PEOPLE'S PERCEPTIONS OF MALARIA AND ITS SOCIO-ECONOMIC CONSEQUENCES AT THE HOUSEHOLD LEVEL-BAGAMOYO DISTRICT - TANZANIA

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DECLARATION

I declare solemnly that the whole or part of this dissertation has never been submitted for a degree in any other University. It is a result of my own sole effort and field work in partial fulfilment of the requirements for the degree of Master of Science in Tropical Diseases Control (M.Sc. TDC) of the University of Dar-Es-Salaam.

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ABSTRACT:

A cross-sectional study was carried out in a holoendemic area of Tanzania during the rainy season when the disease is reported to be most prevalent.

A total of 397 households were involved in the study which included 646 respondents. These were interviewed concerning their perception on the cause of malaria, modes of malaria prevention, appropriate health action in case of malaria episode, impact of malaria on life and on working capacity.

The findings were that:

- 64.2% of the study population had a positive perception of malaria while 35.8% had not. Education, age, sex, household size were found to be significant predictors of positive perception of malaria.
- The majority of the respondents were aware of the cause of malaria.
- The mosquito-net alone or combined with other control measures was the control measure that most respondents perceived to be protective against malaria.
- The majority of the respondents perceived modern medicine more appropriate than traditional healing in treating malaria.
- They also perceived malaria to be life threatening and to have a negative impact on working capacity.
- For each under-five suffering from malaria, 5.4 days were lost by the household member especially the mother who was found to be responsible for child care activities. An amount

found to be responsible for child care activities. An amount of 100 to 1200 T.Sh. were paid per sick child to cover expenses following the malaria episode.

However, labour substitution of domestic activities was found to take place in affected household. Close relatives of the sick child like sister, aunt, grand-mother took over additional responsabilities.

Given that mosquito-net was the most cited malaria control measure, the author suggests that prospective malaria control programme in the study area should include mosquito-net to meet people's expectations.

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1. INTRODUCTION:

1.1. Description of the study area:

The United Republic of Tanzania, situated in the eastern region of Africa between 1 and 2 degrees latitude south and between 30 and 40 degrees longitude east, is composed of Tanganyika and Zanzibar.

The Country covers a surface area of 945.050 square kilometres and shares boarders with Kenya and Uganda in the North, Rwanda, Burundi and Zaire in the West, Zambia, Malawi and Mozambique in the South, the eastern boarder of the Country being occupied by the Indian Ocean(34).

The climate of Tanzania is largely influenced by its relief which can be broadly divided into three categories: highlands, plateau and coast.

The highlands are areas where the rain is the heaviest and more reliable so that the crops do not suffer from drought. There, temperatures are lower and hence people prefer those parts of the Country for farming and settlement. The soil is fertile because the higher mountain often offers volcanic soil(17). The mountain lands are the most densely populated in Tanzania. They are found in the Southern part, in the Northern around Mount Kilimanjaro, Mount Meru and Usambara and Pare mountains, and lastly in the western boarder with

Burundi. However, most of the Country relief is in a form of a plateau of about 1000m of altitude.

It comprises the central plateau, the south-east plateau and the Masai steppes. In this zone, temperatures are high in the day but drop down during the night. Rainfall is low and the soil is usually dry. Some of the plateau areas are infested by tse-tse fly. Therefore, few people live there. Regions under this category include Dodoma, Singida, Ruvuma, Mbeya, Tabora, Shinyanga, Mwanza, Kigoma, Rukwa, and some areas in Arusha region(17). Finally, the coastal region includes a narrow belt of 900 kilometres differing from the above in altitude and in its long history of Arab trade. Tanga, Coast, Lindi, Mtwara, Dar-Es-Salaam and Morogoro regions fall in this category. In the Coastal belt, temperatures are generally high and the air mostly. Short rains begin around November while long rains fall between March and May. The rainfall ranges between 800 and 1400 mm per annum. While much of the area is covered by bushy grassland, higher ground is often wooded.

Bagamoyo district, which is situated in the Coastal Region (see appendix 1), is known to have been an important centre for trade of ivory and slaves during the last century. In fact, it has one of the oldest cities of the coast which was the capital before the German era in Tanganyika(17). Population densities in this Coastal region vary widely but are generally low.

According to the 1988 national census[39], a population of 173 918 was counted in Bagamoyo district for a surface area of 9842 square kilometres. This represents around 1/132 part of the whole population of Tanzania. The female to male ratio is 1.03. The district is divided into 16 wards wherein live 31401 households. The average size of each household is estimated to be 5.4 persons of whom approximately one under-five-year-old child. The main tribes of Bagamoyo are Kwere, Zigua, Doe, Luguru, and others immigrating in search of land and labour. They all speak Swahili which is understood throughout the Country. It is actually the national language.

1.2. Disease background in Tanzania:

Malaria is a group of human febrile diseases caused by the infection of red blood cells. Four species are known to cause malaria in Tanzania: *Plasmodium falciparum*, the most lethal and the commonest in Tanzania[19], *Plasmodium malariae*, *Plasmodium vivax* and rarely *Plasmodium ovale*. All the above malaria parasites are transmitted through a female mosquito bites of *Anophelinae* genus. The principal vectors are *A.gambiae* and *A.funestus*.

Since the pre-independence period, malaria has been reported as one of the public health problems in Tanzania[19,42]. According to the recently available information (see appendix 2), malaria is by far the

leading cause of health care attendances. For instance, up to 10% of the total admissions in hospitals and more than a third of all outpatient attendances were due to malaria[19].

However, the disease is unequally distributed depending on the geographical characteristics of each locality (see appendix 3)

1.3 Conceptual framework:

This study is based on Rosenfield *et al* framework which examines the socio-economic consequences of tropical diseases of affected populations[37]. It assumes that preconditioning factors of the social, economic, and physical endowments determine the health outputs (expressed in terms of morbidity and mortality rates) which in turn lead to various social and economic consequences at the individual, household, and community levels.

It also assumes that the health outputs are influenced by a number of proximate determinants such as the behavioural aspects of the population at risk. The focus of the study is on perception which can be defined as how people organize and interpret sensory stimuli into a meaningful picture of the "world"[41].

Understanding the people's perceptions of malaria may explain why they seek treatment from health centres.

2. STATEMENT OF THE PROBLEM AND RATIONALE:

Malaria seems to be part of a socio-economic depression complex.People living in malarious areas have been conditioned to live with it so that they may have difficulty to single it out for particular concern[13].

However, people's perceptions of malaria may differ from one area to another depending on the socio-economic and demographic characteristics. For instance, age, sex, household size, level of education, occupational status and availability of modern health services might in one way or another have an influence on the perception of malaria. Hence, there was a need to determine the perceptions which people living in holoendemic have on malaria and their socio-economic and demographic correlates.

A malaria control project is under way in Bagamoyo district[40] where malaria is reported to be holoendemic[19]. The findings of this study will enable the planners to find out a way of establishing acceptable and feasible strategies for the implementation of that malaria project.

3. LITERATURE REVIEW:

From time immemorial, malaria has always been one of the most widespread disease affecting the human populations, principally those living in tropical climates but also active in temperate areas in former times[5]. Nowadays, malaria is considered to be the greatest pandemic in the world. Though it has been considered to be almost eradicated from the Developed World, one and half billion individuals are still exposed to it[33].

The disease affects people of both sexes and ages although pregnant women and children are more sensitive to its effects. All over the world, 250-300 million cases of malaria are estimated to occur annually. In Africa, 160-200 million cases of malaria are estimated to occur with about one million deaths per year[33].

Furthermore, work incapacitating caused by malaria is quite serious since the disease is most encountered during the heavy farming season[7]. This is the time when people in the rural areas are expected to participate in market production activities that will enable them to earn their income.

A number of health programmes have been set up during the colonial rule in order to contain the malaria epidemic in Africa[4].

Thereafter, malaria control activities have been tried throughout the continent using insecticide spraying and effective drugs to reduce malaria morbidity and

mortality in affected populations. In some islands like Reunion, Sao-Tome and Principe, malaria has been somehow eradicated[6]. However, the rest of the continent has failed to control the disease. Reasons advanced for that failure were mainly administrative, logistic, financial and political commitment[6]. Some authors suggested that human behaviour especially that of the local population could be incriminated in that failure[13,15]. For instance, local population may show some negative attitudes towards on-going disease control programmes or worse remain indifferent while they are actually implemented for their own benefits.

R.H.Black in discussing Farid's paper[13] advanced the argument that the role of the sciences like psycho-sociology, politics, economics, ... should be considered in the failure of malaria control programmes as well as that of the sciences like entomology, epidemiology...

Again C.P.MacCormack[26] examined the role of human behaviour in different malaria control strategies carried out in Africa.

For example, as regard to spraying programmes, he stated that death of chickens and cats following spraying activities might make local population suspicious of the side-effects of the insecticide.

They might think that their children may die from the same insecticide and hence develop some negative attitude to it. Similarly, J.D. Gillett[15] made an

extensive account of the role of the human behaviour in the transmission of tropical diseases.

That author stressed that this part of research area has been somehow neglected although this may explain some unexplained areas of human failure in the control of certain diseases like malaria. For instance, a mosquito net seems to be extremely simple to use.

However, unless the people see the benefits of using it to control the disease, they are unlikely to invest in it or use it properly.

In Southeast Asia, T.Hongvivatana[18] pointed out that the importance of understanding people's perception was to secure people's acceptance and participation in control measures. In addition, he suggested that lay persons might not be concerned with the disease causation and therefore not be aware of the importance of applying a specific control programme. Although the above authors[15,18,26] thought that people's perceptions are an important factor in the control of malaria, they didn't specify what kind of perception should be considered in order to prevent the failure.

Is it the perception of people of the cause of malaria, or of the modes of malaria prevention?

In a study done by Isabelle de Zoysa *et al* [10] in Zimbabwe, the perceived cause of the illness was found to be a predictor for the use of modern health services by the local population.

Other parameters may play a role in the choice of health services like distance of clinics[11,24], financial constraints, beliefs in traditional medicine in treating some conditions like convulsions[32].

As far as the behavioural sciences are concerned, people of different localities, societies or communities perceive malaria differently, sometimes depending on their sex or their educational level.

For instance, in a study done by T.R.Lariosa[25], females exhibited slightly higher knowledge scores than males but the opposite was shown in the attitude scale. In addition, those with higher education showed better performance in both knowledge and attitudes scales.

She also found that people living in larger households (more than five) scored higher in the knowledge scale than those from smaller households. Not significant finding was reflected in the attitude scale concerning household size. In this study, most respondents believed that malaria is caused by mosquito bite (93.2%). Furthermore, more than half (54%) of the respondents agreed that malaria is a serious disease while 46% disagreed. With regard to malaria prevention 73.7% replied that malaria is preventable, the majority of the respondents 76.9% mentioned bed-nets as one of the control measures.

Different methods of malaria control which have been tried were also perceived differently by the people. In

a study by O.Ranyajin[36], the respondents revealed that mosquito repellants were unnecessary because the majority of them were perceiving the mosquito-net enough protective. In that study, most respondents didn't use the modern health facility because they perceived the clinic personnel incapable of curing severe malaria.

In Tanzania, C.P.MacCormack and G.Lwihula[27] found that some people were not convinced that regular chloroquine taking might prevent malaria in children. This was one of the contributing factors in the failure of malaria control through chemoprophylaxis.

Similarly Y.G.Matola and L.N.Malle [28] in Tanga found that among non-compliance factors in the under-fives, uselessness of the chloroquine tablets in preventing malaria was perceived by some mothers.

In a study done by D.C.O.Kaseje, E.K.N.Sempebwa and H.C.Spencer[23] mothers perceived that malaria was an important cause of abortion and stillbirths. However, malaria control programme using chloroquine chemoprophylaxis in pregnant women failed mainly due to logistical and organizational reasons.

The above studies [23,27,28] showed that chloroquine chemoprophylaxis failed to control malaria due to different factors, some of which being side-effects of the used drug, organizational problems and people's perceptions of malaria. However, concerning this matter,

these authors didn't study the persons characteristics like level of education, age, occupation...

Identifying the persons characteristics would have been of value in preventing non-compliance for instance by providing health education programme to the concerned population group.

In some communities where malaria has been holoendemic for a long time, indigenous perceptions on the disease concerning its impact on human life, its prevention or even its way of control could give some clues to the most expert manager in disease control.

For instance, in a study conducted in Liberia by Linda Collie Jackson [20], adults perceived malaria as a nuisance which incapacitates and causes loss of vigour but very rarely produces death. Moreover, the disease was viewed to be more serious for children and an ever present threat to their health. The cultural perceptions on the severity of illness corresponded with the clinical evidence of the disease.

In Tanzania, Kasale [22] conducted a study in Tanga which found that the majority of the respondents (95.2%) knew that malaria is transmitted through mosquito bite. Most of them (96%) knew that malaria could be prevented by bed-nets, mosquito coils, cleaning of the compounds and insecticide spraying. Concerning the cleanliness of the environment, most respondents attributed the responsibility to the municipality not to individuals.

Fivawo [14] in Muheza studied the local concepts of malaria control in a rural community. She found that the indigenous people could easily recognize malaria manifestations and made special efforts to control the disease using local herbs. In that study, malaria was mentioned as the most prevalent disease by about half of the respondents, the second most prevalent being diarrhoeal diseases. This corresponded with the disease statistics from the local health facilities. The course of action that followed the home diagnosis of a malaria case varied between administering a single tablet of aspirine on one hand or chloroquine on the other hand. Others consulted the traditional healer. The majority of the respondents (85%) recognized malaria as a lethal disease. However, concerning the cause of malaria, only 46% mentioned mosquitoes. An interesting point in that research was that most respondents related the cause of malaria with the environmental conditions rather than magical causes of the disease. Therefore, the disease control in this area would be more likely feasible through environmental management involving local population participation.

In Bagamoyo district, a study done by D.Neuvians, F.D.E.Mtango, A.A.Kielmann [30] found that malaria was recognized as the number one health problem by both adults and children of that district. Those authors found that malaria was responsible for about 25% of all

health care attendances in that area. Even though malaria was mentioned by most people to be the number one health problem in that district, no proper malaria control programme has been implemented so far in that area to testify if the local population would have really expressed their perceived needs into action.

Although the above authors[14,22,30] thought that people's perceptions are an important factor in the control of malaria, they didn't specify what kind of perception should be considered before embarking in such activities. Is it perception of the cause of malaria, or of modes malaria prevention, or of the impact of malaria?

Understanding the perceptions of the local population concerning a certain disease is not the only condition that should be taken into account when launching a disease control programme. There is also need for an economic assessment to find out if the burden caused by the disease at the individual level, household level or community level is heavy enough to justify allocation of resources to its control[10]. Further, in studying the link between economics and decisions to take action, Chernichovsky[8] stressed that most decisions taken by an individual results from a combination of individual and household decisions and practices. In addition, the Health Belief Model[21] postulates that the probability

of people to take action will depend on the perceived costs and inconveniences involved in taking action.

A more complete model proposed by Green[16] stipulates that action may be due to predisposing (knowledge, attitude, values and perceptions); enabling (availability of resources); and reinforcing factors (attitudes of peers).

Again, B.M.Popkin[35] has suggested a theoretical framework based on time allocation concept to examine economic impact of tropical diseases on affected populations. However, the applicability of the "time allocation" concept in the assessment of malaria impact on affected households seems to be difficult since most of rural populations where those diseases are common are illiterate. For example, given that malaria episodes are relatively frequent in that particular community, people are unlikely to remember all the malaria episodes that would have affected all the household members. This could generate some information biases especially if the study design is of retrospective type.

A parasitic disease like malaria is considered to have a negative impact by making people unproductive. For instance, people may stay away from work when they are sick or when a relative dies from the disease. In both cases, there is a potential economic loss caused by medical costs and opportunity costs. The problem of "work-day loss" may be accommodated by some

intrahousehold labour substitution[37] by relatives of the sick child. They may neglect some non-crisis activities like schooling, house cleaning. However, it doesn't mean that the household output will not drop because this will depend on the marginal product of both the person who was absent from work and that of the person who took over his/her work. Some authors interested with the socio-economic impact of tropical diseases have carried out researches to identify the factors which are associated with tropical diseases. For instance in Columbia, Banguero[3] found that malaria incidence was significantly associated with age, sex, and household size. In addition, occupational status, wage income, frequency of DDT spraying, use of mosquito net or antimalarial drugs showed a significant association with malaria incidence while educational level did not.

The literature search did not find any study which has examined the socio-economic impact of malaria in Tanzania.

4.OBJECTIVES:

The broad objectives of this study were:

1. To determine the perceptions of malaria that people in Bagamoyo district have.
2. To assess the socio-economic consequences of malaria on households in Bagamoyo district.

Consequently, the specific objectives were:

1. To determine what people in Bagamoyo district perceive to be the cause, prevention, appropriate health action in the event of a malaria episode and the impact of malaria.
2. To find out if the perceptions of people concerning malaria vary with their:
   a) age
   b) sex
   c) household size
   d) level of education
   e) occupation
3. To determine the kind of action which affected households take when an underfive child has malaria.
4. To determine the number of working days lost in a household when an underfive is suffering from malaria.
5. To determine the kind of potential labour substitution taking place in the affected households.

5.DEFINITION OF TERMS TO BE USED:

1. Malaria: in this study, means clinical malaria and not the fact of carrying malaria parasites in the blood.

2. People's perceptions of malaria: in this study, means an entity which includes knowledge, attitudes and beliefs of people concerning malaria.

For a matter of statistical analysis, the term perception has been dichotomized into two components: positive perception and negative perception. Before clarifying how the categorisation was done, it is necessary to set up how the variables were defined.

Independent variables: X

age(X_1): 1=less than 35 years; 0=35 years or above.

sex(X_2): 1=male; 0=female.

household size(X_3):1=less than five; 0=five or above.

education(X_4):1=formal education;0=no formal education.

occupation(X_5):1=Wage-labourers;0=farmers.

Dependent variable: Y: perception of malaria where

1= positive perception; 0= negative perception.

The conditions to be considered in the definition of the dependent variable were as follows:

-Knowledge of malaria cause (mosquito bite)

-Knowledge of malaria prevention (mosquito-net, chemoprophylaxis, mosquito-coils...)

-Positive attitude towards modern health facility

-Negative impact of malaria on life

-Negative impact of malaria on working capacity.

A respondent was classified as having a positive perception of malaria if he/she satisfies at least four of the above conditions. Otherwise, a respondent who was found to satisfy less than four conditions was considered as having a negative perception of malaria.

3. Household: set of relations among individuals who share the same roof and food.

4. Criteria for diagnosis of clinical malaria: the interviewee must know at least three recognized signs of clinical malaria. MCH card record was used to check if the diagnosis was done by medical personnel.

5. Principal activity: activity that consumes more time during the working day/generates more income.

6. Farmers: People who involve themselves in activities aiming at food/cash crops production but at subsistence scale. They are commonly called peasants.

7. Appropriate health action: in this study, this means what people think one should do when sick of malaria.

8. Working day: term that means here time used by individuals to participate in household or market activities. It may differ according to sex.

6.MATERIALS AND METHODS:

6.1 RESEARCH DESIGN AND SAMPLING PROCEDURE:

This was a retrospective cross-sectional study which was carried out among the adult population in Bagamoyo district from March 30th to May 24th 1990. The study covered eight out of sixteen wards which constitute the district. The wards were randomly selected using a table of random numbers (see appendices 4 and 5) having assigned an index number of two digits from 01 to 16 to each ward. The Principal Investigator(PI) blindly picked up a starting point which was found to be the digit (18) at the first row of the table of random numbers. The PI had previously decided to read the table from left to right along the rows whereby a data point had to be chosen only once. The wards which were selected are: Kiromo, Zinga, Chalinze, Ubenazomozi, Kiwangwa, Miono, Mkange and Kibindu. From each ward, one village was randomly selected using the same procedure. The list of villages was obtained from the National Bureau of Statistics in Dar-Es-Salaam. The villages covered by the study were respectively: Mataya, Kerege, Chahua, Matuli, Fukayosi, Kikaro, Mkange and Kibindu. Finally, the households to be visited were randomly selected from each village depending on the total number of households in each ward. The number of households to be included in the sample population was proportional to the number of households in the ward.

6.2 THE SAMPLE:

A	B	C	D	E	F	G	H	I
12	Chalinze	3688	86	90	90	158	3	155
03	Miono	2330	55	57	56	91	2	89
14	Ubena	2502	58	61	61	99	0	99
04	Mkange	1768	41	43	41	70	4	66
08	Zinga	2514	59	61	61	93	2	91
16	Kibindu	875	21	21	21	38	3	35
07	Kiromo	903	21	22	22	35	0	35
01	Kiwangwa	1834	43	45	45	76	0	76
	Total	16414	384	400	397	660	14	646

Key: A= Code number

B= Ward name

C= Total number of households in the selected areas

D= Expected number of households in the sample population.

E= Actual number of households in the sample population.

F= Number of households who participated in the study.

G= Total number of observational units

H= Number of non-responses

I= Total number of interviewees

This was done in order to obtain a sample population as representative as possible of the study population.

The sample size was determined using the formula below:

$$n = \frac{(Z^2pq)}{d^2}$$

where n = the desired sample size (when the study population is greater than 10 000)

Z = the standard normal deviation, set at 1.96, which corresponds to the 5% confidence level.

p = the proportion in the target population estimated to have a particular characteristic. In this case, people's perceptions of malaria(p =0.50)

q = 1 - p

d = degree of accuracy desired, set at 0.05 (5%)

Thus $\mathbf{n = \frac{(1.96)^2 \times 0.50 \times 0.50}{(0.05)^2} = 384}$ **households**

The sampling units, i.e. households, to be visited in each village were obtained using the following procedure. First, a list of ten-cell leaders were obtained from the village office. Assuming that each ten-cell leader has ten households, a number of ten-cell leaders was pre-determined. The ten-cell leaders were selected using the table of random numbers. All households belonging to the selected ten-cell leader were visited. The observational units were either both husband and his wife or one of the two if he or she is living alone in the household. If the husband was polygamous, the wife who had an underfive child was chosen for interview in order to collect more accurate

information concerning the sick child. MCH card was requested from the mother in order to counter check date of birth of the sick child and to ascertain the diagnosis and medication where the child was reported as having been sick during the past two weeks. If a number of wives were having underfive children, then the wife whose child was sick of malaria within the past two weeks was the one to be included in the study. A total of 646 individuals were involved in the study. The unit of analysis for the perception part of this study was individual while for the socio-economic section, it was set to be household.

6.3 DATA COLLECTION, PROCESSING AND ANALYSIS:

6.3.1 INSTRUMENT:

A questionnaire in Kiswahili was designed and pre-tested in Kigamboni. The questionnaire (see appendices 6 and 7) consisted of four sections:

a) Identification
b) Demographic and socio-economic characteristics of respondents.
c) Perceptions of malaria
d) Socio-economic consequences of malaria.

6.3.2 MANPOWER:

Three interviewers were recruited from the District Hospital in Bagamoyo. Their qualifications were Medical Assistant, Health Assistant, and MCH aide. The Medical Assistant and the MCH aide had previously been involved

in surveys and had the experience of conducting interviews. The Principal Investigator trained them for four days on how to administer the questionnaire.

The training took place at Kiromo village. This consisted of familiarizing the Research Assistants with the questionnaire and cross-checking the interviewees in order to minimize the inter-observer bias. The actual data collection started on March 30th and ended on May 24th 1990. Unfortunately, the MCH aide dropped out after the first day due to health problems and she was not replaced. The Principal Investigator was also actively participating in the data collection process.

6.3.3 DATA COLLECTION PROCESS:

The interviews were conducted at the homes of respondents. Each interviewer made a house-to-house visit with the ten-cell leader who was introducing him to the household members. The interviewer had to create a good rapport with the prospective interviewees and to obtain their consent. The process of interviewing was carried out privately and each person was interviewed separately. Sometimes during the data collection, the Principal Investigator had to make an impromptu visit to the Research Assistants as part of supervision. Every day after data collection the team had to meet, to ensure that the questionnaires were adequately filled and to discuss problems encountered during the data collection process. Absent interviewees were revisited

once. If absent again, they were considered as non-responses.

6.3.4 DATA PROCESSING AND ANALYSIS:

Back from the field, the Principal Investigator arranged and assigned serial number on the questionnaires. Thereafter, the responses for the open-ended questions were reviewed, categorized and coded. The other questions had pre-coded response categorized (see appendices 6 and 7). The data was entered into the computer by the Principal Investigator and a Computer Operator using SPSS software package. Then, data cleaning and validation were done with the assistance of an experienced Computer Operator. Finally, data analysis was done using SPSS, STATXACT and EGRET programmes. Fisher's exact test, chi-square and trend tests as well as logistic regression analysis were performed.

The p value was at 0.05 level of significance.

6.4 PROBLEMS ENCOUNTERED DURING DATA COLLECTION AND LIMITATIONS OF THE STUDY:

6.4.1 Remoteness of some places of the study area and transportation challenges:

Some areas like Kiwangwa, Miono, Mkange and Kibindu were reached after many difficulties due to bad conditions of the roads caused by the heavy rains.Each of the above places is situated about 15 miles from the Dar-Es-Salaam - Tanga main road.

The transportation problems were somehow related to the infrastructure prevailing in rural areas of the whole district where the roads are poorly maintained.
Consequently, few car-owners were willing to take the risk of going there during the rainy season. Sometimes, we were forced to hire a tractor in order to reach some places like Kiwangwa, Miono and Kibindu.
All those problems delayed the data collection of two weeks and almost all the non-responses were observed in the four areas above.

6.4.2 Problems of tse-tse flies:

The areas between Miono and Mkange, Kwaruhombo and Kibindu are infested with tse-tse flies. Those insects were biting us on our way to Mkange and Kibindu. However, no human trypanosomiasis case has been reported so far in the study area.

6.4.3 Other problems:

- In rural areas of Bagamoyo district, drinking water is a big problem. It is really impossible to find tap water in those areas. Therefore, we were forced to use un-boiled water for drinking purposes which the inhabitants drink too. That water was drawn from villages wells.
- Finally, we were all subjected to malaria episodes towards the end of data collection process.

6.4.4 LIMITATIONS OF THE STUDY:

Although this study has provided some baseline information concerning people's perceptions of malaria

and its socio-economic consequences at the household level, two important constraints seem to have limited the findings of the study at the household level:

The study design and the fact that information concerning malaria episode was collected only for underfive children.

As regards to the study design, it is basically inappropriate to prove a causal relationship between two variables through a cross-sectional study.

However, this doesn't mean that this study is nullified because it was not aiming at proving that malaria leads to socio-economic consequences but at bringing up some elements that can be used in prospective analytical studies in Bagamoyo district.

The second point that would be of interesting concern is that this study would be more valuable if it has been focused on malaria episodes affecting all household members. This has been purposely decided by the Principal Investigator to minimize the recall effect that would have introduced some information biases in this study on one hand, and the financial constraints that might have followed the increased number of interviewees in the household if this was done to tackle the recall effect on the other hand.

As far as this study is concerned, it is possible that the internal validity may have been slightly affected by intraobserver bias due to the fatigue of interviewers.

This has been tackled by the Principal Investigator by restricting the number of individuals to be interviewed at ten per interviewer per day. Concerning the external validity of the study, the results can be generalized to the adult population of Bagamoyo district of both sexes and aged fifteen year-old and above because the sample population was randomly selected.

Finally, the report writting was rather problematic because the author is French speaking, with little exposure to the English language.

7.RESULTS:

UNIVARIATE ANALYSIS:

7.1 DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS OF THE SAMPLE:

A total of 400 households were visited and 646 respondents were interviewed. This exercise was undertaken from March 30th to May 24th 1990.

Fourteen of the selected respondents were missed because one was deaf, another had mental illness and the rest had been travelling far away at the time of the visit. The sample population was composed of 345 (53.3%) females and 301 (46.6%) males. It was found that 504 (78%) of the respondents were living as couples while 142 (22%) were living as singles. The household size in the sample population ranged between one and sixteen household members with a mean of 5.1 and a median of 5.0. The distribution of underfive children was found to be 0.8 per household in the study sample (see details in appendix 8). People who have heard of malaria in the sample population were found to be 530 (82%) while the rest 116 (18%) didn't. Most of the people who have never heard of malaria before are eldery people.

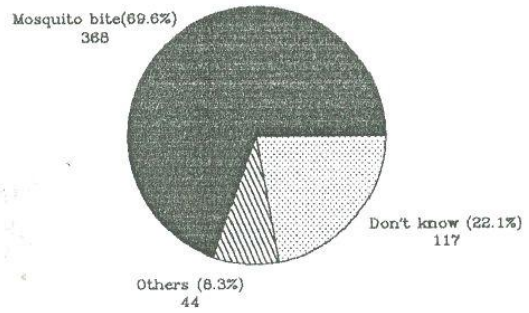
Among those who have heard of malaria, 413 (63.8%) knew three signs of malaria: periodic fever, headache, and weakness. In addition, 85 (13.1%) could recognize at least two signs of malaria which included periodic fever and the rest of the respondents 29 (4.5%) couldn't

mention any of the malaria signs. The majority of those who have heard of it 315 (59.8%) considered it to be a major problem in their environment and 405 (76.4%) of the respondents considered it to be more prevalent in the rainy season. In that study area, women were found to work 7 to 12 hours while men were working 4 to 6 hours per day. Women were found to participate in market production activities as well as in home production activities like cooking, washing up vessels, cleaning house and clothes, fetching water, collecting firewood and taking care of children.

7.2 PEOPLE'S PERCEPTION OF MALARIA (CAUSE, MODES OF PREVENTION):

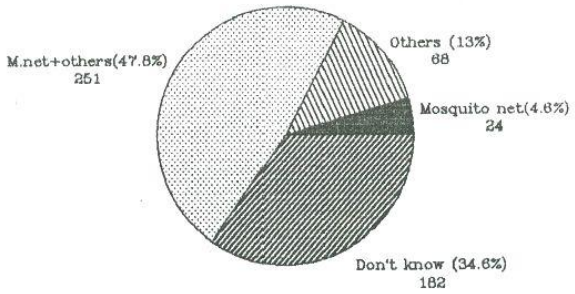
Most of the respondents 368 (69.6%) perceived that malaria is transmitted through mosquito bites while 44 (8.3%) thought that malaria is transmitted through houseflies and unclean water. The remaining people 117 (22.1%) didn't know how malaria is transmitted.

Fig.1 : Perceived cause of malaria (n=529)



The modes of malaria prevention known to the respondents were: mosquito net 24 (4.6%); other control measures like environmental sanitation, insecticide spraying; chemoprophylaxis 68 (13%) and mosquito net combined with other control measures 251 (47.8%); 182 (34.6%) of the interviewees didn't know any preventive measure.

Fig.2 Perceived modes of malaria prevention (n=525)



Most respondents considered mosquito-net alone or combined with the above control measures to be effective in preventing malaria while others thought of each of the following malaria control measures: environmental sanitation, insecticide spraying, use of mosquito coils, and chemoprophylaxis.

7.3 PERCEIVED APPROPRIATE HEALTH ACTION IN CASE OF MALARIA.

7.3.1 ATTITUDE OF RESPONDENTS TOWARDS TRADITIONAL HEALING:

The majority of respondents 432 (82.6%) disagreed with the idea of seeking treatment from the traditional healer when an underfive child is sick of malaria. Only 89 (17%) of them agreed with the use of traditional healer to treat malaria while 3 (0.4%) didn't know what they should do.

REASONS AGAINST THE USE OF TRADITIONAL HEALERS IN MALARIA TREATMENT WERE THAT:

Malaria cannot be treated by herbs; traditional healers don't have any test/drug specific for malaria; the traditional healer charges a lot of money; other respondents said they are simply used to seek treatment from the modern health facility.

Among the few who agreed with the use of traditional healer to treat malaria, reasons given were that they rely on traditional medicine; especially in treating convulsions while others can go there only if the hospital is far away or if it has failed to treat the malaria fever.

7.3.2 ATTITUDE OF RESPONDENTS TOWARDS MODERN MEDICINE:

Most of respondents 523 (98.9%) have agreed with the idea of seeking treatment from the modern health facility when an underfive child is sick of malaria while only 6 (1.1%) disagreed.

REASONS FOR THE USE OF MODERN MEDICINE IN MALARIA TREATMENT WERE THAT:

Those who accepted use of modern health facilities said that such facilities have appropriate drugs, tests and qualified manpower.

The few respondents who disagreed said that:

Drugs are not available in health centres.

7.4 PERCEIVED IMPACT OF MALARIA ON LIFE AND ON WORKING CAPACITY:

Most of the respondents 513 (97.2%) perceived malaria to be life threatening while only 13 (2.5%) disagreed and 2 (0.4%) didn't know.

The reasons why malaria can cause death were given as follows : malaria is an acute disease, the complications of the disease can be fatal.

Only 75 (14.2%) of the respondents said that someone suffering from malaria can usually pursue his working activities while 452 (85.8%) disagreed.

Reasons given for inability to carry out their daily activities were: weakness; illness; high fever and complications of malaria.

Therefore most of the respondents perceived malaria to be life threatening and to have a negative impact on working capacity.

BIVARIATE ANALYSIS:

7.5.1 PERCEIVED CAUSE OF MALARIA:

Table 1: Perceived cause of malaria by age (n=412)

	15-24	25-34	35-44	45-54	55-64	65+	Tot.
Mosq.	69(96%)	101(96%)	92(90%)	50(89%)	29(76%)	27(69%)	368
Others	3(4%)	4(4%)	10(10%)	6(11%)	9(24%)	12(31%)	44
Total	72	105	102	56	38	39	412

(Two- sided trend test : p<0.0000)

* 116 not applicable cases

117 didn't know the cause of malaria

14 non-responses

1 missing case

Age is a very highly significant factor in the perception of the cause of malaria (p< 0.0000).

Table 2: Perceived cause of malaria by sex (n=412)

	Male	Female	Total
Mosquito bite	181(89%)	187(90%)	368
Others	23(11%)	21(10%)	44
Total	204	208	412

(X^2=0.1499; d.f.=1; 0.05<p< 0.6986)

* 116 not applicable cases

117 didn't know the cause of malaria

14 non-responses

1 missing case

Sex is not a statistically significant factor in the perception of the cause of malaria (0.05<p<0.6986)

Table 3: Perceived cause of malaria by household size (n=412)

Household size	Mosquito bite	Others	Total.
1	16	0	16
2	41	3	44
3	58	5	63
4	39	5	44
5	51	3	54
6	41	7	48
7	34	4	38
8	22	7	29
9	21	2	23
10	16	5	21
11	10	0	10
12	3	0	3
13	5	0	5
14	4	0	4
15	6	0	6
16	1	3	4
Total	368	44	412

(Two-sided trend test:p<0.0246)

* 116 not applicable cases

117 didn't know the cause of malaria

14 non-responses

1 missing case

Household size is a significant factor in the perception of the cause of malaria (p<0.0246).

Table 4: Perceived cause of malaria by level of education (n=411).

	Adult ed.	Formal ed.	Informal ed.	Tot..
Mosquito bite	75(86%)	224(93%)	68(82%)	367
Others	12(14%)	17(7%)	15(18%)	44
Total	87	241	83	411

(X^2=8.941; d.f.=2; p<0.0114)

* 116 not applicable cases
  117 didn't know the cause of malaria
  14 non-responses
  2 missing cases

Level of education is a significant factor in the perception of the cause of malaria (p<0.0114).

Table 5 : Perceived cause of malaria by occupation (n=412)

	Farming	Wage lab.	Tot.
Mosquito bite	281(89%)	87(91%)	368
Others	35(11%)	9(9%)	44
Total	316	96	412

(X^2=0.2233; d.f.=1; 0.05<p<0.6365)

* 116 not applicable cases
  117 didn't know the cause of malaria
  14 non-responses
  1 missing case

Occupational status is not a statistically significant factor in the perception of malaria (0.05<p<0.6365).

7.5.2. PERCEIVED MODES OF MALARIA PREVENTION:

Table 6: Perceived modes of malaria prevention by age (n=343)

	15-24	25-34	35-44	45-54	55-64	65+	Tot.
(a)	53(82%)	74(80%)	71(82%)	40(93%)	22(69%)	15(63%)	275
(b)	12(18%)	18(20%)	16(18%)	3(7%)	10(31%)	9(37%)	68
Total	65	92	87	43	32	24	343

(Two- sided trend test:0.05<p<0.1265)

* 116 not applicable cases

182 didn't know any malaria mode of prevention

14 non-responses

5 missing cases

a= mosquito net alone or combined with other control measures

b= other control measures mosquito net excluded.

Age is not a statistically significant factor in the perception of the modes of malaria prevention (0.05<p<0.1265).

Table 7: Perceived modes of malaria prevention by sex (n=343)

	Males	Females	Total
(a)	143(81%)	132(80%)	275
(b)	34(19%)	34(20%)	68
Total	177	166	343

(X^2=0.8732; d.f.=1; 0.05<p<0.7676)

* 116 not applicable cases

182 didn't know any malaria mode of prevention

14 non-responses

5 missing cases

a=mosquito net alone or combined with other control measures

b= other control measures mosquito net excluded

Sex is not a statistically significant factor in the perception of the modes of malaria prevention (0.05<p<0.7676)

Table 8: Perceived modes of malaria prevention by household size (n=343).

Household size	(a)	(b)	Total
1	13	2	15
2	33	6	39
3	39	13	52
4	33	8	41
5	36	9	45
6	33	10	43
7	28	4	32
8	16	3	19
9	14	1	15
10	10	6	16
11	7	1	8
12	2	0	2
13	4	2	6
14	3	1	4
15	4	1	5
16	0	1	1
Total	275	68	343

(Two- sided trend test:0.05<p<0.5068)

* 116 not applicable cases

182 didn't know any malaria mode of prevention

14 non-responses

5 missing cases

a= mosquito net alone or combined with other control measures

b= other control measures mosquito net excluded

Household size is not a statistically significant factor in the perception of the modes of malaria prevention (0.05<p<0.5068).

Table 9: Perceived modes of malaria prevention by level of education (n=342)

	Adult ed.	Formal ed.	Informal ed.	Tot.
(a)	48(73%)	173(84%)	53(77%)	274
(b)	18(27%)	34(16%)	16(23%)	68
Total	66	207	69	342

(X^2=4.290; d.f.=2; 0.05<p<0.1171)

* 116 not applicable cases

182 didn't know any malaria control measure

14 non-responses

6 missing cases

a= mosquito net alone or combined with other control measures

b= malaria control measures other than mosquito net

Level of education is not a statistically significant factor in the perception of the modes of malaria prevention (0.05<p<0.1171).

Table 10: Perceived modes of malaria prevention by occupation (n=343)

	Farming	Business/ wage lab.	Tot.
(a)	203(78%)	72(88%)	275
(b)	58(22%)	10(12%)	68
Total	261	82	343

(X^2=3.947; d.f.=1; 0.05<p<0.0562)

(a) mosquito net alone or combined with other control measures

(b) malaria control measures other than mosquito net

* 116 not applicable cases
182 didn't know any mode of malaria prevention
14 non-responses
5 missing

Occupational status is not a statistically significant factor in the perception of the modes of malaria prevention (0.05<p<0.0562).

7.6 PERCEIVED APPROPRIATE ACTION IN CASE OF MALARIA EPISODE:

7.6.1 APPROPRIATE HEALTH ACTION IN CASE OF MALARIA EPISODE (TRADITIONAL HEALER):

Table 11: Perceived appropriate health action by age (n=521)

	15-24	25-34	35-44	45-54	55-64	65+	Tot.
Agreed	14 (16%)	15 (13%)	17 (14%)	12 (17%)	14 (23%)	17 (27%)	89
Disagr.	72 (84%)	103 (87%)	104 (86%)	58 (83%)	48 (77%)	47 (73%)	432
Total	86	118	121	70	62	64	521

(Two-sided trend test :p<0.0218)

116 not applicable

14 non-responses

7 missing

2 didn't know what should be done

Age is a significant factor in the perception of seeking treatment to the traditional healer in case of malaria episode as the appropriate health action. (p<0.0218).

Table 12: Perceived appropriate health action by sex (n=521)

	Male	Female	Total
Agreed	33(13%)	56(21%)	89
Disagreed	219(87%)	213(79%)	432
Total	252	269	521

(X^2=5.478; d.f.=2; p<0.0193)

* 116 not applicable cases

14 non-responses

7 missing

2 didn't know what should be done

Sex is a significant factor in the perception of seeking treatment to the traditional healer in case of malaria episode as the appropriate health action. (p<0.0193).

Table 13: Perceived appropriate health action by household size (n=521)

Household size	Agreed	Disagreed	Total
1	7	16	23
2	10	51	61
3	16	62	78
4	11	48	59
5	14	52	66
6	10	56	66
7	4	45	49
8	7	23	30
9	2	26	28
10	3	22	25
11	1	10	11
12	1	2	3
13	0	8	8
14	1	3	4
15	1	5	6
16	1	3	4
Total	89	432	521

(Two-sided trend test:0.05<p<0.0910)

* 116 not applicable cases

14 non-responses

7 missing

2 didn't know what should be done

Household size is not a statistically significant factor in the perceived appropriate health action consisting of seeking treatment to the traditional healer in case of malaria episode (0.05<p<0.0910).

Table 14: Perceived appropriate health action by level of education (n=521)

	Adult ed.	Formal ed.	Informal ed.	Total.
Agreed	25(21%)	33(11%)	31(27%)	89
Disagreed	94(79%)	255(89%)	83(73%)	432
Total	119	288	114	521

(X^2=15.95; d.f.=2; p<0.0003)

* 116 not applicable cases

14 non-responses

7 missing cases

2 didn't know what should be done

Level of education is a very highly significant factor in the perceived appropriate health action consisting of seeking treatment to the traditional healer in case of malaria episode (p<0.0003)

Table 15: Perceived appropriate health action by occupation (n=521)

	Farming	Business/ wage lab.	Total
Agreed	76(18%)	13(12%)	89
Disagreed	340(82%)	92(88%)	432
Total	416	105	521

(X^2=2.052; 0.05<p<0.1520)

*116 not applicable, 14 non-responses, 7 missing cases, 2 didn't know what should be done

Occupational status is not a statistically significant factor in the perception of the appropriate health action consisting of seeking treatment to the traditional healer in case of malaria episode (0.05<p<0.1520).

7.6.2 PERCEIVED APPROPRIATE HEALTH ACTION (MODERN HEALTH FACILITY):

Table 16: Perceived appropriate health action by age (n=529)

	15-24	25-34	35-44	45-54	55-64	65+	Tot.
Agreed	83(97%)	118(99%)	123(100%)	71(99%)	62(98%)	66(100%)	523
Disagr.	3(3%)	1(1%)	0(0%)	1(1%)	1(2%)	0(0%)	6
Total	86	119	123	72	63	66	529

(Two-sided trend test:0.05<p<0.1842)

* 116 not applicable cases

14 non-responses

1 missing case

Age is not a statistically significant factor in the perception of the appropriate health action consisting of seeking treatment to the modern health facility in case of malaria episode (0.05<p<0.1842).

Table 17: Perceived appropriate health action by sex (n=529)

	Male	Female	Total
Agreed	253(99.6%)	270(98.2%)	523
Disagreed	1(0.4%)	5(1.8%)	6
Total	**Total**	254	275	529

(FI(X)=2.211; d.f.=1; 0.05<p<0.1370)

* 116 non applicable cases

14 non-responses

1 missing case

Sex is not a statistically significant factor in the perception of the appropriate health action consisting of seeking treatment to the modern health facility in case of malaria episode

(0.05<p<0.1370).

Table 18: Perceived appropriate health action by household size (n=529)

Household size	Agreed	Disagreed	Total
1	22	1	23
2	63	0	63
3	79	1	80
4	58	2	60
5	65	0	65
6	68	0	68
7	50	0	50
8	31	0	31
9	27	1	28
10	25	0	25
11	10	1	11
12	3	0	3
13	8	0	8
14	4	0	4
15	6	0	6
16	4	0	4
Total	523	6	529

(Two-sided trend test:0.05<p<0.8689)

* 116 not applicable cases

14 non-responses

1 missing case

Household size is not a statistically significant factor in the perception of the appropriate health action consisting of seeking treatment to the modern health facility in case of malaria episode (0.05<p<0.8689).

Table 19: Perceived appropriate health action by level of education (n=528)

	Adult ed.	Formal ed.	Informal ed.	Tot.
Agreed	121(99.2%)	268(98.5%)	133(99.2%)	522
Disagreed	1(0.8%)	4(1.5%)	1(0.8%)	6
Total	122	272	134	528

(FI(X)=0.4268; d.f.-2;0.05< p<0.8078)

* 116 not applicable cases

14 non-responses

2 missing cases

Level of education is not a statistically significant factor in the perception of the appropriate health action consisting of seeking treatment to the modern health facility in case of malaria episode (0.05<p<0.8078).

Table 20: Perceived appropriate health action by occupation (n=529)

	Farming	Business/ wage lab.	Tot.
Agreed	419(98.8%)	104(99%)	523
Disagreed	5(1.2%)	1(1%)	6
Total	424	105	529

(FI(X)=0.7326; d.f.= 1 ;0.05<p<0.7866)

* 116 not applicable cases

14 non-responses

1 missing case

Occupational status is not a statistically significant factor in the perception of the appropriate health action consisting of seeking treatment to the modern health facility in case of malaria episode (0.05<p<0.7866).

7.7 PERCEIVED IMPACT OF MALARIA:

7.7.1 PERCEIVED IMPACT OF MALARIA ON LIFE:

Table 21: Perceived impact of malaria on life by age (n=526)

	15-24	25-34	35-44	45-54	55-64	65+	Tot.
Agreed	81	118	120	70	61	63	513
Disagreed	5	1	2	1	2	2	13
Total	86	119	122	71	63	65	526

(Two-sided trend test:0.05<p<0.6622)

* 116 not applicable cases
  14 non-responses
  2 didn't know if malaria can cause death
  2 missing cases

Age is not a statistically significant factor in the perception of the impact of malaria on life (0.05<p<0.6622).

Table 22 : Perceived impact of malaria on life by sex (n=526)

	Male	Female	Total
Agreed	250(98.8%)	263(96.3%)	513
Disagreed	3(1.1%)	10(3.7%)	13
Total	253	273	526

(X^2=3.343; d.f.=1; 0.05<p<0.0675)

* 116 not applicable cases

14 non-responses

2 didn't know if malaria can cause death

2 missing cases

Sex is not a statistically significant factor in the perception of the impact of malaria on life (0.05<p<0.0675).

Table 23: Perceived impact of malaria on life by household size (n=526)

Household size	Agreed	Disagreed	Total
1	22	1	23
2	59	4	63
3	77	3	80
4	57	1	58
5	64	1	65
6	67	0	67
7	50	0	50
8	30	1	31
9	27	1	28
10	25	0	25
11	11	0	11
12	2	1	3
13	8	0	8
14	4	0	4
15	6	0	6
16	4	0	4
Total	513	13	526

(Two-sided trend test:0.05<p<1.511)

* 116 not applicable cases

14 non-responses

2 didn't know if malaria can cause death

2 missing cases

Household size is not a statistically significant factor in the perception of the impact of malaria on life (0.05<p<1.511).

Table 24: Perceived impact of malaria on life by level of education (n=525)

	Adult ed.	Formal ed.	Informal ed.	Total
Agreed	121 (99.2%)	263 (96.7%)	128 (97.7%)	512
Disagreed	1 (0.8%)	9 (3.3%)	3 (2.3%)	13
Total	122	272	131	525

(FI(X)=1.931; d.f.=2;0.05<p<0.3807)

* 116 not applicable cases
  14 non-responses
  2 didn't know if malaria can cause death
  3 missing cases

Level of education is not a statistically significant factor in the perception of the impact of malaria on life (0.05<p<0.3807).

Table 25: Perceived impact of malaria on life by occupation.

	Farming	Business/ wage lab.	Total
Agreed	407(97%)	103(98%)	513
Disagreed	10(3%)	2(2%)	13
Total	417	105	526

(FI(X)=0.704; d.f.=1; 0.05 <p<0.7907)

* 116 not applicable
  14 non-responses
  2 didn't know if malaria can cause death
  2 missing cases

Occupational status is not a statistically significant factor in the perception of the impact of malaria on life (0.05<p<0.7907).

7.7.2 PERCEIVED IMPACT OF MALARIA ON WORKING CAPACITY:

Table 26: Perceived impact of malaria on working capacity by age (n=527)

	15-24	25-34	35-44	45-54	55-64	65+	Tot.
Agreed	75	102	108	60	52	55	452
Disagreed	10	17	14	12	11	11	75
Total	85	119	122	72	63	66	527

(Two-sided trend test:0.05<p<0.2512)

* 116 not applicable cases

14 non-responses

3 missing cases

Age is not a statistically significant factor in the perception of the impact of malaria on working capacity (0.05<p<0.2512).

Table 27: Perceived impact of malaria on working capacity by sex (n=527)

	Male	Female	Total
Agreed	228(90%)	224(82%)	452
Disagreed	26(10%)	49(18%)	75
Total	254	273	527

(X2=6.412; d.f.=1; p< 0.0113)

* 116 not applicable cases

14 non-responses

3 missing cases

Sex is a significant factor in the perception of the impact of malaria on working capacity (p<0.0113).

Table 28: Perceived impact of malaria on working capacity by household size (n=527)

Household size	Agreed	Disagreed	Total
1	20	3	23
2	50	12	62
3	66	14	80
4	54	6	60
5	58	7	65
6	58	10	68
7	43	6	49
8	28	3	31
9	23	5	28
10	21	4	25
11	10	1	11
12	3	0	3
13	5	3	8
14	4	0	4
15	5	1	6
16	4	0	4
Total	452	75	527

(Two-sided trend test : $0.05<p<0.6314$)

* 116 not applicable cases

14 non-responses

3 missing cases

Household size is not a statistically significant factor in the perception of the impact of malaria on working capacity ($0.05<p<0.6314$).

Table 29: Perceived impact of malaria on working capacity by level of education (n=526)

	Adult ed.	Formal ed.	Informal ed.	Total
Agreed	108(89%)	246(91%)	97(72%)	451
Disagreed	13(11%)	25(9%)	37(28%)	75
Total	121	271	134	526

(X^2=26.38314; d.f.=2; p<0.0000)

* 116 not applicable cases

14 non-responses

4 missing cases

Level of education is a very highly significant factor in the perception of the impact of malaria on working capacity (p<0.0000).

Table 30: Perceived impact of malaria on working capacity by occupation (n=527)

	Farming	Business/ wage lab.	Tot.
Agreed	354(85%)	94(90%)	452
Disagreed	64(15%)	11(10%)	75
Total	418	105	527

(X^2= 1.515 ; d.f.=1; 0.05<p<0.2745)

* 116 not applicable cases
  14 non-responses
  3 missing cases

Occupational status is not a statistically significant factor in the perception of the impact of malaria on working capacity (0.05<p<0.2745).

MULTIVARIATE ANALYSIS:

7.8 PREDICTION OF MALARIA PERCEPTION IN THE STUDY AREA:

The bivariate analysis sought to find out whether age, sex, household size, level of education and occupation had an influence on the perception of malaria. After having separately considered each of the above factors, only age, sex, household size and level of education were found to have an effect on malaria perception. Therefore, it was necessary to know whether or not, when all the significant factors are taken into account , each of them would be independently associated with malaria perception. In other words, does level of education have an influence on the perception of malaria after adjusting for the effect of age, or does household size have an influence on the perception of malaria after controlling for the effect of level of education?

A multivariate analysis was therefore performed using a logistic regression model. However, before doing that it was important to clearly define the variables to be used in that analysis. These were chosen in accordance with the specific objective number two, namely to find out if the perceptions of people concerning malaria vary with their age, sex, household size, level of education and occupation.

If p represents the probability of having a positive perception on malaria, then the appropriate logistic model is $\log(p/1-p) = \beta0 + \beta1 * X1 + \beta2 * X2 + \beta3 * X3 + \beta4 * X4$ where X1, X2, X3, X4 are indicator variables(39).

It was revealed that 64.2% of the respondents had a positive perception of malaria against 35.8% who had a negative perception of malaria. Thereafter, before going into multivariate analysis , further analysis of malaria perception was done against each of the independent variables.

a)Table 31: Perception of malaria by age:

		15-34	35+	Total
Perception:	Positive	151(74%)	184(58%)	335
	Negative	52(26%)	135(42%)	187
		203	319	522

X^2 =14.33825; d.f.=1; p<0.0002

* 116 not applicable cases

14 non-responses

8 missing cases

Age is a very highly significant factor in the perception of malaria (p<0.0002)

b)Table 32: Perception of malaria by sex:

		Male	Female	Total
Perception:	Positive	170(67%)	165(61%)	335
	Negative	83(33%)	104(39%)	187
		253	269	522

(X^2 =1.69797; d.f.=1; p<0.1926)

* 116 not applicable cases

14 non-responses

8 missing cases

Sex is not a statistically significant factor in the perception of malaria (0.05<p<0.1926)

c)Table 33: Perception of malaria by household size:

	< 5	5 +	Total
Perception: Positive	134(61%)	201(67%)	335
Negative	87(39%)	100(33%)	187
	221	301	522

(X^2 =1.83364; d.f.=1; 0.05<p<0.1757)

* 116 not applicable cases

14 non-responses

8 missing cases

Household size is not a statistically significant factor in the perception of malaria (0.05<p<0.1757).

d)Table 34: Perception of malaria by level of education:

		Formal ed.	No formal ed.	Total
Perception:	Positive	204(76%)	130(67%)	334
	Negative	65(24%)	122(33%)	187
		269	252	521

(X^2 =32.20473; d.f.=1; p<0.0000)

* 116 not applicable cases

14 non-responses

8 missing cases

Level of education is a very highly significant factor in the perception of malaria (p<0.0000).

e)Table 35: Perception of malaria by occupation:

	Wage lab.	Farmers	Total
Perception: Positive	109(64%)	226(64%)	335
Negative	61(36%)	126(36%)	187
	170	352	522

(X^2=0.0000; d.f.=1; p< 1.0000)

* 116 not applicable cases

14 non-responses

8 missing cases

Occupational status is not a statistically significant factor in the perception of malaria (0.05<p<1.0000)

Using the above factors, a step-wise logistic regression analysis was done using EGRET software package. It was found that only age, sex, household size and level of education were significant variables independently associated with malaria perception (see table 36).

Table 36: MULTIPLE REGRESSION ANALYSIS

VARIABLES:

1.Perception ; 2.age; 3.sex; 4.household size; 5.education; 6.occupation.

ANALYSIS MODEL:Logistic regression

RISK TYPE:Relative risk(multiplicative)

GROUP SIZE:Fixed group size=1

OUTCOME SPECIFICATION:outcome variable name: perception

REPETITION COUNT:none

REGRESSION TERMS:

a.%GM (Grand Mean); b.age ; c. sex ; d. household size ; e.educ.; f. occupation (not significant)

TERM	COEFFICIENT	STD ERROR	P-VALUE	ODDS RATIO
%GM	-0.5788	(0.156)	< 0.001	0.5606
age	0.7559	(0.205)	< 0.001	2.130
sex	0.5354	(0.234)	0.022	1.708
hsz	-0.5806	(0.175)	< 0.001	0.5595
educ	1.057	(0.187)	< 0.001	2.878
occ	-0.2206	(0.247)	0.371	0.8020

DEVIANCE ON 640 DF= 803.930

LIKELIHOOD RATIO STATISTIC ON 6 DF= 91.615, p < 0.001

Table 36 shows that among the above four factors which were found to be independently associated with malaria perception, level of education (odds ratio = 2.878) is more likely to influence malaria perception while household size (odds ratio = 0.5595) is the least likely to influence malaria perception. Further, it appears that a male of less than 35 year-old and who has attended formal education is the one to have the highest likelihood of having a positive perception of malaria.

Given p=chance of positive perception;

For such a person, X1=1; X2=1; X3=0; X4=1

$\log(p/1-p) = -0.5788+0.7559+0.5354+1.057 = 1.7695$

$p/1-p = e^{1.7695}$

$p = e^{1.7695}(1-p)$

$p = e^{1.7695} - pe^{1.7695}$

$p + pe^{1.7695} = e^{1.7695}$

$p(1 + e^{1.7695}) = e^{1.7695}$

$p = e^{1.7695}/(1 + e^{1.7695}) = 0.854 = 85.4\%$

Hence, the highest likelihood of such a person to have a positive perception on malaria is estimated to be 85.4%. On the other hand, the lowest likelihood of a person to have a positive perception of malaria is a female of more than 35 year-old, living in a household of less than five persons and who has not attended formal education.

For such a person, X1= 0; X2= 0; X3= 1; X4= 0

$\log (p/1-p) = - 0.5788 - 0.5806*1 = -1.1594$

$p/1-p = e^{-1.1594}$

$p = e^{-1.1594} - pe^{-1.1594}$

$p + pe^{-1.1594} = e^{-1.1594}$

$p(1 + e^{-1.1594}) = e^{-1.1594}$

$p = e^{-1.1594}/(1 + e^{-1.1594})$

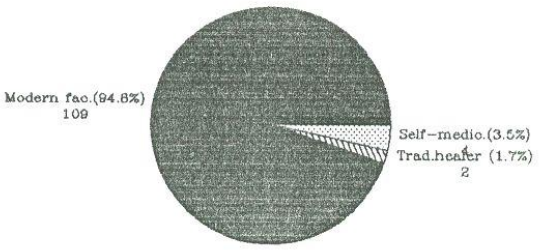
$p = 0.239 = 23.9\%$

Hence, the chance of such a person to have a positive perception of malaria is only 23.9%.

7.9 SOCIO-ECONOMIC CONSEQUENCES OF MALARIA:

7.9.1 KIND OF ACTION TAKEN WHEN AN UNDERFIVE CHILD FALLS SICK OF MALARIA.

Fig.7: Households first place of treatment (n=115)



The majority of household 109 (94.8%) whose underfive children were sick of malaria sought treatment from the modern health facilities. Only (1.7%) went to the traditional healer or used self medication 4 (3.5%).

Only 2.9% of the respondents agreed to have paid a certain amount of money to the health facility . It ranged from 100 to 1200 Shillings (≈ 0.5 to 6 U.S.$, exchange rate 1990, May) per episode per sick child in order to sustain the expenditures related to the child's health care (transport, meals...).

Among those who agreed to have spent money for their sick children, 1.1% of them had to sell or borrow some money probably from neighbours, friends or relatives in order to afford the expenses following the child

hospitalization. The amount of money borrowed ranged from 100 to 500 Shillings.

7.9.2 NUMBER OF WORKING DAYS LOST AND HOUSEHOLD ACTIVITIES SUBSTITUTION :

A total of 115 out of 397 households in the sample population had underfive children who had suffered from malaria two weeks before the interview.

The total number of lost working days was 602 ranging between 1 and 21 days in respective households. The mean lost working days was found to be 5.2 while the median was 4 and the mode 7 days per episode per affected household.

In 80.7% of cases, the mother was the one who took the child to the health facility. In other cases, either the father or the uncle of the sick child was involved in the process of seeking treatment.

Moreover, all the persons who accompanied the sick child to the health facility or to the traditional healer did it before accomplishing their daily activities. However, they were substituted in their household activities by relatives of the sick child. The following relatives were involved and they are listed by decreasing order of frequency: sister (44.8%), aunt (22.4%), grand mother (15.5%), others (13.8%). Only in 3.5% of affected households, did the father or the mother assume the tasks of the person who looked after the sick child.

8. DISCUSSION:

This study looked into people's perceptions of the cause of malaria, modes of malaria prevention, health action taken in case of a malaria episode as well as perceived impact of malaria on life and on working capacity. It also examined the socio-economic impact of a child's malaria episode in the household.

It was found that the majority of the respondents (63.8%) knew at least three signs of malaria while only 13.1% mentioned only two signs of malaria which included periodic fever. In addition, most respondents (69.6%) knew that malaria is transmitted through mosquito bite. Previous studies[14,22] conducted in the Coastal area of Tanzania found the local population to be more or less aware of the cause of malaria. Kasale[22] found that the majority of the urban population (95.2%) of Tanga knew that malaria is transmitted through mosquito bite. However, in a study conducted by Fivawo[14] in a rural area of Tanga, only 46.0% were found to be aware of the cause of malaria. The differences between the two studies above might be due to the fact that Kasale's study[22] was done in an urban settlement of Tanga where a malaria control project had previously been undertaken. The project involved residual insecticide spraying, and environmental cleaning aimed at reducing the mosquito population. It is conceivable that the urban population of Tanga were informed of the cause of

malaria through that project. Although Fivawo's study[14] and this study were all conducted in rural areas, different results were found on the people's knowledge of the cause of malaria. It might be due to the fact that Bagamoyo district has been a target of several health projects like Family Health and Primary Health Care which have a health education component. This might have made the rural population of Bagamoyo aware of the cause of malaria contrary to Fonaroff[12] who claims that the concept of malaria transmission by mosquitoes is difficult to understand for indigenous people. In the Philippines, Lariosa[25] found that most people (93.2%) were aware of the cause of malaria. The differences between the three studies[14,22,25] may be due to the fact that the respective study populations had different diagnostic perceptions of malaria. In this study, it was found that 59.8% of the respondents considered malaria to be a big problem. They also thought that mosquito-net is the most effective way of preventing malaria.

However, people's perception of malaria is not the only condition for its successful control. For example, in Bagamoyo district where the climate is most of the time hot and humid, lack of ventilation[1] is more likely to hinder the implementation of a malaria control project using mosquito-nets. Njunwa *et al* [31] also found that side-effects due to insecticide used in the impregnation

of bed-nets can negatively affect its acceptability. Therefore, before embarking in control activities in the study area, it is advisable to undertake a preliminary survey to find out if the characteristics of the mosquito-nets to be used should be matched with the local needs.

Although this study showed that the majority of the sample population knew the cause of malaria transmission (table 1), the younger population group (15-34 years) seems to be more informed that malaria is transmitted through mosquito bite than the older people (35 years and above). It also appears from table 4 that people who are formally educated were more knowledgeable to the cause of malaria than those who are not educated. Concerning the household size, people living in smaller household size (less than five) were more informed on the cause of malaria than those living in larger household size (table 3).

However, these findings differ from those of Lariosa[25] who found that people living in larger household size were more knowledgeable of the cause of malaria than those living in smaller household size. The differences between this study and the study above[25] may be due to the fact that the respective study populations had not the same access to the health information.

As to the health action taken by the people of Bagamoyo in case of malaria episode, two statements were given to

the respondents as from where he or she should seek treatment when an underfive child is suffering from malaria. The results showed that age was a significant determinant ($p<0.0218$) to the appropriate health action taken by the respondents seeking treatment from the traditional healer. In addition, the positive attitude towards the traditional healing was more likely to increase with age of the respondents (table 11). This means that people tend to choose from where to get the malaria treatment depending on how they perceive it. However, those who agreed with the traditional healing were relatively few (17%) as compared to those who disagreed with its use to treat malaria (83%).

The fact that the majority of the sick children (94.8%) were taken to the health facility confirms the finding that the majority of the respondents had a positive attitude towards the modern health facility. This implies that generally all ages are more likely to seek malaria treatment from the health facility than from the traditional healer. It is important to note that people with higher level of education were more likely to disagree with the use of traditional medicine (table 14) than those who have less educational level. Among the reasons advanced for the use of modern health services as the first place for malaria treatment, the respondents claimed that these have qualified personnel, tests and appropriate drugs against malaria which

reflected quality of health care. Mujinja, P.G.M.[29] also found these reasons to apply for the utilization of non government modern health services in Tanzania. Other studies[11,24,29,31] showed that proximity, accessibility, costs and acceptability can also influence the use of modern health services. It seems therefore that if the above factors are not taken into account, the utilization of those modern services will ultimately drop down in favour of the traditional healers. It is therefore important that the Ministry of Health to find out a way of making antimalarial drugs available especially during the rainy season when malaria is more prevalent. In addition, research should be done to list down effective drugs used by traditional healers in order to integrate them in the existing Primary Health Care system.

In this study, malaria was perceived to be a fatal disease by the majority of the respondents (97.2%). This is due to the acute nature of the disease. In a study conducted in a rural area of Zimbabwe[9], acute diarrhoea was found to be perceived by the majority of people (98%) as a fatal disease. It seems that acute diseases are easily recognized by the lay persons as fatal diseases although the dynamics of why they sometimes delay to seek health care are not fully understood at the moment. Furthermore, the majority of the respondents (85.8%) said that one cannot pursue

one's normal working activities when one is sick of malaria. Body weakness was the principal reason mentioned for inability to carry out one's daily activities. This suggests that the majority of the respondents had experienced a malaria attack.

From table 27, it appears that the proportion of males who perceived the negative impact of malaria on working capacity was higher than that of females ($p<0.0113$). Thus, males are more prone to absenteeism from work than females in the event of malaria attack. However, this might reflect differences in the nature of activities they are involved in.

Concerning the economic aspects of malaria, the amount of money that was mentioned to have been spent by the respondents reflects the relatively high cost of seeking health care for a household member in the study area. This could negatively affect the utilization of modern health services especially by those who can't afford the cost[24,29]. The money spent was probably used to cover the expenses due to transport and meals of the person who was caring for the sick child.

Further, when a child was sick, one had to make a choice between caring for him or performing duties for market production. When all had to be done, an assistance from a relative or a neighbour was sought. In so doing, the sickness of the child went along with inter and intra-household labour substitution.

This study established that the level of education ($p<0.001$) and age ($p<0.001$) were the most powerful determinants of malaria positive perception (table 36). In particular, people with formal education and those aged between eighteen and thirty-five were the ones found to have positive perception of malaria. Furthermore, household size was found to be negatively correlated with malaria positive perception ($p<0.001$, coefficient = -0.5595)

It would seem that people living in smaller households are the ones who are young and have attended formal education, hence they are more knowledgeable of the malaria problem. The implication of this finding is that the best way of improving people's perception of the malaria problem is to enhance their level of education.

9. CONCLUSIONS AND RECOMMENDATIONS:

9.1 CONCLUSIONS:

The main findings of this research are as follows:

a) 64.2% of the study population had a positive perception of malaria while 35.8% had not. Formal education, age, sex and household size were significantly associated with people's perception of malaria problem.

b) The majority of Bagamoyo people perceived malaria to be transmitted through mosquito bite. In addition, age, household size, level of education were found to be associated with the perceived cause of malaria while sex and type of occupation were not.

c) Most people in Bagamoyo district considered malaria to be preventable. They mentioned mosquito-net alone or combined with other control measures like environmental control, insecticide spraying, mosquito coils and chemoprophylaxis as a method of malaria control. Age, sex, household size and level of education and occupational status were not found to be significantly associated with the perceived modes of malaria prevention.

d) Although the majority of the people of the study area were found to have a positive attitude towards modern medicine in treating malaria, almost 20% of the study population still consider traditional healers capable of curing the disease.

Age, sex, and level of education were found to be significantly associated with the appropriate health action consisting of seeking treatment to the traditional healer. As regards to the appropriate health action consisting of seeking treatment to the modern facility, none of the above factors was found to be significantly associated with its use.

e) The majority of the people of Bagamoyo perceived malaria to be life threatening and to have a negative impact on working capacity. On one hand, age, sex, household size, level of education and type of occupation were not found to be significantly associated with the impact of malaria on life. On the other hand, sex and level of education were found to be associated with the perceived impact of malaria on working capacity while age, household size and type of occupation were not.

f) Almost all the households with underfive children sick of malaria like conditions sought treatment either from modern health facilities or from the traditional healers or used self medication. Only 2.9% of the respondents said they had spent money for child's health care. The money spent ranged from 100Sh. to 1200Sh. per sick child per episode.

It is important to note that mothers were found to be the key-people in bringing the sick children to the health facility for treatment. The mean number of

working days lost during the malaria episode was found to be 5.2 per affected household.

g) Through this research, it was found that the person who has the highest chance (85.4%) of having a positive perception of malaria is most likely a male of less than 35 year-old living in a household of more than five persons and who has attended formal education while the one who is more likely to have the lowest chance (23.9%) of having a positive perception of malaria is a female of more than 35 year-old living in a household of less than five persons and who has not attended formal education.

9.2 RECOMMENDATIONS:

a) The majority of Bagamoyo people knew the cause of malaria transmission and its prevention. Given that mosquito-net was the most widely known control measure, it is advisable to introduce it in the study area at least to protect underfive children who are vulnerable to malaria and are at risk of dying from the disease. The Government should find out some way of making mosquito-nets affordable by the local population. In promoting use of mosquito-nets, sex and level of education should be taken into consideration by for instance providing health education to both mother and father. At the same time, a malaria component should be included in right from the primary school.

b) Further research of prospective follow-up design involving all the household members should be undertaken in the study area in order to determine quantitatively the socio-economic impact of malaria on household production.

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