% and is well represented in all categories. The men and boys should perhaps wear protective gear when fishing, instead of quitting fishing altogether. Just as was the case with adults, few are keen to confess to having used the river as toilet. But it is noteworthy that 5.6% of the men dug pit latrines within their homesteads following the health education lessons, while 2.6% of the boys say that they stopped defecating and urinating in the river.

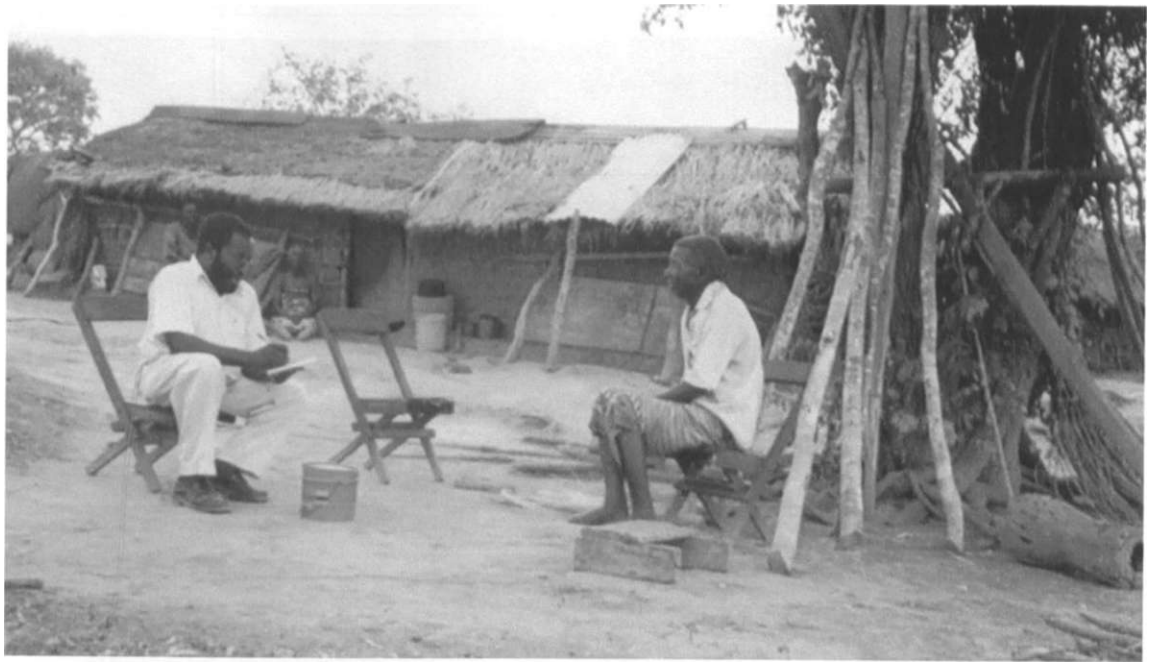

Plate 1. The investigator, David Irungu, interviewing Mr. Mkuruto Shauri, a former village chairman

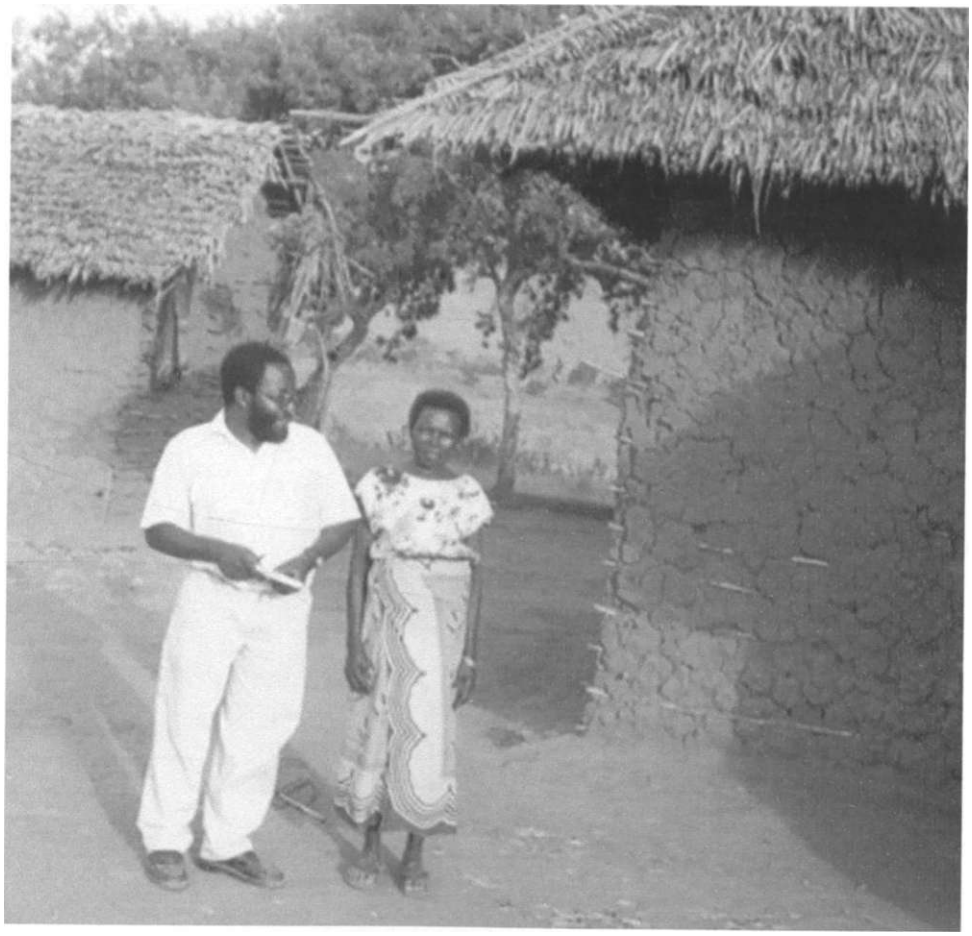

Plate 2. The investigator, being seen off by Mrs. Binti Hamisi Salim, a former kiosk water system coordinator and treasurer after an interview.

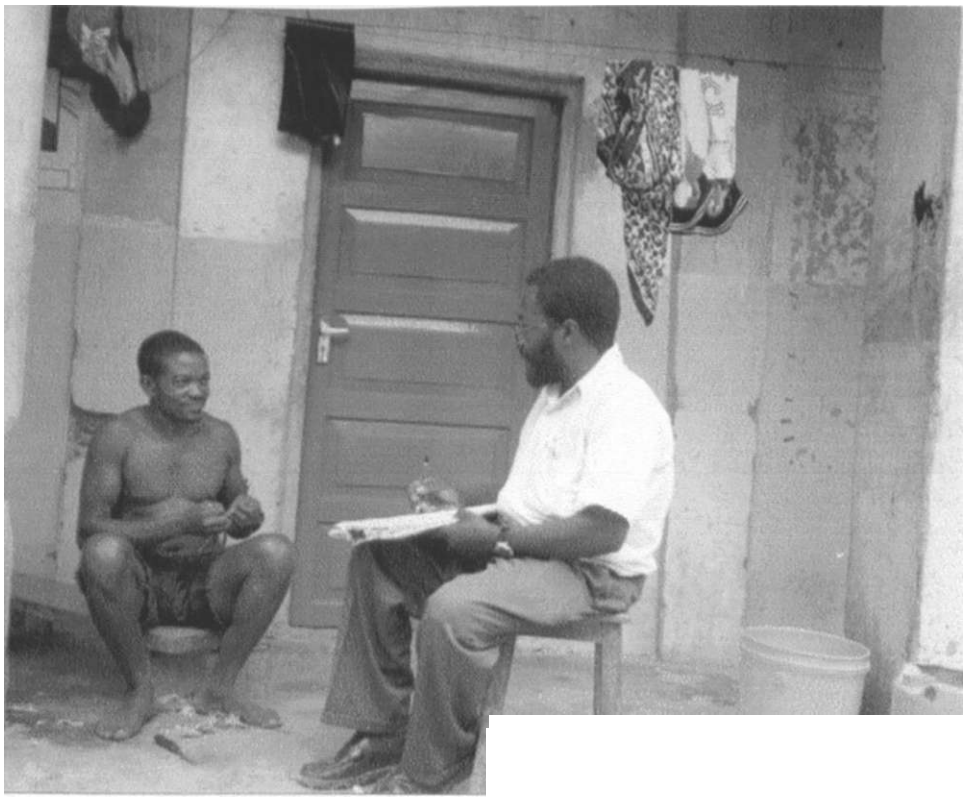

Plate 3. The investigator, interviewing a resident. This residence is in a class of its own. There are less than five of such in the entire village.

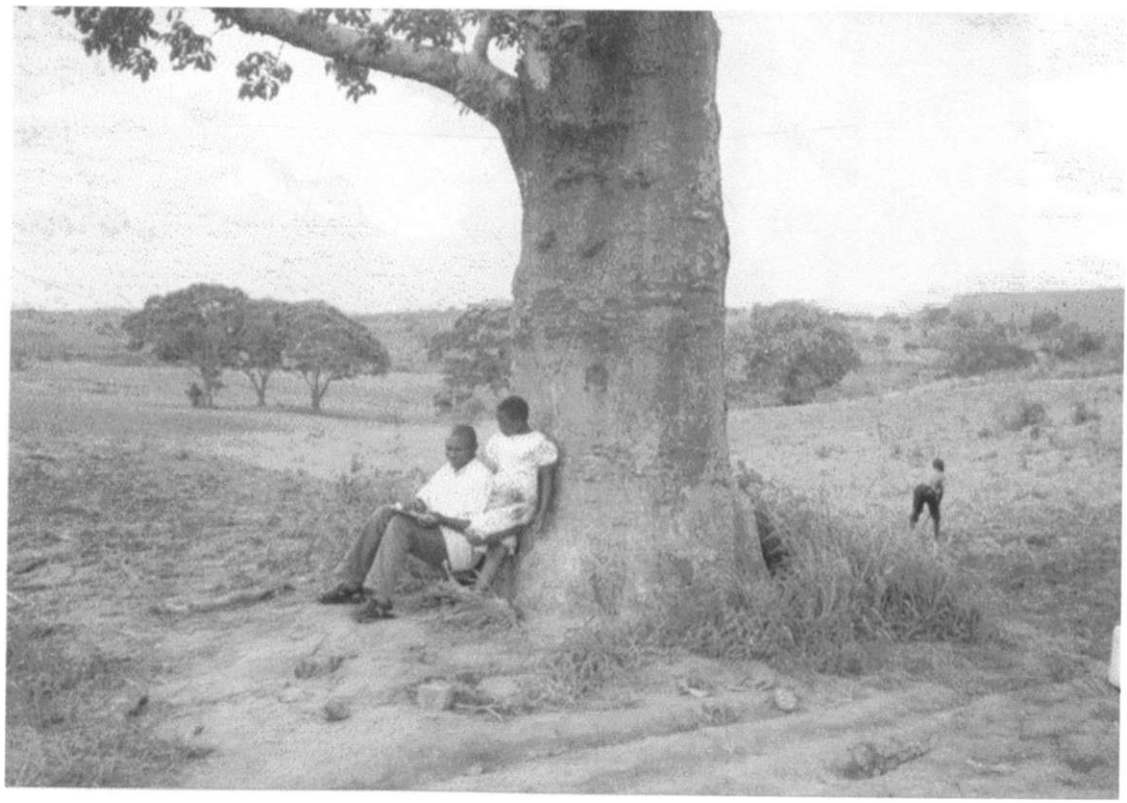

Plate 4. One of the field assistants, Mr. Mwatasa Salim Changoma, interviewing a school girl.

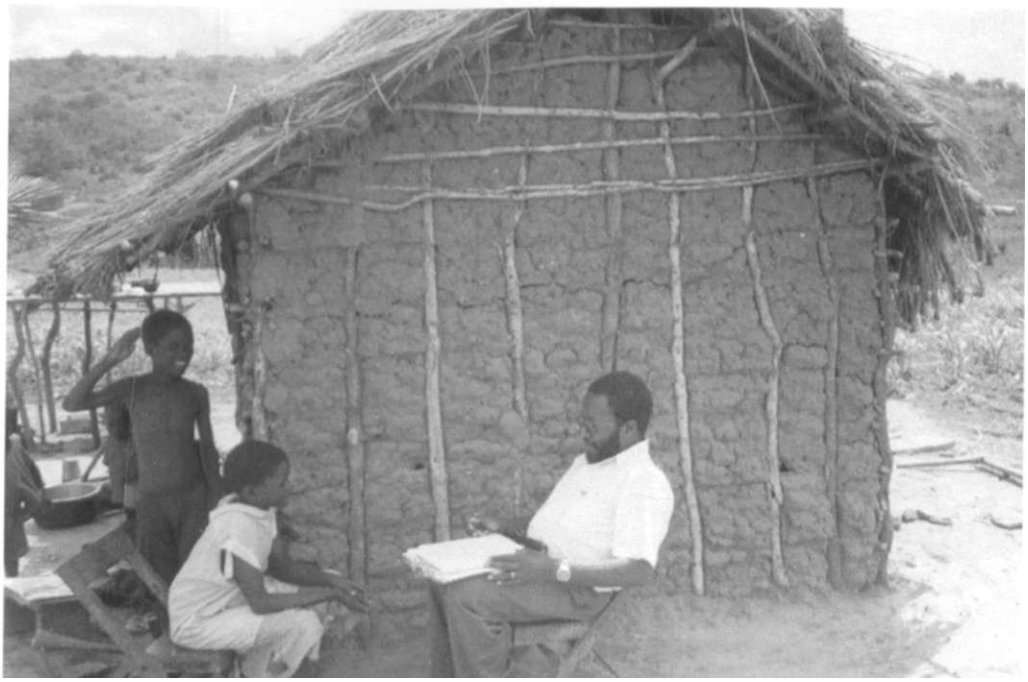

Plate 5. The investigator, interviewing a school girl, outside her home. This is a typical house in the area

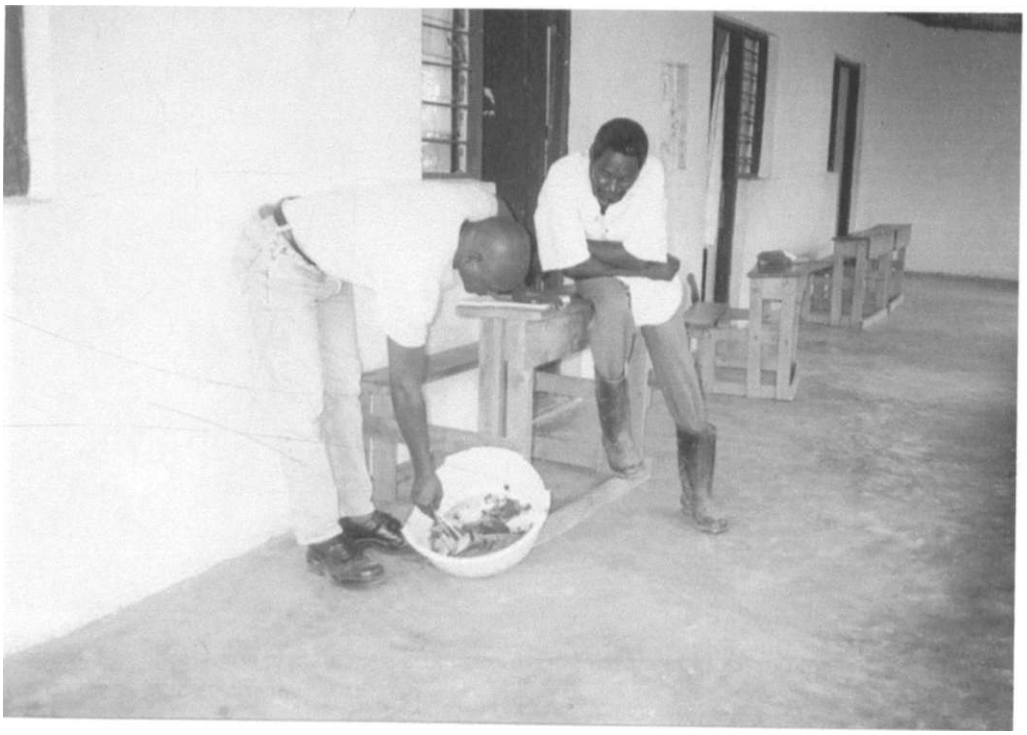

Plate 6. Mr. Hassan (sitting on bench) looks on as Mr. Changoma (field officer and Dknensarv-in-Charpe^ insnects his snail samnle collection for the dav

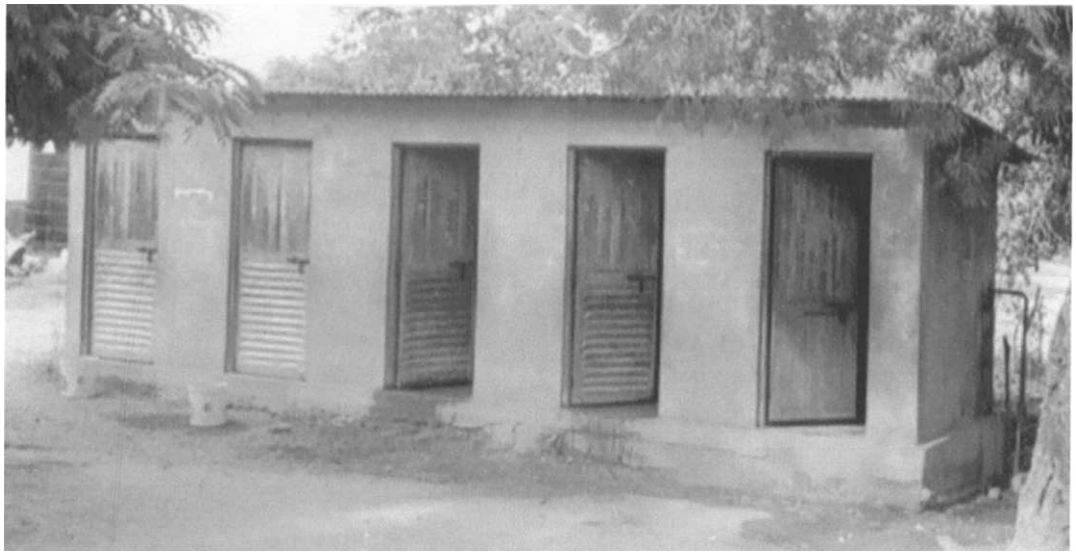

Plate 7. The JICA project bathrooms at Ng'onzini Primary School.

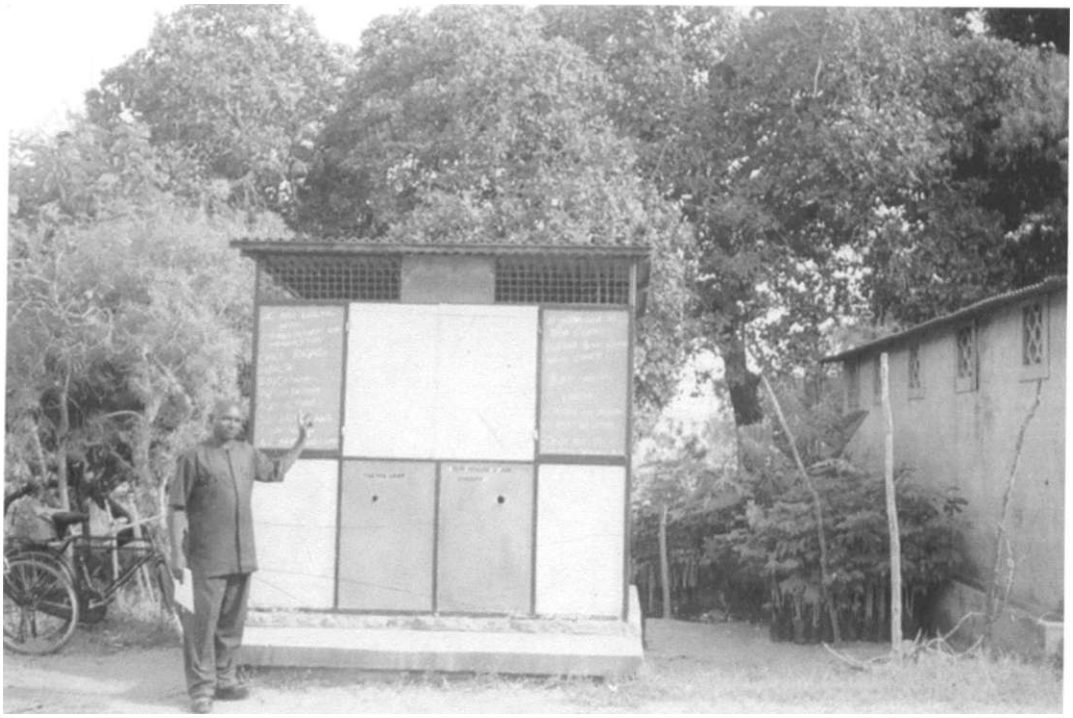

Plate 8. Mr. Changoma explaining a point concerning the water kiosk (no longer operational) at Ng'onzini Primary School.

Plate 9. This is what remains of the Kibaoni water kiosk after the collapse of the project some seven years ago.

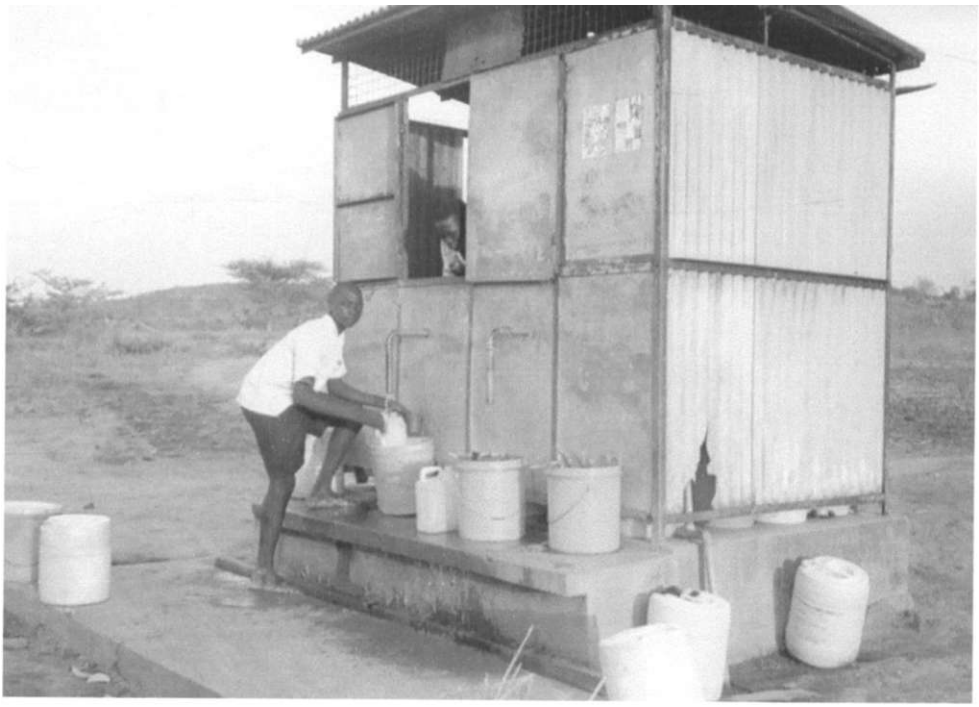

Plate 10. The only operational water kiosk (albeit as private business) at Kibanda Hasara.

Plate 11. Leakage water is one of the safe water options available to Mwachinga village residents. Here they bathe, wash clothes and draw some to take home at no cost.

CHAPTER FIVE

5.0 Summary, Conclusion and Recommendations

5.1 Summary

5.1.1 Knowledge

Knowledge of bilharzia the disease, experience (living with it), and prevention are known to the majority of the residents of Mwachinga village in all the categories interviewed. A good proportion of them (94%) may know what bilharzia is but may not know how to prevent it. This proportion is thought to contribute to the sustained high prevalence of bilharzia in the village. The majority of these are school children, among whom prevalence stood at 35% in March 2005.

However, there are some who have high knowledge and awareness, but are not ready to change river water use behaviour. This group blames their failure to change on the lack of foot-bridges - so they have to step on the water while crossing the river; insufficient water taps - so they find the river more accessible; harsh weather - so they have to swim to cool their bodies. Hunger makes some of them go to the river to fish *(kuvua mboga);* this problem is attributed to poverty, drought and wild animals.

Fishing during safe hours (early in the morning or just before sunset) is countered with the argument that the bigger fish do not appear during safe hours. Besides, fear of wild animals, especially elephants, which start appearing at dusk, is ever present.

5.1.2 Perception of disease

The residents are so used to seeing blood in urine that some of them see it as a way of life. Indeed. 59.5% (Table 19) believe that non-infection with bilharzia is just a matter of luck. Others (51.5%) believe that it is those who are weak who succumb to it (Table 18).

Infection with bilharzia is not perceived as embarrassing since almost everyone either has it or has experienced it; and it is not bothersome: all one requires to do is to go to the dispensary for medication. Among those who are bothered about their frequency of visits to the dispensary for bilharzia treatment, 26.4% are only bothered about cost. The concern of the other 73.6% is tied to self-esteem.

5.1.3 Perception of intervention

The interventions through chemotherapy, village *barazas*, home visits and regular messages at the school were well received and were found enlightening. The residents who attended the *barazas* say they would recommend them to others. The community is therefore generally very receptive to new ideas. They hold in high esteem the JICA and KEMRI teams and associate with "liberation" from the grip of bilharzia.

Some of the residents feel that attention should now be directed to poverty and protection from wild animals. Indeed. 64% of the respondents believe that poverty in the village is a more serious problem than bilharzia.

5.1.4 Impact of the Interventions

The interventions seem to have had a bigger impact on the adult men and women than on the boys and girls. The village *barazas* resulted in behaviour change among 51% of the residents. At the school, where a bilharzia prevention message is conveyed to the pupils as they each receive a bowl of porridge from the school administration and teachers, 95.9% of the pupils declare to have stopped some practices.

5.2 Conclusion

While the analysis manifests widespread knowledge of bilharzia and infection prevention methods amongst all the categories of respondents interviewed, a good proportion of them seems to either not know how to prevent infection, or are unwilling to avoid situations that would lead to it. Cases of re-infection confirm the existence of information gaps, to which the sustained prevalence of bilharzia in Mwachinga village may be attributed. It is also evident that the intervention campaigns were not strong towards bridging the gap between attitude towards infection, and intention to avoid it.. Although some of the respondents perceive poverty as requiring more attention than bilharzia, the influence of the intervention exercise is evident, in that a good proportion of them changed their water contact practices following the lessons at school and at the barazas. Poverty, harsh weather and conflict with wild animals are among other factors that may influence the residents' ability to adhere to health education gained through the interventions.

5.3 Recommendations

1. Future bilharzia interventions in Mwachinga village should aim at changing certain beliefs - target beliefs. For, example, the belief that blood in urine is harmless so long as there is no pain ought to be changed urgently. This should be done with the assumption that if the said beliefs are changed, a change in attitude (that is, the dependent variable) and hence, behaviour, will follow.

2. Health education lessons should be regular so as to create understanding of issues underlying the dynamics of infection. Changes in beliefs resulting from exposure to new information provide the foundation on which rests the ultimate effectiveness of any influence attempt.

3. To bridge the gap between research and practice, it is important to:
   a) *improve technology transfer.* An effort to kill the *miracidia* in the river should be made through regular spraying (miracidizing). This would disrupt the life cycle of the schistosomes, thereby controlling the prevalence of schistosomiasis.
   b) *conduct participatory research.* The residents should be involved in the task in (a) for, once they agree to become part of the operation, their understanding of the danger being combated would be enhanced.
   c) *promote practice-centered prevention.* Some of the practices that the respondents would not openly confess to, though rampant in the village include urinating and defecating in the river during fishing or swimming. A stop to this practice would

disrupt the life cycle of the schistosomes. The residents should, therefore, be encouraged to dig, and use, pit latrines in their homesteads.

4. To destabilize the dynamics of infection, Ng'onzini Primary School should be upgraded into a boarding school. This would control the movements of the pupils and ensure that they do not come into contact with river water during the school term. This would be just an extension of the government programme through which the pupils get free lunch. Just as the free lunch has served as an incentive for some of them to go to school, a lot of others would be shielded from bilharzia infection.

5. The water kiosk system should be revived, or better still, avail tap water at homestead level - free of charge. The initial system stalled over water billing disagreements. The Government should now fully take up the project and pump water from the main water pipe that runs across the village into the old kiosks, since they are still intact. The number of kiosks should also be increased to say, 10, for more effective service.

6. The residents should be empowered to earn money to meet their basic needs. Without the elephant's menace, they would probably engage in productive agricultural activities. The elephants should be either confined to the nearby Mwaluganje Elephant Orphanage or relocated to bigger game reserves. Proceeds from the Orphanage should benefit the residents directly. The Government should establish community development activities in the area. A cooperative movement tor poultry farming, or carvings and curios for tourists are good examples.

CHAPTER SIX

6.0 References

Armstrong. D. 2000. Social Theorizing About Illness. The Handbook of Social Studies in Health and Medicine.25-35. SAGE Publications, Inc. London.

Awori F. *Daily Nation Weekendpullout.* Daily Nation Friday. January 7, 2005.

Barker. K. (2003) *Order from Chaos: Organizational Aspects of Information, Education, and Communication (a Case Study from Mali)* J. of Health Communication. Vol. 8 pp 383 - 394.

Centers for Disease Control and Prevention. (2002). *Schistosomiasis (Bilharzia).*

Cook G.C. and Alimuddin Zumla. (2003). *Manson's Tropical Diseases.* 2P[1] Edition. Saunders.

Dabo A., Doucoure B. Koita O.. Diallo M,, Kouriba B., Klinkert M.Q., Doumbia S.. Doumbo O. (2000). *Reinfection with Schistosoma haematobium and mansoni despite repeated praziquantel office treatment in Niger, Mali.* Service de Biologie Moleculaire de l'Universite d'Heidelberg, Allemagne. Med Trop (Mars). 60(4):351-5.

de Clercq D., Sacko M.. Behnke J., Gilbert F., Vercruysse J. (1998). *The relationship between Schistosoma haematobium infection and school performance and attendance in Bamako, Mali.* Programme ESPOIR, Region Medicale de St Louis, Senegal. Ann Trop Med Parasitol. 92(8):851-8.

Fishbein, M. and leek Ajzen. 1975. *Belief Attitude, Intention and Behaviour: An Introduction to Theory and Research.* Addison-Wesley Publishing Company.

IRIN (2002). East Africa. *Bilharzia health hazard highlighted.*

Jukes M.C., Nokes C.A., Alcock K.J., Lambo J.K., Kihamia C., Ngorosho N., Mbise A., Lorri W., Yona E., Mwanri L., Baddeley A.D., Hall A.. Bundy D.A. (2002) *Heavy schistosomiasis associated with poor short-term memory and slower reaction times in Tanzanian schoolchildren.* Partnership for Child Development. Department of Infectious Disease Epidemiology, Imperial College School of Medicine, London, UK. Trop Med Int Health. 7(2): 104-17.

Karama, M. 2002. *The Reliability of a Ouestionnaire-based Self-diagnosis in estimating the prevalence of Schistosoma Haematobium in Kwale District.*

Kasper, J.D. 2000. *Health-Care Utilization and Barriers to Health-Care.* The Handbook of Social Studies in Health and Medicine.323-337. SAGE Publications, Inc.

Katsivo, M.N., K. Moji, W.M. Kisingu and M. Karama (1994). *Impact of Health Education in Control of Bilharziasis Haematobium Assessed by KAP on both Adults and Children in Mwachinga and Mtsangatamu Villages, Kwale District*

Kimura E., Moji K., Uga S., Kiliku F.M., Migwi D.K., Mutua W.R., Muhoho N.D., Aoki Y. (1992). *Effects of Schistosoma haematobium infection on mental test scores of Kenyan school children.* Department of Parasitology, Nagasaki University, Japan. Trop Med Parasitol. 43(3): 155-8.

Kvalsvig J.D., Cooppan R.M., Connolly K.J. (1991). *The effects of parasite infections on Cognitive processes in children.* Human Sciences Research Council. Natal. South Africa. Ann Trop Med Parasitol. 85(5):551-68.

Obel N.. Black F.T. (1994). *Microscopic examination of sperm as the diagnostic clue in a case of Schistosoma haematobium infection.* Dept. of Med. and Infectious Diseases, Marselisborg Hospital, University of Aarhus, Denmark.

Scand J Infect Dis. 26(1):117-8.

Poggensee G., Krantz I., Nordin P., Mtweve S., Ahlberg B., Mosha G., Freudenthal S. (2005/ *A six-year follow-up of schoolchildren for urinary and intestinal schistosomiasis and soil-transmitted helminthiasis in Northern Tanzania.* Department Infectious Disease Epidemiology, Robert Koch-Institute, Seestrasse 10, 13353 Berlin, Germany. Acta Trop. 93(2): 131-40.

Poggensee G., Kiwelu I.. Saria M., Richter J., Krantz I., Feldmeier H. (1998). *Schistosomiasis of the lower reproductive tract without egg excretion in urine.* Institut fur Tropenmedizin, Charite, Humboldt-Universitat zu Berlin, Germany. Am J Trop Med Hyg. 59(5):782-3.

Prohaska, T.R., K.E. Peters and Jan S. Warren. 2000. *Health Behaviour: From Research to Community Practice.* The Handbook of Social Studies in Health and Medicine.359-373. SAGE Publications. Inc. London.

Siegrist, J. 2000. *The Social Causation of Health and Illness.* The Handbook of Social Studies in Health and Medicine. 101-113. SAGE Publications, Inc. London.

Turner, B.S. 2000. *The History of the Changing Concepts of health and Illness: Outline of a General Model of Illness Categories.* The Handbook of Social Studies in Health and Medicine.9-23. SAGE Publications, Inc. London.

Waddington, K. (2001). *In the shadow of Africa's killers.* Bilharzia.

Wambani, M. 2005. *Blood in Urine.* Feature article. The Standard. Apr.27, 2005

World Health Organization (1996). *Schistosomiasis.* Fact Sheet No. 115

World Health Organization (2001) *Water-related Diseases. Schistosomiasis.*

ANNEXTURE

APPENDIX I

UNIVERSITY OF NAIROBI

School of Journalism

Project Work for Master of Arts Degree in Mass Communication

Questionnaire on Bilharzia Intervention Project at Mwachinga Village, Kinango Division, Kwale District. *The respondents are in four categories: A - Adult men; B - Adult women; C - Boys; D - Girls*

Serial No. A

Sex

1 Male [ ]
2 Female [ ]

Age_____years

Education

1 None
2 Primary school
3 Secondary school
4 Tertiary level
5 University
6 Other training (specify)

Religion

Occupation

Knowledge

1. Are you aware of any water-borne diseases?
   1 Yes [ ]
   2 No [ ]

2. If *Yes* to No. 1, please list the waterborne diseases you are aware of:

3. What is bilharzia?

4. How do people get infected with bilharzia?

5. How can someone tell whether he/she has bilharzia?

6. What should you do to prevent bilharzia infection?

7. When is it safe to get into contact with river water?

8. If you must use river water, what should you do?

9. What should a person do if he/she suspects he/she has bilharzia?

Attitude

10. It makes no difference whether one uses river water or piped water.
    1 I strongly agree [ ]
    2 I agree [ ]
    3 I am not sure [ ]
    4 I disagree
    5 I strongly disagree [ ]

11. Blood in urine is harmless so long as there is no pain.
    1 I strongly agree [ ]
    2 I agree [ ]
    3 I am not sure [ ]
    4 I disagree [ ]
    5 I strongly disagree [ ]

12. Bilharzia affects those who frequently come into contact with river water.
    1 I strongly agree [ ]
    2 I agree [ ]
    3 I am not sure [ ]
    4 I disagree [ ]
    5 I strongly disagree [ ]

13. The dispensary is not sufficient for such a serious disease as bilharzia.
    1 I strongly agree [ ]
    2 I agree [ ]
    3 I am not sure [ ]
    4 I disagree [ ]
    5 I strongly disagree [ ]

14. People who get infected with bilharzia are just weak.
    1 I strongly agree [ ]
    2 I agree [ ]
    3 I am not sure [ ]
    4 I disagree [ ]
    5 I strongly disagree [ ]

15. Non-infection with bilharzia in this area is just a matter of good luck.
    1 I strongly agree [ ]
    2 I agree [ ]
    3 I am not sure [ ]
    4 I disagree [ ]
    5 I strongly disagree [ ]

16. Poverty is a more serious problem in this area than bilharzia.
    1 I strongly agree [ ]
    2 I agree [ ]
    3 I am not sure [J
    4 I disagree [ ]
    5 I strongly disagree

17. Are you concerned about the number of times you have had to visit the dispensary for bilharzia treatment?

1 Yes [ ]
2 No [ ]

18. Please state why you are/or are not concerned about your number of visits to the dispensary.

Practice

19. Have you sought medication for bilharzia in the last six months?

1 Yes [ ]
2 No [ ]

20. If *Yes* to No. 19 state the number of times you have sought treatment:

21. If *Yes* to No. 19 state, also, where you sought the treatment:

22. What signs made you seek medication?

23. In your view, what brings about such a situation?

24. What should you do to avoid such a situation?

25. What are your sources of water for:

a) Drinking?
1. tap/leakage [ ] 2. river or dam [ ] 3. both 1 and 2 [ ]

b) Cooking?
1. tap/leakage [ ] 2. river or dam [ ] 3. both 1 and 2 t]

c) Bathing?
1. tap/leakage [ ] 2. river or dam [ ] 3. both 1 and 2 [ ]

d) Washing clothes?
1. tap/leakage [ ] 2. river or dam [ ] 3. both 1 and 2 1 1

26. When do you use river water?
1 Early in the morning or after sunset [ ]
2 Daytime [ ]
3 Never [ ]
4 I cannot remember [ ]

27. When and if you must use river water, is there something you do to it before use?
1 Yes [ ]
2 No [ ]

28. If your answer to No.27 is *Yes,* please state what you do to river water before use:

Interventions

29. Have there been any health *barazas* in this village?
1 Yes [J
2 No [ ]

30. If your answer to No. 29 is *Yes,* have you attended any of them?

31. Can you remember the people who had organized the *barazasl* (List groups and/or people)

32. How did you learn about the meeting?

33. Can you remember what you learnt from each group?

34. Are there some practices you have changed after attending those meetings?

35. If *Yes* to No. 34. please write down the practices you have changed.

36. If the meetings were to be repeated, would you recommend them to other people?

37. Please name three (3) of the diseases you consider to be most serious in this area:
1
2
3

38. Please name three (3) of the problems you consider to be most disturbing in this area:
1
2
3

Interventions at School

39. Do you know of any health lessons taught at Ng'onzini Primary School?
    1 Yes [ ]
    2 No [ ]

(If **No** to No.39, please **stop** the Questionnaire here.)

40. If *Yes* to No.39, please name the people or groups you can remember who conducted the lessons:

41. Please state the diseases they talked about:

42. Can you remember what you learnt from each group? Please state:

43. Are there some practices you have changed after attending those lessons?

44. If your answer to No. 43 is *Yes,* please write down the practices you have changed.

Thank you for your cooperation.

APPENDIX II

Key Informants

1. Mr. Mkuruto Shauri - Former village head
2. Mr. Chai Ramoyo - Headmaster, Ng'onzini Primary School
3. Mrs. Binti Hamisi Salim - Former JICA water Treasurer
4. Mr. Mwatasa Salim Changoma - Field Officer
5. Mrs. Maua Kombo - Former JICA water Treasurer
6. Ms. Binti Omar - Nurse, Mwachinga Dispensary
7. Mrs. Rehema Rashid - Assistant, Mwachinga Dispensary