PREVALENCE AND FACTORS ASSOCIATED WITH SCHISTOSOMIASIS AMONG PRIMARY SCHOOL CHILDREN IN BUHIGWE DISTRICT TANZANIA

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By

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A Dissertation submitted in (Partial) Fulfillment of the Requirements for the Degree of Master of Science (Epidemiology and Laboratory Management) of

Muhimbili University of Health and Allied Sciences
October, 2018

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences dissertation entitled; **"Prevalence and Factors Associated with Schistosomiasis among school children in Buhigwe District",** in (partial) fulfillment of the requirements for the degree of Master of Science in Epidemiology and Laboratory Management of Muhimbili University of Health and Allied Sciences.

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DECLARATION AND COPYRIGHT

I , **Mohamedi Mwedi Athumani**, I declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for similar or any other degree award.

Signature: ……..…... **Date:** ……..

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ABSTRACT

Introduction: Schistosomiasis remains one of the most prevalent neglected tropical diseases among school children. School-based Mass Drug Administration with Praziquantel and Albendazole has been implemented annually in Buhigwe district Tanzania since 2012. However, there has been no survey conducted in this district to determine the current prevalence of this disease which has a high re-infection rate in endemic areas. This study was conducted to provide information on the prevalence and intensity of Schistosomiasis and factors associated with its transmission in the area after scale-up of school-based Mass Drug Administration.

Method: A cross-sectional study was conducted among 421 school children from Buhigwe district in Kigoma region. School children were interviewed using a structured questionnaire. Fecal samples were examined for the presence of *Schistosoma mansoni* eggs using the Kato-Katz method while the urine samples were examined using the filtration technique for the presence of *Schistosoma hematobium* eggs. Multivariate logistic regression adjusted for age and sex was used to estimate the odds ratio for factors associated with transmission.

Results: Out of 421 pupils enrolled, 406 pupils provided urine and stool specimens with a response rate of 96.4%. The prevalence of *S. mansoni* was 33.3% while *S. hematobium* infection was not detected in all urine samples examined. The prevalence of *S. mansoni* was significantly higher among children in the age group 6-10 years 40.10% (95% C.I 35.30% - 51.70%, $p<0.01$) compared to the prevalence of 26.79% (95% C.I 22.00-33.20) among those in the age group of 11-17 years. Children of standard one to three were having a higher prevalence of 39.41% (95% C.I 33.2-47.00, $p=0.02$) compared to the prevalence of 27.09% (95% C.I; 20.70-33.10) of those of standard four to seven. An intensity level status was created among those positive (n=135) following WHO guideline with 71.0%, 9.6% and 19.3% for light, moderate and heavy infections intensity respectively. Four variables were significantly independent risk factors for *S. mansoni* transmission among school children such as age (AOR=2.46; 95% C.I 1.62-3.74), crossing the river with bare feet (AOR = 1.98; 95%

C.I; 1.26-3.12), swimming in rivers (AOR = 1.64; 95% CI; 1.02-2.81), and fishing (AOR 2.82 95% C.I. 1.59-4.97).

Conclusion: Prevalence of *S. mansoni* is high among school children in Buhigwe district despite the school based MDA conducted one year before the study. This study recommends all schools to provide health education about Schistosomiasis. The parents should prohibit their children to contact with river water to reduce the transmission of this disease.

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LIST OF ABBREVIATIONS

ADR	Adjusted Odds Ratio
CI	Confidence Interval
COR	Crude Odds Ratio
DC	District Council
DEO	District Education Officer
DMO	District Medical Officer
EPG	Eggs Per Gram
ERB	Ethical Review Board
MDA	Mass Drug Administration
MoHCDGEC	Ministry of Health Community Development Gender Elderly and Children
MPL	Multipurpose Laboratory
MUHAS	Muhimbili University of Health and Allied Sciences
NTD's	Neglected Tropical Diseases
NTDCP	Neglected Tropical Diseases Control Program
RMO	Regional Medical Officer
SCI	Schistosomiasis Control Initiatives
SD	Standard Deviation
SOP's	Standard Operating Procedures
SSA	Sub-Saharan Africa
TELTP	Tanzania Field Epidemiology and Laboratory Training Program
USD	United States Dollar
VEO	Village Executive Officer
WEO	Ward Executive Officer
WHO	World Health Organization

CHAPTER ONE

1.0. INTRODUCTION

1.1. Background

Schistosomiasis or bilharzias is a parasitic disease caused by blood-dwelling flukes of the genus *Schistosoma.* Schistosomiasis affects 240 million worldwide (1). It is estimated that 200,000 people die from disease per year (1). The disease is still a public health problem in rural areas with no potable water and adequate sanitation in developing countries in Africa, Asia, and South America. More than 97% of all Schistosomiasis occur in Africa and pupils are the most affected group (2, 3).

Two major schistosoma species that are prevalent in the Sub-Saharan Africa region are *Schistosoma mansoni* and *Schistosoma hematobium* causing intestinal and urogenital schistosomiasis respectively (4). The transmission of schistosomiasis starts when eggs in urine or feces released by infected person reach freshwater bodies. Parasitic larvae are known as miracidium hatch from the eggs, the miracidium seeks out habitat on certain snail species of the genus *Biomphalaria* and *Bulinus* as an intermediate host for *S. mansoni* and *S. hematobium* respectively. In the intermediate host, the larvae undergo development through first and second sporocyst before producing infective larvae called cercariae. The cercariae leave the snails and freely swim in water. These cercariae can penetrate human skin when a person comes into contact with infested water (4).

Inside the human body, the cercariae change into schistosomula after losing its tail and migrate through several organs before reaching the liver where they develop into adult and pair. The worms migrate into specific locations, the blood vessels of the intestine or the urinary bladder where they reside for years. Successfully worms evading the immune system while producing hundreds to thousands of eggs daily, which must either leave the body in urine or feces or become trapped in nearby tissues. The eggs are eventually released into the water in urine or feces and restart the cycle (4).

Urinary Schistosomiasis is associated with passing blood in urine, bladder. Urethra fibrosis, sandy patches in the bladder mucosa and hydronephrosis are commonly seen in chronic cases while bladder cancer is possible as a late-stage complication. Clinical manifestations for intestinal schistosomiasis include abdominal pain, diarrhea, and blood in stool while in advanced stages hepatosplenomegaly is common and repeatedly associated with ascites and other signs of portal hypertension (5,6). Other clinical features include anemia, growth stunting, impaired cognition and decreased physical fitness among children (6, 7).

1.2. Control Strategies

World Health Organization control strategy for Schistosomiasis includes the provision of praziquantel to pupils, provision of safe tap water to the whole community and health education (8, 9). Also knowing the knowledge, attitude and practice related to the disease in any community will provide the necessary information on how to provide health education and achieve the purpose of controlling Schistosomiasis in endemic areas (6). The global control strategy for Schistosomiasis has targeted primary school children with aims to reach all school-aged children at risk of morbidity from Schistosomiasis and this is because the prevalence of the disease seems to be higher in primary school-aged children compared to other members of the Community (7). The WHO criterion for school-based Mass Drug treatment stated that communities are selected for Praziquantel MDA on the basis of prevalence of Schistosomiasis whereby in schools with prevalence <10%, Praziquantel is made available in local health facilities, prevalence of 10–50% annual Praziquantel MDA is given to all school age-children and where the prevalence > 50% annual Praziquantel MDA has given to all school-age children plus other high-risk groups in the community (6).

Control efforts on the mainland of Tanzania began in the 1950's. Through the mid-1970's, this program focused on snail control as the primary means of reducing the rising transmission and prevalence rates. On January 2009 Ministry of Health Community Development Gender, Elderly and Children started school-based Mass Drug Administration with Praziquantel and Albendazole in five regions of Ruvuma, Mbeya, Morogoro, Iringa, and Tanga. The second phase started in 2010 in three regions namely Mtwara, Lindi and Coast. Mara, Shinyanga,

Kagera, and Kigoma were in the third phase that started in 2012. Buhigwe district has been conducted MDA from 2012 to 2017.

1.2. Statement of the problem

School children are the most affected group by Schistosomiasis. Continuous exposure to infested water and general lack of knowledge are among of the key factors for the transmission of Schistosomiasis among school children. In Tanzania, a cross-sectional study conducted by Bakuza and colleagues in the neighboring Kigoma District Council showed that the prevalence of intestinal Schistosomiasis among school children was 53% (11).

School-based Mass Drug Administration with Praziquantel and Albendazole has been conducted in Buhigwe district since 2012 and the latest was 2017. However, since the beginning of the school-based MDA in Buhigwe District, there has been no survey to determine the current prevalence and burden of Schistosomiasis among school children. Also, the hospital records are not truly representing the real infection status in the community, as it is known that the important factor for Schistosomiasis among children is re-infection.

Therefore this study was aimed at determining the prevalence and intensity of Schistosomiasis and associated factors for infection in the study area one year after scale-up of school-based MDA. The information will generate baseline data that may raise awareness of the impending problem and also mobilize control efforts directed towards the study area.

1.3. Conceptual framework

There are several factors known to determine the transmission of Schistosomiasis among primary school children. School children are considered at higher risk of Schistosomiasis due to their play habit in freshwater hence continuous exposures to infected water (3). Age is among of the factors associated with Schistosomiasis infection as children with lower age have higher exposure to infected water compared to those with higher ages (9). But also Sex is considered as contributing factor for Schistosomiasis as male children have a higher tendency with contact to infested water through swimming in lakes, rivers or ponds compared to female children (10). The children crossing the rivers with bare feet's are considered to be at higher risk of getting Schistosomiasis because of continuous exposure to fresh water. Also, the tendency of washing clothes and utensils in the rivers or ponds has been reported as contributing to Schistosomiasis transmission (11). Drinking river water has also been reported as a contributing factor for Schistosomiasis infections (11). Similarly, the communities with no latrines have been reported to have a higher prevalence of Schistosomiasis (12). Participation in MDA has a great contribution to reducing infection among school children hence the lower prevalence of disease (6).

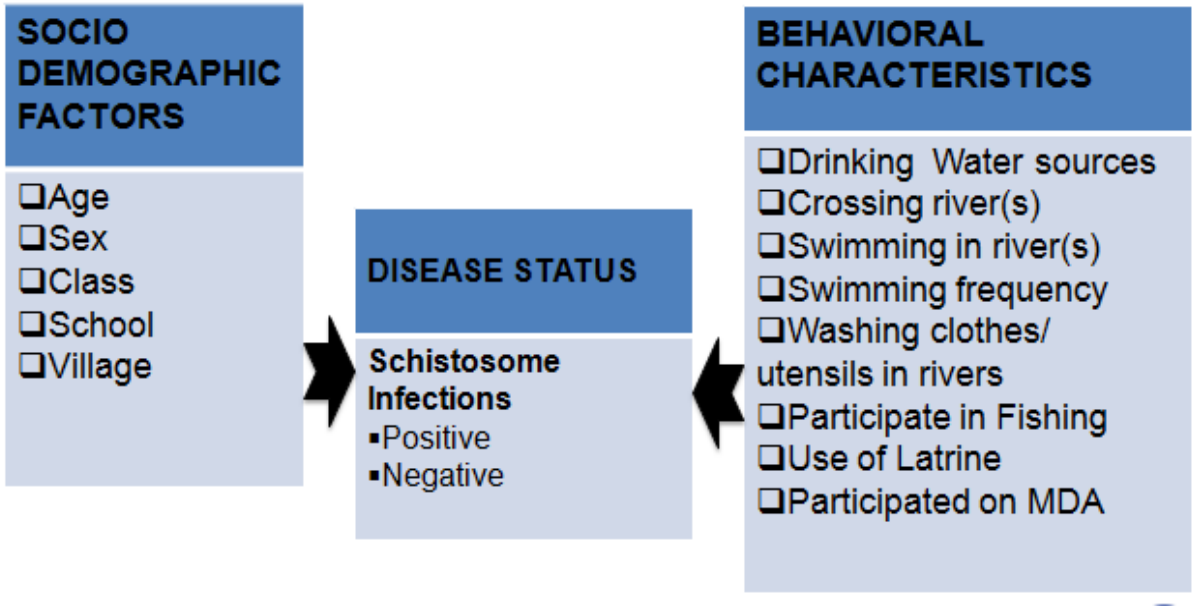


Figure 1.3: Conceptual Framework

1.4. Rationale

In Tanzania different surveys that have been conducted in the past and recently indicated the areas along the Great Lakes are more affected by Schistosomiasis (11). The Ministry of Health Community Development, Gender, Elderly and Children through Neglected Tropical Disease Control Program carries out Schistosomiasis control activities in Kigoma such as health awareness and education, school-based Mass Drug Administration to school-aged children and chemotherapy to symptomatic people. This study was set up to investigate the current prevalence and distribution of Schistosomiasis and factors associated with its transmission in Buhigwe district and its findings will inform the NTDCP and other stakeholders and may help in the design and implementation of control strategies in this district in the future. But also the information will be used as a baseline to evaluate the effectiveness of future interventions.

1.5. Research questions

a) What is the prevalence of Schistosomiasis among primary school children in Buhigwe district Kigoma Tanzania?
b) What is the intensity of Schistosomiasis infection among primary school children in Buhigwe district Kigoma Tanzania?
c) What are the factors associated with Schistosomiasis among school children in Buhigwe district Kigoma Tanzania?

1.6. Objectives

1.6.1. Broad Objective

To determine the prevalence and intensity of Schistosomiasis and factors associated with its transmission among primary school children in Buhigwe district Kigoma Tanzania.

1.6.2. Specific Objectives

1. To determine the prevalence of Schistosomiasis infections among primary school children in Buhigwe district.
2. To determine the intensities of Schistosomiasis infections among primary school children in Buhigwe district.
3. To determine factors associated with Schistosomiasis infections among primary school children in Buhigwe district.

CHAPTER TWO

2.0. LITERATURE REVIEW

2.1. Overview

According to the Center for Disease Control, Schistosomiasis ranks second to malaria as the most common parasitic disease in the African region and the burden of disease is high in pre-school and school children (9). It is estimated that more than 200 million people are infected with the disease worldwide. More than 650 million people live in endemic areas of Sub Saharan Africa including Tanzania (5).

2.2. Prevalence and intensity of Schistosomiasis infections

Different studies conducted in the world indicated a high prevalence of Schistosomiasis among primary school children. A cross-sectional study conducted in Magba subdivision of Cameroon showed a prevalence of Urinary Schistosomiasis among primary school children was 41.1% (12). A similar study conducted by Olulabi and colleagues in Lagos state Nigeria showed that the prevalence of urinary Schistosomiasis was 78% of which 43% were heavy, 35% were mild and 22 were light infections (13). Similarly, a study conducted by Kayuni and colleagues in Malawi showed that the prevalence of urinary Schistosomiasis was 12.5% where the highest infection intensity was found in 2.5% of the infected (14). Also, a study conducted in Tana Delta district in Kenya showed that the prevalence of Urinary Schistosomiasis among primary school children was 94% (15).

A nested cohort study conducted at Nyanza province in Kenya showed the prevalence of 69% for intestinal Schistosomiasis among primary school children of which 33% were diagnosed with the light infection, 23% moderate infection and 12% heavy infection (2). In Zimbabwe, an overall prevalence of urogenital and intestinal Schistosomiasis was observed to be 22.7% among primary school children and the intensity from light to heavy was 12.4% and 5.6% respectively (16). Another study conducted by Worku and colleagues in Ethiopia showed the prevalence of intestinal Schistosomiasis was 89.9% and school children with light infection were 18.4%, moderate infection 47% and those children with heavy infection were 18.7% (17).

In Tanzania prevalence of Schistosomiasis infections differs from one region to another. A community survey conducted in the regions around Lake Victoria basin showed that prevalence of *Schistosoma hematobium* among adults was 24.8% with the highest prevalence in Kagera region while for *Schistosoma mansoni* the prevalence was 16.7% with the highest prevalence in Shinyanga region (7). Also, another study conducted by Munis and colleagues in Rorya district showed that the prevalence of Intestinal Schistosomiasis was 84.01% of which 34.11% were light infections, 39.91% were the moderate infection and 25.99% were the heavy infection (18). A cross-sectional study conducted by Bakuza in Kigoma district shows the prevalence of intestinal Schistosomiasis among school children was 53% (11).

2.3. Socio-demographic factors associated with transmission of Schistosomiasis infections

Socio demographic characteristics are among the factors associated with Schistosomiasis transmission among primary school children. The study conducted in Yemen by Sandy and colleagues showed that children aged > 10 years had significantly higher prevalence of Schistosomiasis infections compared to those aged ≤ 10 years (37.6% Vs 27.0%, p=0.023) but also male children had higher prevalence of Schistosomiasis infections compared to females although the difference was not statistically significant (33.9% Vs 29.0% p=0.332) (19). Another cross-sectional study conducted in Sokoto Nigeria by Kabiru and colleagues showed that gender was among the statistically significant variables whereby males had higher Schistosomiasis prevalence of 33.7% compared to female 10.4%, ($p<0.05$). Age was significantly associated with the Schistosomiasis infections where the higher prevalence was observed between age 10-14 years with the prevalence of 39.6% followed by 15-19 with the prevalence of 25.3%(20).

A community survey conducted in Nkhohotokota District Malawi by Moyo and colleagues showed that age was the only risk factor associated with a statistically significant risk of urinary Schistosomiasis acquisition whereby children aged >4 years had 5.26 times higher risk of contracting urinary Schistosomiasis infection compared to children aged ≤ 4 years (p=0.048) (21). A prospective cross-sectional study conducted in Malawi by Kayuni and colleagues showed the prevalence of Schistosomiasis was higher among children of >8 years

(15.8%) compared to children aged <8 years. There was no association between sex and Schistosomiasis infections (14). Similarly, a cross-sectional study conducted by Njunda and colleagues in Magba Cameroon reflected the prevalence of Schistosomiasis was significantly higher among male than female children (p=0.029). Also, children aged <10 years were significantly associated with Schistosomiasis infection compared to children aged >10 years (p=0.009) (12).

A cross-sectional study conducted among primary school children in Rorya district by Munisi and colleagues shows the prevalence of Schistosomiasis infection varies significantly between age group with those aged 10-12 years having the highest prevalence and those aged 6-9 years having the lowest prevalence (p=0.004). The difference in prevalence between sexes was not statistically significant. The study results also showed a very strong association between infection prevalence and the children's villages (p=0.001) (18).

2.4. Behavioral factors associated with transmission of Schistosomiasis

There are a number of behavioral factors known to determine the transmission of Schistosomiasis and their association differs from one place to another. The study conducted in Magba Cameroon showed that the prevalence of Urinary Schistosomiasis was significantly higher in children who had frequent contact with water from the dam (p=0.001), use the water from the dam and having a parent whose occupation was fishing (12). Another cross-sectional study conducted in Ethiopia by Worku and colleagues showed that swimming in the river, frequent swimming habit, washing clothes and utensils in the river, crossing in rivers with barefoot and fishing activities were associated with *S. mansoni* infection among school children. The study results also showed that children who swam in the river had 5.12 times higher risk of being infected with *S. mansoni* compared to those with no swimming habit. A significant association was also observed among children who wash clothes and utensils in the river having 5.54 and 4.91 times higher risk of being infected with *S. mansoni* compared to those who did not. Similarly, a significant association was observed among children who cross the river with a bared foot having 3.95 higher odds of being infected compared to those who do not. In addition to that, the results showed children with fishing habit had three times

higher odds of acquiring infection compared to those who do not (17). Another study conducted in Lagos state Nigeria by Olalubi and colleagues shows the prevalence of Schistosomiasis among school children was higher among those children who swimming/drinking contaminated water followed by those children washing clothes or utensils in the rivers and the lowest group were those children playing or bathing in the rivers ($p<0.05$)(13)

In a cross-sectional study conducted among primary school children in Rorya District by Munisi and colleagues, a strong association was observed between infection and children village's where children at Busaga had a higher prevalence (89.4%) compared to those at Kabuyi (79.3%) ($p=0.001$). Also, the children who use toilets at home only had higher prevalence compared to those who use toilets not only at home ($p=0.01$), and the children who visit the lakes had also higher prevalence compared to those who do not visit the lake ($p=0.018$). The study results also showed the children who spent most of their time on the shoreline had a higher prevalence of infection compared to those who spent time deeper in the lake (18).

CHAPTER THREE

3.0. METHODOLOGY AND MATERIALS

3.1. Study design and duration

This was a cross-sectional study conducted in January 2018, which involved primary school children in Buhigwe District.

3.2. Study population

The study population involved primary school children aged 6 -17 years of both sexes in Buhigwe district. This age group consistently has high Schistosomiasis transmission rate and infection intensity and serves as a general representative of the community (22). All pupils received MDA on April 2017 except those of standard one who were not registered at the school.

3.3. Description of the study area

Buhigwe is one of the eight districts in Kigoma region Tanzania. The district lies at about 4° south and 29° east of Greenwich. It is bordered to the north by Burundi, to the east by Kasulu Rural District and Kasulu Urban District and to the west by Kigoma Rural district. According to the 2012 Tanzania National Census, the population of Buhigwe D.C was 254,342. The district receives one season of rainfall. The district is surrounded by rivers and forests. The district is on a plateau that slopes from the northeast down to the shore of Lake Tanganyika. The most important river in Buhigwe district includes Kasumo and Kajana rivers which drain to the main river of Malagarasi. Majority of the population in Buhigwe district depend on river water for domestic and economic uses.

In health administrative system Buhigwe district is under the Regional Medical Officer who is in-charge of Kigoma Region including Buhigwe district. At the regional level, there is a regional referral hospital found at Kigoma Municipal Council. Buhigwe district is under the District Medical Officer who administrates all health activities in Buhigwe. At the district level, there is a district hospital, health centers, and dispensaries. In each health facility, there

is a medical officer in charge. Under Education Administrative system Regional Educational Officer is the overall in charge of all educational activities in Kigoma region including Buhigwe and the district is under District education officer who administrates all education activities in the district. In the district, each school has a Head Teacher who administrates the school.

3.4. Eligibility criteria

3.4.1. Inclusion criteria

All school children who have been living in the study area for at least three months, with age 6-17 years and their parents/guardian signed a written consent form were included in the study.

3.4.2. Exclusion criteria

School children who meet the criteria but are dumb, deaf or with mental retardation, school children with history of being clinically ill or used drug within a period of one month, school children who do not live in the study area, school children with age below 6 years and school children whose parents refused to sign consent form were not included in the study.

3.5. Sample size estimation

In this study, the sampling units were pupils of selected schools. In estimating the sample 53% average prevalence of Schistosomiasis among children in Kigoma district was used (11). The minimum number of study subjects was estimated by using the formula of sample size estimation with regard to disease prevalence

$n = Z^2 p [1-p] / \varepsilon^2$

Whereby:

n = number of sample size

Z = Z score for 95% Confidence Interval (1.96)

p = prevalence 53% prevalence of schistosomiasis among children in Kigoma.

ε = tolerable errors (5%)

Therefore:

$n = (1.96 /5)^2 \times 53 \times (100-53) = 383$ pupils

Adding 10% for non-response,

Then n = 383 + 38 = 421 pupils. Therefore the minimum sample size for this study was 421 school children.

3.6. Sampling procedures

A Multistage random sampling was used to obtain the sample for this study. Buhigwe district has twenty wards. Muyama ward was selected purposively from the list of twenty wards due to the previous occurrence of the unknown outbreak in 2017. Three villages of Munyika, Kajana, and Kasumo were selected randomly from the list of seven villages in Muyama ward. Each village consists of at least one public primary school and one school was selected from each village to make a total of three primary schools to be included in the study. Each school provided a number of study participants depending on the number of children in the school and at the school level, each class provided a number of study participants with proportional to the number of study participants at that school. At the class level, study participants were selected by systematic random sampling technique from the list of all class pupils.

3.7. Study variables

3.7.1. Independent variables

The independent variables of this study included were social demographic characteristics such age, sex, class, village, and school and behavioral characteristics such as domestic water sources, crossing rivers while going to and from school, swimming in river, swimming frequency in rivers, washing clothes or utensils in rivers, use of latrine, fishing activities, participation in MDA (received Praziquantel or not within one year)

3.7.2. Dependent variables

The outcome variable was Schistosomiasis status such as positive or negative and intensity of Schistosomiasis i.e. light, moderate and heavy infections from laboratory findings.

3.8. Recruitment and training of research assistant

Two research assistants with medical background were recruited from Maweni regional referral hospital and trained on how to record participant's information using a structured questionnaire. Also, the research assistants were trained on how to guide participants in specimen collection (urine and stool) and also on how to preserve specimens after collection

3.9. Data collection procedure

3.9.1. Preparations to Data Collection

A day before collection, the research activity including its benefits was explained to the teachers, village leaders, and all school children. The school attendance was gathered to count a number of children at each school and to calculate the proportion to sample from each school. The selected pupils were instructed that, once they get home, they should give the consent form to their respective parents or guardians for them to read and then agree or disagree to allow them to participate in the study.

3.10. Administering of Questionnaires

A pre-tested questionnaire was applied to the participants in order to collect demographic data (age, gender, class, school, and village) and behavioral characteristics (drinking water sources, swimming in rivers, swimming frequency in rivers, washing clothes or utensils in rivers, toilets use at home, fishing activities and mass chemotherapy participation). The participants were interviewed by two research assistants who received a specific training on how to administer the questionnaire.

3.10.1. Specimen Collection

Following the administration of the questionnaire, wide mouth 50 mL and 100 mL, screw-capped containers pre-labeled with the participant's name and code were distributed to each participant for the collection of stool and urine specimens respectively. Also, participants were provided with a piece of applicator stick, a plain paper and instructed how to collect specimens. The samples were mixed with 10% Formal saline fixative immediately after collection to preserve the morphology of the eggs and prevent bacteria overgrowth and

transported to Muhimbili University of Health and Allied Sciences - Parasitology Laboratory for Analysis.

3.10.2. Parasitological Investigations

The standard operating procedure was used for specimen collection, preservation, and processing for maintaining good quality study and to ensure quality control the examination the specimen was being done by two observers for the same prepared slide (23).

Urine specimens were examined by using urine filtration method previously described by Cheesbrough (23).

All the stool samples were examined using Kato-Katz techniques for the presence of *S. mansoni* eggs. To determine the worm burden, egg counts were performed and recorded as eggs per gram of feces. The number of *S. mansoni* eggs seen were recorded and converted into a number of egg per gram of faces in order to analyze the intensity of infection. EPG was calculated by multiplying egg count per slide to conversion factor i.e. 24. An infection intensity status (Light/Moderate/Heavy) was created following the standard operating procedure used by W.H.O. (24). EPG for positive samples and the intensity of infections was then graded as heavy (≥ 201 EPG), moderate (100-200 EPG) or light (1-99 EPG) according to the criteria proposed by the WHO (24)

3.11. Validity and reliability

Validity refers to the extent to which the concept is accurately measured. It is to ensure that the tool covers all the content intended to cover. In our study, this was ensured during pre-testing of tools in Dar es Salaam region before commencing of my study. The questionnaires were administered to primary school children in the selected school and the results were assessed to ensure the validity of a study

Reliability this refers to the consistency of measuring. In our study this was assured by processing specimen with known results (positive and negative) every day before processing participant specimen, this ensures that the results obtained from participant specimen are accurate and consistent.

3.12. Data processing

Data editing was done during and after data collection exercise. Principal Investigator was cross-checking the filled questionnaire for errors and missing variables every day after data collection activity. The questionnaires with errors were sorted out for corrections. After data corrections, the primary data was entered by the principal investigator into the excel sheet and the questionnaires were packed together for future references. Data were exported to statistical software STATA/MP 13.1 for analysis.

Descriptive analysis was carried out using frequency and proportion for categorical variables of socio-demographic characteristics, and mean and standard deviation for continuous variables. The median and inter-quartile range was used to express the egg counts (25). Pearson's Chi-square test was used to examine the associations of Schistosomiasis infection with the demographic and behavioral factors. Any variable with $p<0.2$ was considered for multivariate logistic regression analysis to identify the risk factors significantly associated with infection. The level of statistical significance for the final model was set at $p < 0.05$.

3.13. Ethical Considerations

Before the commencement of the study, ethical clearance was obtained from the MUHAS Ethical Review Board. Permission to conduct the study in Buhigwe District was sought from the District Executive Director, who wrote a letter of introduction to DEO, and DMO of Buhigwe District. Then DEO wrote a letter to the WEO of Muyama ward for introduction and as a permit to conduct the research in the area. The WEO introduced the Principal Investigator to the VEO of each village and head teachers of respective primary schools. A consent form was provided to each study subject a day before data collection. Parents were asked to sign the consent forms if they agreed their children to be involved in the study.

Verbal consent to collect specimen was sought from the pupils themselves. Interview and collection of the specimen were conducted from those children whose parents/guardians signed the consent forms. No other investigations were done on the sample except those needed for the study objectives that described in the consent form. Any information that was obtained during the study was kept confidential. At the end of the study, a brief report was prepared and sent to the District Medical Officer, District Education Officer, and the respective schools so that schools with infected children could liaise with dispensaries in their vicinity to provide the required treatment to the children.

CHAPTER FOUR

4.0. RESULTS

4.1. Demographic Characteristics of Study Participants

Out of 421 pupils approached, 406 pupils provided urine and stool specimen with a response rate of 96.4%. Majority of the pupils (51.48%, n=209) were in the age group of 11 - 17 years and mean age was 10.7 years and standard deviation (±0.14). Females accounted for 51.97% (n=211). Pupils were sampled from three primary schools with Munyika school contributing 35.47% (n=144) of the study population. More details are found in Table 4.1 below.

Table 4.1: Socio-demographic characteristics of study participants (n=406)

Characteristics	Number	Proportion (%)
Age		
6 -10	197	48.52
11-17	209	51.48
Sex		
Male	195	48.03
Female	211	51.97
Classes		
1-3	203	50.00
4-7	203	50.00
Village / School		
Munyika	144	35.47
Kajana	132	32.51
Kasumo	130	32.02

4.2. Prevalence of *Schistosoma mansoni* infections among primary school children.

Of the 406 pupils whose stool samples were tested, intestinal Schistosomiasis was observed in 135 pupils making the overall prevalence of 33.3% (95% C.I 28.7% - 38.1%). The prevalence was significantly higher among pupils in the age group 6 – 10 years at 40.10% (95% C.I 35.3-51.7) compared to the prevalence of 26.79% for those in the age group 11 – 17 years, (95% C.I 22.00-33.20). Also, a significantly higher prevalence of 39.41% (95% C.I 33.2-47.0) was observed among pupils of standard 1 to 3 as compared to the prevalence of 27.09% (95% C.I 20.7-33.1) of those of standard 4 to 7. Other parasites detected in stools were *Ascaris lumbricoides* (0.7%), *hookworms* (0.2%) *and Hymenolepis nana* (0.2%). *Schistosoma hematobium* infection was not detected in all 406 urine samples examined. More details found in Table 4.2 below.

Table 4.2: Univariate Analysis for Socio-demographic characteristics associated with Schistosomiasis (n=406)

Characteristics	Total Number Examined	*S. Mansoni* Number of Positive	Proportion (%)	Chi-square p-value
Age				
6-10	197	80	40.10	<0.01
11-17	206	55	26.79	
Sex				
Male	195	59	36.02	0.22
Female	211	76	30.26	
Classes				
1-3	203	81	39.41	0.01
4-7	203	54	27.09	
Village/School				
Munyika	144	53	36.11	0.56
Kajana	132	43	33.33	
Kasumo	130	39	30.00	

4.3. Intensities of Intestinal *Schistosoma mansoni* infections among school children

The median egg per gram of faces for school with *S. mansoni* infection was 48 EPG (IQR=96). Table 4.3 describes *S. mansoni* infection levels stratified from light, moderate to heavy infection according to WHO guideline (24). An intensity level status created among those positive (n=135) was 71.0%, 9.6% and 19.3% for light, moderate and heavy infections intensity respectively. In order to assess the level of morbidity due to *S. mansoni* infections the prevalence of light, moderate and heavy infection was determined and stratified by age, sex, class, school, and village. Pupils aged 6 – 10 years were more infected with a median of 60 EPG (IQR=168 EPG) compared to those aged 11 – 17 years with a median of 48 EPG (IQR=72 EPG). There was an almost equal level of infection intensities between sex, classes, villages, and schools. More details are found in table 4.3 below.

Table 4.3: Distribution of the Intensity of Infections in the study population stratified according to age, sex, class, school, and village (n=135)

Characteristics	*S. Mansoni* Number of positive	Median Eggs per gram	IQR (75-25) Eggs per gram
Age			
6-10	80	60	168
11-17	55	48	72
Sex			
Male	59	48	168
Female	76	48	72
Class			
1-3	81	48	144
4-7	54	48	48
Villages/schools			
Munyika	53	48	72
Kajana	43	72	144
Kasumo	39	48	144

4.4. Factors associated with Intestinal Schistosomiasis among school children

On bivariate analysis, seven factors were identified significantly associated with Intestinal Schistosomiasis infections ($p<0.05$). Pupils aged 6-10 years were having 1.9 times higher odds for the infections compared to those aged 11-17 years (COR=1.91; 95% C.I 12.6-2.91). Also, pupils of standard one to three were having 1.83 times higher odds for the infections compared to those pupils of standard four to seven (COR=1.83; 95% C.I=121-2.78). Crossing the rivers with bare feet was also associated with infections by having 2.05 times higher odds compared to those who do not cross the rivers (COR=2.05; 95 C.I=1.29-3.18). Pupils who had a history of washing clothes or utensils in the rivers were having 1.91 times higher odds for the infections compared to those who did not (COR=1.91; C.I=1.19-3.05). Furthermore, the pupils with the tendency of swimming in the rivers were having 1.71 times higher odds for the infections compared to those who did not (COR=1.71; 1.04-2.79). Participating in fishing activity was also identified as a risk factor associated with infection among pupils by having 1.77 times higher odds for the infections compared to those who do not swim.

Table 4.4: Bivariate logistic regression for socio-demographic and behavioral factors associated with *Schistosoma mansoni* infections among school children (n=406)

	Schistosoma mansoni				
Characteristics	**YES (%)**	**NO (%)**	**Crude OR**	**95% C.I**	**p-value**
Age					
6 – 10	80(40.60)	117(59.40)	1.91	1.26 – 2.91	<0.01
11 – 17	55(26.30)	154(73.70)	Ref		
Sex					
Female	76(36.02)	135(63.98)	1.297	0.86 – 1.97	0.22
Male	59(30.26)	136(69.74)	Ref		
Classes					
1 – 3	81(39.90)	122(60.09)	1.83	1.21 – 2.78	0.01
4 – 7	54(26.60)	149(73.40)	Ref		
Village/School					
Munyika	53(36.05)	94(63.95)	1.34	0.81– 2.22	0.25
Kajana	43(33.86)	84(66.14)	1.22	0.72 – 2.06	
Kasumo	39(29.55)	93(70.45)	Ref		
Drinking water					
River Water	14(38.89)	22(61.11)	1.45	0.58 – 3.64	0.42
Tap Water	107(33.02)	217(66.98)	1.12	0.58 – 2.20	
Both	14(30.43)	32(69.57)	Ref		
Crossing river with bare feet					
Yes	50(45.05)	61(54.95)	2.05	1.29 – 3.18	<0.01
No	85(28.81)	210(71.19)	Ref		
Swimming in rivers					
Yes	108(36.24)	190(63.76)	1.71	1.04 – 2.79	0.03
No	27(25.00)	81(75.00)	Ref		
Washing clothes in rivers					
Yes	103(37.73)	170(62.27)	1.91	1.198 – 3.05	0.01
No	32(24.06)	101(75.94)	Ref		
Participate in fishing activities					
Yes	38(43.68)	49(56.32)	1.774	1.09 – 2.89	0.02
No	97(30.41)	222(69.54)	Ref		
MDA Participation in 2017					
No	36(36.73)	62(63.27)	1.238	0.77 – 1.99	0.38
Yes	98(31.92)	209(68.08)	Ref		

4.5. Multivariate Analysis

Seven variables that showed ($p < 0.2$) with the prevalence of *S .mansoni* were considered for the multiple logistic regression analysis. After adjusting for age, and sex, four variables were retained as significant predictors of *S. mansoni* among the examined pupils. The results confirmed that pupils with age of 6-10 years had 2.46 times higher odds for the infections compared to those of 10-17 years (AOR=2.46; 95% C.I 1.62-3.74). Pupils crossing the river with bare feet had 1.99 times higher odds for the infections when compared to those not crossing the rivers (AOR = 1.99; 95% C.I; 1.26-3.12). Pupils who had a history of swimming in rivers had 1.64 times higher odds for the infection compared to those who do not swim (AOR = 1.64; 95% CI; 1.022-2.81). Moreover, pupils who participated in fishing activities were having almost 3 times higher odds for the infections compared to counterparts (AOR 2.82 95% C.I. 1.59-4.97). More details are found in Table 5.

Table 4.5: Multivariate logistic regression for behavioral factors associated with infections.

Characteristics	Crude OR	Adjusted OR	95% C.I	p-value
Age				
6 - 10	1.91	2.46	1.62 - 3.74	0.01
11-17	Ref			
Crossing Rivers				
Yes	2.01	1.99	1.26 – 3.12	<0.01
No	Ref			
Swimming in Rivers				
Yes	1.71	1.64	1.02 – 2.81	0.04
No	Ref			
Participate in Fishing				
Yes	1.77	2.82	1.59 – 4.97	<0.01
No	Ref			

CHAPTER FIVE

5.0. DISCUSSION

In this study, we found the prevalence of *S. mansoni* among pupils in Buhigwe district was 33.3%. The prevalence was highest among 6-10 age groups and children of standard one to three. The distribution of *Schistosoma mansoni* infections level among pupils who were positive (n=135) was 71.0%, 9.6% and 19.3% for light, moderate and heavy infection intensity respectively. The proportion of *S. mansoni* heavy infection intensity was highest, among children aged 6-10 years and children of standard one to three. Age, crossing rivers with barefoot while going to school, swimming in rivers, and participate in fishing activities were found significantly associated with *S. mansoni* infections among the pupils. In this study *S. hematobium* infection was not detected in all urine samples examined

The prevalence of *S. mansoni* found in our study is lower compared to the previous study done in neighboring Kigoma district council which reported the prevalence of 53% (11). Similarly, the prevalence of *S. mansoni* in our study was lower compared to the study done in Rorya district Tanzania, which reported the prevalence of 84% (18). Comparatively the prevalence of *S. mansoni* in the present study was lower than that found on the previous study done in Malawi which reported the prevalence of 40% (26). Similarly, the prevalence was lower than that found in the previous study done in Ethiopia which reported the prevalence of 89.9% (17). Considering school-based MDA with Praziquantel and Albendazole which was carried out in April 2017 with 100% geographical coverage in Buhigwe district, the prevalence was expected to be lower. However, the prevalence of *S. mansoni* in the present study was lower than that of other studies the difference could be partly attributed to the laboratory method used to determine the *S. mansoni.* By using single test of Kato-Katz it is difficult to check for false negative results compared to other tests like formol-ether concentration technique since because method tends to have low sensitivity in the diagnosis of *S.mansoni* particularly in areas with high proportions of low intensity of infections (40).

In our study, the prevalence of *S. mansoni* infection was much higher among pupils aged 6-10 years compared to those aged 10-17 years. This finding is similar to the recent study done in Sanja Town Ethiopia which showed the prevalence of 90.4% among children aged 6-10 years compared to the prevalence of 89.7% among those aged 10-17 years (17). However other studies done in other area showed opposite findings, for instance, the study was done in Sengerema district Tanzania showed a prevalence of 37.9% among children aged 13-18 years compared to those aged 8-12 years (27). Similarly, a study done in Usoma Kenya showed a higher prevalence of 90% among children aged >10 years (28). Another study done in Kenya showed that the prevalence *S. mansoni* increased with age among children (29). The higher prevalence of *S. mansoni* among children aged 6-10 years showed in our study might be attributed to behavior characteristics and level of contact to infested river water. Also, the higher prevalence might be attributed to fact that the children of standard one are not covered by MDA before they start school that may have contributed to significant morbidity among this group (31).

In our study children aged 6-10 years were having a higher proportion of *S. mansoni* heavy infection compared to children aged >10 years. This finding is similar to the previous study done in Northern Western Tanzania which showed higher infection intensity of up to 376 EPG among children aged 4-10 years compared to 215 EPG among children aged 11-15 years (31). Similarly, a study done in Uganda showed males children had significantly higher infection intensity of 370 EPG compared to females who had 132 EPG (32). In our study, there was an almost equal proportion of *S. mansoni* infection intensities between boys and girls. This finding is opposite to the previous study done in Mwanza region which reported that male children had higher infection intensities compared to female(31). Similarly, a study conducted in Malawi showed that male children had higher infection intensities of 290 EPG compared to female 224 EPG (33). Boys being affected more than girls might be attributed to their behavioral pattern, where boys are more interested in swimming and playing in rivers and therefore more likely to come into contact with infested water (2).

The present study investigated important behavioral characteristics associated with *S. mansoni* among school children. We found a significant association between *S. mansoni* infection and age, crossing the river with barefoot while going to school, swimming in rivers, and fishing among school children. The children who cross the river with barefoot while going to school had the highest prevalence compared to those who did not cross the river. This finding is similar to what was reported in Ethiopia where crossing the river with barefoot was a significant predictor of Schistosomiasis (34). The present study has further demonstrated that swimming in rivers was significantly associated with *Schistosoma mansoni* infection among school children. This observation has also been reported by a number of previous studies done in Ethiopia (35,36). Moreover, this study showed that fishing was significantly associated with *Schistosoma mansoni* infection among school children. This finding is similar to the previous study done in Tanzania (18). Similarly, a study conducted in North central Nigeria showed a significantly higher prevalence of *S. mansoni* among children who participate in fishing compared to those who do not (38). On visual examination the area lacks safe water sources, therefore communities in this area depend on river water for domestic and economic use hence children get more time to go swimming and fishing when they went to fetch water hence they have more exposure to infested water.

The absence of urogenital Schistosomiasis in Buhigwe district could be due to the absence of ponds and the fact that no rice cultivation is practiced in this area, Presence of ponds and rice cultivations activities are the favorable conditions for the snails of the genus *Bulinus* which are the vectors for *S. hematobium* (39)

5.1. Study Limitations

We acknowledge some limitations of our methodology. One limitation was from younger children who were not able to give accurate information during interviews due to the communication problem; however, we trained their teachers to interview them in the local language. Also, this study had relied on a single test of Kato-Katz which was difficult to check for false negative results compared to other tests like formol-ether concentration technique (40) and therefore the results of our study might be underestimated. But also Baseline prevalence before the mass chemotherapy was not available; therefore it has been difficult to directly link the low prevalence with the mass chemotherapy that was applied.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The present study has demonstrated that the prevalence of *S. mansoni*, infection among schoolchildren in Buhigwe district is 33.3%, one-year post-chemotherapy. This shows that the problem still exists. The prevalence observed this area could be due to continuous exposure to contaminated water among school children and this is due to the fact that the villages in which school children live lack safe water sources and most of them depend on river water. The study found that age, swimming and washing clothes or utensils in rivers and participating in fishing activities were significantly associated with *S. mansoni* infections. S.hematobium has not detected among school children enrolled in this study.

6.2 Recommendations

This study recommends all schools in Buhigwe district to introduce health education program on Schistosomiasis to reduce pupils to contact with infested water hence to reduce the transmission of this disease. Further studies should be conducted to assess the effectiveness of school-based MDA in this district since the prevalence found is ≥10% above the recommended threshold for MDA by W.H.O one year after scale-up of MDA.

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APPENDICES

Appendix 1: Questionnaire – English Version

To primary school children Buhigwe district Kigoma Region

Part 1. Social Demographic Information

1. Questionnaire number……..
2. Date of Interview……../……/…….
3. Name of the school……..
4. I.D Number…….
5. Name of student…….
6. Sex of the student
    a) Male
    b) Female
7. Date of Birth of participant……/……/……
8. Class of pupil……
9. Area of residence (village)…….

Part 2. Risk factors

10. What are the sources of drinking water at home?
    a) Tap water……..
    b) Rivers……
    c) Lakes……
    d) Wells……
11. Are you crossing rivers while coming to school?
    a) Yes……
    b) No…….
12. Are you swimming in Lakes/rivers/ponds?
    a) Yes……
    b) No…….

13. How often are you swimming in Lakes/rivers/ponds?
    a) Everyday……
    b) Three times a week….
    c) Once a week……

14. Are you washing clothes/utensils in rivers/lakes/ponds?
    a) Yes……..
    b) No……...

15. Are you participating in fishing activities?
    a) Yes……..
    b) No……...

16. Are you using Latrine at home?
    a) Yes…….
    b) No……..

17. Have you participated on MDA?
    a) Yes…….
    b) No……..

    When was last time (month/year)…….

Part 3.Laboratory Investigation

a) Urine Examination- Urine filtration technique

   Type of Schistosoma ova seen

	Urinary Schistosoma species	Ova/egg seen	No ova/egg seen
I	Schistosoma hematobium		

Name of Analyst 1……Signature…….

Name of Analyst 2…….Signature…….

b) Stool Examination – Formol ether and Kato Katz

	Intestinal Schistosoma species	Eggs seen/Not Seen	Eggs/slide	Eggs/gram
I	Schistosoma mansoni			
Ii	Other parasites			

Name of Analyst 1…… Signature…….

Name of Analyst 2…….Signature…….

Appendix 2: Questionnaire – Swahili Version

Dodoso kwa wanafunzi wa shule za msingi wilayani Buhigwe mkoani Kigoma

Sehemu ya kwanza: Taarifa binafsi za mwanafunzi

1. Namba ya Dodoso……..
2. Tarehe ya mahojiano……../……./…….
3. Jina la shule anayosoma mwanafunzi……..
4. Namba ya utambulisho…….
5. Jina la mwanafunzi…….
6. Jinsia ya mwanafunzi
    c) Mvulana
    d) Msichana
7. Tarehe ya kuzaliwa……/……./……
8. Darasa analosoma mwanafunzi……..
9. Mahali anapoishi (kijiji)…….

Sehemu ya pili. Mazingira na tabia zinazopelekea maambukizi ya kichocho

9. Je ni vyanzo gani vinatumika kupata maji ya kunywa nyumbani?
    a) Maji ya bomba……..
    b) Maji ya mtoni……
    c) Maji ya ziwani……...
    d) Maji ya visima……
10. Je unavuka mto wakati wa kuja shule?
    a) Ndio……
    b) Hapana……
11. Je una tabia ya kuogelea kwenye ziwa/mto/madimbwi?
    a) Ndio……
    b) Hapana……

12. Mara ngapi unakwenda kuogelea kwenye ziwa/mto/madimbwi?
    a) Kila siku……...
    d) Mara tatu kwa wiki……..
    e) Mara moja kwa wiki……

13. Je una tabia ya kwenda kufua au kuosha vyombo kwenye ziwa/mto/madimbwi?
    a) Yes……..
    b) No……...

14. Je una tabia ya kushiriki kwenye shughuli za uvuvi?
    a) Ndio……..
    b) Hapana……..

15. Je mnatumia choo nyumbani?
    a) Ndio…….
    b) Hapana……

16. Je umeshawahi kumeza dawa za kichocho na minyoo?
    a) Ndio…….
    b) Hapana…….

    Je unakumbuka mara mwisho ilikua lini (Mwezi/Mwaka)……..

Sehemu ya tatu. Uchunguzi wa Kimaabara.

e) Urine Examination- Urine filtration technique

Type of schistosoma ova seen

	Urinary Schistosoma species	Ova/egg seen	No ova/egg seen
I	Schistosoma hematobium		

Name of Analyst 1…… Signature…….

Name of Analyst 2…….Signature…….

f) Stool Examination – Formol ether and Kato Katz

	Intestinal Schistosoma species	Eggs seen/Not seen	Eggs/slide	Eggs/gram
I	Schistosoma mansoni			
Ii	Other parasites			

Name of Analyst 1…… Signature…….

Name of Analyst 2……..Signature…….

Appendix 3: Informed Consent – English Version

Muhimbili University of Health and Allied Sciences - Directorate of Research & Publications

ID-NO: ……

Consent to participate in this study

Greetings my name is Mohamedi Mwedi Athumani from Muhimbili University of Health and Allied Sciences, Dar es Salaam. At the moment, we are carrying out a study to determine the prevalence of schistosomiasis and associated factors for its transmission among school children in Buhigwe Kigoma Region.

Purpose of the study

This study aims to determine the prevalence of schistosomiasis and the associated factors for its transmission among primary school children in Buhigwe Kigoma. You asked to allow your child to participate in this study as a stakeholder and resident in the study site.

What participation involves

If you agree your child to participate in this study the following will occur

1. Your child will be asked to collect urine and stool specimen in a provided container and bring it to the investigator for laboratory investigation.
2. Your child will be interviewed for factors associated with transmission of schistosomiasis infection in the study area.

Confidentiality

I assure you that all the information collected from you and your child will be kept confidential. Only people working in this research study will have an access to the information. We will ensure that any information included in our report does not identify you and your child as respondent as we will not put your name or other identifying information on the records of the information you provide.

Risks and Discomfort

There are no physical risks associated with this study

Rights to withdraw and alternatives

Your participation in this study is completely voluntary. If you choose your child not to participate in the study or if you decide to stop him/her participating in the study no harm will come to you. You can stop your child participating in this study at any time, even if you have already given your consent. Refusal to participate or withdraw from the study will not involve loss of any benefit to which you are otherwise entitled.

Benefits

If you agree your child to participate in this study there may be a direct and indirect benefit to your child. The direct benefit is that once your child is found either infected with any of the Schistosoma infection will be referred to the nearby dispensary for appropriate treatment. Also participating in the study assists in the determination of the level of infection in this community, this information will help in developing appropriate control measures for the parasites in the district.

Compensation

There will be no compensation of time spent during the interview; however, your child participation is highly appreciated.

Who to contact

Dr. Joyce Masalu the Director of Research and Publication**,** Muhimbili University of Health and Allied Science (MUHAS), P. O. Box 65001, Dar es Salaam, Tel. no 2150302-6. OR

Dr. M.L. Mubi, The study Supervisor (Mobile: 0655-367993)

Dr. A. N. Sabasaba, The study Supervisor (Mobile: 0715951085)

Mohamed, Mwedi Athumani – Principal Investigator (Mobile 0655096651)

Signature of parent/guardian ……...…… Date of signed consent……

If a participant cannot read:

I was present while the benefits, risks, and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to allow his/her child to take part in the research.

Signature of Witness.....

Signature of research assistant.....

Date of signed consent.....

Appendix 4: Informed Consent – Swahili Version

Chuo Kikuu cha Sayansi za Afya na tiba Muhimbili - Kurugenzi ya Utafiti na Machapisho

Namba ya Utambulisho……

Ridhaa ya kushiriki katika utafiti huu

Habari, Jina langu naitwa Mohamedi Mwedi Athumani natoka Chuo Kikuu cha Sayansi za Afya Muhimbili, Dar es salaam. Tumekuja kufanya utafiti kutambua hali ya maambukizi ya ugonjwa wa kichocho na kubaini tabia na mazingira yanayopelekea maambukizi ya kichocho kwa watoto wa shule za msingi wilaya ya Buhigwe mkoani kigoma.

Malengo ya utafiti

Utafiti huu una lengo la kuainisha hali ya maambukizi ya ugonjwa wa kichocho na kubaini mazingira na tabia hatarishi yanayopelekea maambukizi ya kichocho kwa watoto wa shule za msingi za wilaya ya Buhigwe mkoani Kigoma. Hivyo unaombwa kumruhusu motto wako aweze kushiriki katika utafiti huu kama mkazi na mdau muhimu katika eneo la utafiti.

Ushiriki unahusisha nini?

Ukikubali kumruhusu motto wako kushiriki katika utafiti huu yafuatayo yatatokea

1. Mtoto wako ataombwa kukusanya sampuli ya mkojo na choo kikubwa kwa ajili ya kwenda kufanyiwa uchunguzi wa kimaabara.
2. Mtoto wako ataulizwa maswali yanayohusu tabia na mazingira yanayopelekea maambukizi ya ugonjwa wa kichocho.

Usiri

Nakuakikishia kwamba taarifa zote zitakazokusanywa kutoka kwa motto wako na kwako zitakuwa ni siri, ni watu wanaofanya kazi katika utafiti huu tu ndio wanaweza kuziona taarifa hizi.Tunakuakikishia ya kwamba taarifa zitakazojumuishwa kwenye ripoti yetu hazitakuwa zinatoa utambulisho wako. Hatutaweka jina lako au taarifa yoyote ya utambulisho kwenye kumbukumbu ya taarifa utakazo tupatia.

Madhara

Hamna madhara yeyote ya kimwili yanayotegemewa kutokana na kujumuika kwa mototo wako katika utafiti huu.

Haki ya kujitoa na mbadala wowote

Ushiriki wa motto wako katika utafiti huu ni wa hiari. Kama utachagua motto wako kutoshiriki au utaamua kusimamisha ushiriki wake hautapata madhara yoyote. Unaweza kusimamisha ushiriki katika muda wowote hata kama ulisharidhia ushiriki wake. Kukataa kushiriki au kujitoa katika utafiti hakufanyi apoteze stahili yoyote anayotakiwa kupata.

Faida

Kumruhusu mtoto wako kushiriki katika utafiti huu kunaweza kukawa na faida za moja kwa moja na faida zisizokuwa za moja kwa moja. Faida za moja kwa moja ni pamoja na kama mtoto wako atakutwa na maambukizi ya kichocho na minyoo basi atapewa rufaa ya kwenda kwenye kituo cha afya cha jirani yako na kupatiwa matibabu husika, na pia kushiriki kwa mwanao kwenye utafiti huu, kutasaidia upatikanaji wa takwimu za kiwango cha maambukizi ya kichocho hali hatarishi zinazopelekea maambukizi kwa watoto wa shule. Taarifa hizi zitatumika katika kuifahamisha serikali ukubwa wa maambukizi ya magojwa haya, lakini pia kupanga mpango mahsusi wa kudhibiti kichocho katika wilaya ya Buhigwe.

Fidia ya muda

Hakutakuwa na fidia ya muda uliotumika wakati wa kufanya mahojiano au majadiliano katika utafiti huu, hata hivyo ushiriki wako katika utafiti huu utashukuriwa na kuthaminiwa.

Watu wa kuwasiliana nao

Kama kuna swali kuhusianan na utafiti huu itakubidi kuwasiliana na

Mkurugenzi wa Utafiti na Uchapishaji Dr Joyce Masalu - Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili, S.L.P. 65001 DSM. Simu namba 2150302-6. Kama una maswali zaidi unaweza kuwasiliana na

Dr. M.L MUBI – Msimamizi wa Utafiti (Mobile: 0655-367993)

Dr. A. N SABASABA - Msimamizi wa Utafiti (Mobile: 0715951085)
Mohamed, Mwedi Athumani - Mtafiti Mkuu (Mobile 0655 096651)

Sahihi ya Mzazi/mlezi…….

Tarehe ya kusainiwa ruhusa…….

Kama hawezi kusoma na kuandika (Shahidi Asaini)

Nilikuwepo wakati faida, madhara na namna ya utafiti huu utakavyofanyika viliposomwa kwa mzazi huyu. Maswali yake yote yamejibiwa, na mzazi huyu amekubali kumruhusu mtoto

wake ashiriki kwenye utafiti huu.

Sahihi ya shahidi ……

Sahihi ya mtafiti msaidizi……...

Tarehe ya makubaliano ……

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

P.O. Box 65001
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Direct Line: +255-22-2151378
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E-mail: dpgs@muhas.ac.tz

Ref. No. HD/MUH/T.401/2016

23rd November, 2017

District Executive Director
Buhigwe District
BUHIGWE.

Re: INTRODUCTION LETTER

The bearer of this letter Mr. Mwedi Athumani Mohmaed is a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MSc. Epidemiology and Laboratory Management.

As part of his studies he intends to do a study titled:"***Prevalence and intensity of schistosomiasis and associated factors among primary school children in Buhigwe District Tanzania ".***

The research has been approved by the Chairman of University Senate.

Kindly provide him the necessary assistance to facilitate the conduct of his research.

We thank you for your cooperation.

Ms. A. Ndyetukiza
For: DIRECTOR, POSTGRADUATE STUDIES

cc: Dean, School of Public Health and Social Sciences
cc: Mr. Mwedi Athumani Mohamed

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Ref. No. MU/ PGS/SAEC/Vol.X/

22nd November, 2017

Mr. Mwedi Athumani Mohamed
MSc. Epidemiology and Laboratory Management
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED: PREVALENCE AND INTENSITY OF SCHISTOSOMIASIS AND ASSOCIATED FACTORS AMONG PRIMARY SCHOOL CHILDREN IN BUHIGWE DISTRICT TANZANIA

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from 22nd November, 2017 to 21st November, 2018. In case you do not complete data analysis and dissertation report writing by 21st November, 2018, you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya
Ag: DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Public Health and Social Sciences

HALMASHAURI YA WILAYA YA BUHIGWE

(Barua zote ziandikwe kwa Mkurugenzi Mtendaji)

Simu/ Fax 255 028 2810 339
Email: buhigwedc@gmail.com

Ofisi ya Mkurugenzi Mtendaji (W),
S.L.P. 443,
BUHIGWE.

Unapojibu tafadhali taja

Kumb. Na. BHDC/ **10 Januari, 2018.**

WALIMU WAKUU,

HALMASHAURI YA WILAYA BUHIGWE.

YAH: UTAMBULISHO

Rejea kichwa cha barua hapo juu.

Ninawatambulisha MOHAMED MWEDI ATHUMANI na DR. PILI KIMANGA kwamba ni wanafunzi wa Chuo Kikuu Muhimbili, wako katika shughuli ya utafiti. Wapeni ushirikiano stahiki.

Kazi njema.

Fred A. Fandey

AFISA ELIMU MSINGI

BUHIGWE.

AFISA ELIMU MSINGI
HALMASHAURI YA WILAYA
BUHIGWE