PREVALENCE AND INTENSITY OF *SCHISTOSOMA MANSONI* INFECTION AMONG SCHOOL CHILDREN IN SELECTED PRIMARY SCHOOLS NEARBY RIVERS IN JIMMA TOWN, SOUTHWEST ETHIOPIA

A THESIS SUBMITED TO JIMMA UNIVERSITY INSTITUTE OF HEALTH, FACULTY OF HEALTH SCIENCE, SCHOOL OF MEDICAL LABORATORY SCIENCE IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN MEDICAL PARASITOLOGY

BY

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JIMMA, ETHIOPIA

JIMMA UNIVERSITY
INSTITUTE OF HEALTH
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Declaration Sheet

We, the undersigned, declare that this research paper is our original work and has not been presented for degree in this or any other University. All sources of materials used in this thesis have been fully acknowledged.

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ABSTRACT

Background: *In Ethiopia, Schistosoma mansoni is widespread and its presence has been recorded in all administrative regions.*

Methods: *Institutional based cross-sectional study was conducted to determine the prevalence and intensity of Schistosoma mansoni infection among purposively selected primary school children nearby rivers and other water sources in Jimma town, from March to April 2017. Three hundrede twenty-eight schoolchildren were participated in this study. Structured questionnaires used to collect information on socio-demographic characterstics and risk factors for S.mansoni infection. Stool sample was processed using double Kato- Katz thick smear technique for the quantification of S.mansoni and STH eggs.*

Results*: The overall prevalence rate for S. mansoni infection was 28.65 %(94/328). The prevalence for males and females were 39.28 %(77/196) and 12.87 %(17/132), respectively.Out of 94 positives, 53 %(50) had light (1-99 EPG), 35 %(33) moderate (100-399 EPG) and 11.7 %(11) (≥ 400 EPG) had heavy infection intensity with minmum of 24 eggs per gram and maximum 1728 eggs per gram of stool sample. The geometric mean infection intensity of S.mansoni was 102.27EPG. Distance of school from river (AOR=4.305, p=0.001, 95% CI: 1.704-10.878), swimming habit nearby rivers (AOR=5.069, p=0.001, 95%CI: 2.718-9.453) and water body contact while crossing in the river (AOR=4.132, p=0.001, 95%CI: 2.466-6.923) had statistical significant association with S.mansoni infection.*

The prevalence of STH and other intestinal parasite infections were, T.trichuira 66(20.12%), A.lumbricodes 16(4.5%), Hookworm *1(0.30%), H.nana 10(3.04%), Taenia species 1(0.30 %,), Giardia lamblia 15(4.57%) and E.histolytica/dispar 10(3.04%).*

Conclusion and Recommendations*: The prevalence of S.mansoni infection among school children was moderate with low infection intensity. There is a need to promote health education on S. mansoni and other intestinal parasite infections. Mass screening is necessary for all school children nearby rivers in Jimma town. The prevalence found to be moderate hence, Praziquantel is required for all school age children once every two years in this area.*

Keywords*: Schistosoma mansoni, Prevalence, Intensity of infection, Eggs per gram, School Children*

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LIST OF ACRONYMS AND ABBREVIATIONS

CSA:-Centeral Statistics Agency

DALYS:-Disability Adjusted Life Years

EPG:- Eggs Per Gram of Stool

MDA: - Mass Drug Administration

NTD:- Neglected Tropical Disease

SIM:- Society of International Missionaries

PS:- Primary school

SOP:- Standard operating procedure

SPSS:- Statistical Package for Social Science

STH:- Soil-transmitted Helminth

WHO:-World Health Organization

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Human Schistosomiasis is a disease caused by any of the six species of parasitic trematodes of the family Schistosomatidae, Genus *Schistosoma, Schistosoma haematobium, S. intercalatum, S. japonicum, S. mansoni, S. mekongi, and Schistosoma guineens* [1]. Intestinal Schistosomiasis is cased by S. *mansoni*, which occurs in the Middle East, South America, and Africa, and S. *japonicum*, which occurs in parts of China and the Philippines[2].

From epidemiological studies conducted in Ethiopia, *Schistosoma mansoni* and *Schistosoma haematobium* have major medical and public health problem. *S. mansoni* is widespread and its occurrence has been recorded in all regions of the country and is rapidly being distributed in connection with water resource development and intensive population movements the prevalence reaching as high as 90% among school children [3].

The eggs penetrate the vasculature walls and enter either the bladder or intestinal lumen to be shed in urine (urinary schistosomiasis) or stool (intestinal schistosomiasis). *S. mansoni* have a complex indirect life cycle of involving an intermediate snail host .The eggs hatch in freshwater sources and release free-swimming miracidia, which then infect a specific freshwater snail intermediate host-for example, with *S. mansoni*, this one generally *Biomphalaria pfeifferi* snails. Within the snail, the miracidia transform into sporocysts, and after two rounds of asexual reproduction, free-swimming cercariae are released after about 30 days. The cercariae continue the life cycle by penetrating the skin of the definitive mammalian host. Whereas *S. haematobium* and *S. mansoni*, in general, infect humans and animals, *S. japonicum* infects humans and more than 40 species of mammalian reservoir hosts [4].

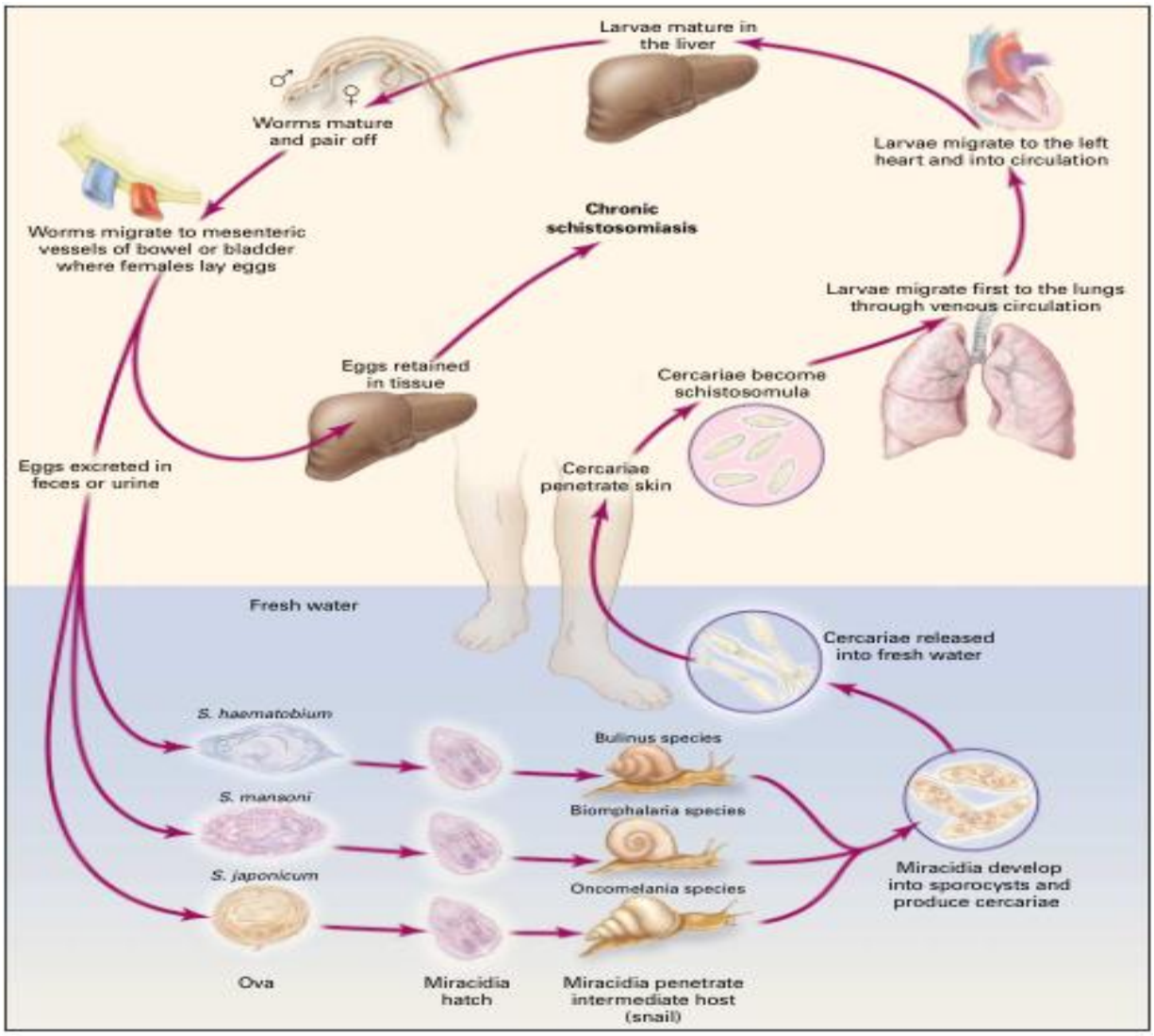


Figure 1: Life cycle of *Schistosomiasis* species (Source: 2)

Human infection initiated during water exposure (planting, fishing, washing, and swimming), that contains the free-living infective stage of the parasite, cercaria [5]. It penetrates the intact skin of the host and transformed to schistosomula, that is adapted to live in the higher osmotic environment of the body. The larvae migrates through the skin, blood and lungs; the worms grow and mature, descend to the liver, mate by paring in the mesenteric veins and start to oviposit after 6 to 8 weeks infection [6] .

Schistosomiasis is strongly associated with social, cultural, behavioral, economic factors and life styles that interact in a complex way with ecological and environmental factors at the local scale. The main factors are migration and urbanization, quality of sanitation and water supply, proximity to transmission sites, water contact behavior, and agricultural practice [7].

The pathology and clinical presentation of the disease occurs in three stages, which include dermatitis, acute and chronic schistosomiasis. Schistosome dermatitis (swimmers'itch) is a local inflammatory reaction, hardly visible at the site of cercarial penetration,composed of edema, dilated capillaries and a few cells, attributed to the local release of monokines.The duration and severity of this reaction depend on the length of schistosomular stay in the dermis [8] .

Acute Schistosomiasis may include the following: Generalized lymphadenopathy, hepatosplenomegaly, rash, and fever, right upper quadrant tenderness, urticaria, and bloody stool .Chronic schistosomiasis may include Portal hypertension with abdominal distention, hepatosplenomegaly, pedal edema, pallor, distended abdominal veins, ascites, and intestinal polyposis with heme-positive stool, pallor, and signs of malnutrition. CNS symptoms including focal neurologic findings, seizures, spinal cord lesions and renal failure with anemia, hypertension and Cor pulmonale with signs of right heart failure [9] .

Patients with schistosomiasis diagnosed with a wide range of methods. These are based on a combination of clinical symptoms, history of residence in an endemic or non-endemic area, parasitological examinations, serological findings, antigen test and ultrasonography. In

parasitological examination, Kato–Katz technique is widely used and recommended by WHO for surveillance and monitoring of schistosomiasis and STH control programme [10].

Antigen tests are measure parasite antigen as opposed to host antibody response; they reflect active infection. Urine circulating cathodic antigen (CCA) assays may be an appropriate test for the diagnosis of *S. mansoni* in moderate transmission zones [11]. Antibody testing is epidemiologically useful but lack to differentiate active and past illness. It also does not allow quantification of egg burden [12].

Ultrasonography (US) is a sensitive means of assessing hepatosplenic disease with periportal fibrosis or urinary obstruction. It can demonstrate periportal fibrosis, splenomegaly, portal collaterals, periportal adenopathy and obstructive nephropathy [13].

Praziquantel is currently used to treat all species while, metrifonate is active against *S. haematobium* only [14]. Artemisinins earlier synthesized for the treatment of malaria infection used in some endemic communities to treat schistosomiasis [15]. Corticosteroids used to treat Katayama fever to suppress the hypersensitivity reaction [16]. Oxamniquine acts only on *S. mansoni* and nowadays mainly used in Brazil [17].

Control and prevention of schistosomiasis on the recommendation of WHO, population-based treatment with praziquantel is now the main component of most national control programs. The fundamental aim is to reduce morbidity by keeping down intensity of infection. Various strategies applied, including indiscriminate mass treatment, active case finding, and treatment of particular risk groups such as school-aged children [18]. Health education towards promoting and reinforcing healthy behavior and development of focal snail control through application of molluscicides regarding plant-derived molluscicides that developed at the local levele and removing aquatic vegetations from rivers [19]

1.2. Statement of the Problem

Schistosomiasis is one of the most important parasitic diseases of human occurring mostly in the tropical and subtropical regions and it is the second most prevalent tropical parasitic disease next to malaria, and is a leading cause of morbidity in endemic areas of Africa, Asia and South America [20]. Globaly, 200 million people are infected worldwide, of whom 120 million are symptomatic and 20 million have severe disease. Six hundred million people are at risk of infection. In Ethiopia there are an estimated 37.3 million people living in schistosomiasis endemic areas, comprising 3.4 million pre-school children, 12.3 million school-aged children, and 21.6 million adults and STH endemic areas is estimated at 79 million, which comprised of 9.1 million pre-school-aged children, 25.3 million school-aged children and 44.6 million adults [21].

The burden of Schistosomiasis due to *S. mansoni* in other African countries is 28.8 million in Nigeria, 19 million Tanzania, 15.2 million Ghana, 14.9 million Congo, and 13.2 million Mozambique [22]. Globally, in the African Region according to WHO report, 10 countries account for 67.4% of the total number of people that require preventive chemotherapy. Schoolchildren constitute a high risk group and are the worst affected by Schistosomiasis [23].

Death rate from schistosomiasis infection is relatively low, Schistosomiasis remains underdiagnosed and undertreated, leading to its inclusion within the World Health Organisation's (WHO) Neglected Tropical Diseases list [24]. The disability burden caused by Schistosomiais is greater than that due to DALYs lost through HIV/AIDS and exceeds that of malaria or tuberculosis because of nonfunctioning kidneys (from *S. haematobium*) and hematemesis (from *S. mansoni*) [25]. The age-specific DALY weights for Schistosomiasis, assigned by the Global Burden of Disease Programme, ranged from 0·005 to 0·006, which is similar to those for disorders such as moderate discolouration of the face (facial vitiligo) [26].

In children, Schistosomiasis typically presents with generalized, non-specific signs and symptoms, making it difficult to identify disease-specific morbidity indicators and challenging to

develop tools for assessing those indicators. Over time, morbidity may progress from subtle manifestations such as anemia, to more severe, debilitating, and irreversible conditions such as growth stunting, impaired cognitive development, increased susceptibility to co-infection, decreased quality of life, exercise intolerance, infertility, portal hypertension, and liver failure [27].

In general, I argue that, *S.mansoni* is one of the causes of health problems next to malaria in African countries including Ethiopia. Especially, related to the health of children, as explained in the literature indicated above, *S.mansoni* causes anaemia, immature growth, organomegaly, and poor cognitive functions. It also reduces immunity of a child that may result in other co-infections affecting the future life of a child.

In Jimma town there are rivers running through the town proximate to selected schools of the present study site. Based on the evidences from the above literature, *S.mansoni* has adverse effects on the health of children. As a result, it seems appropriate to conduct research on the prevalence, intensity, and risk factors of *S.mansoni* in Jimma town. Hence, this study investigated *S.mansoni* infection prevalence, intensity, and risk factors in selected school children of Jimma town.

CHAPTER TWO

2. LITERATURE REVIEW

Schistosomiasis is distributed throughout the tropics and subtropics, which is next to malaria in terms of socioeconomic and public health importance [19]. The prevalence of the disease is higher in sub-Saharan countries including Ethiopia. Children whose age ranged 10-14 are the most affected groups [18].

According to the study conducted in Israel travelers returning from Tanzania, Schistosomiasis high attack rates (39%–100%) reported in travelers to sub-Saharan Africa who had been exposed to freshwater lakes. Most of these outbreak descriptions are characterized by prolonged exposure to fresh water, lasting days or more, such as in rafting trips or lengthy lakeside stays [28]

A school survey carried out in the Forest Zone of Pernambuco, Brazil indicated that the overall positivity for *S. mansoni* was 14.4% and the eggs count for this parasite in the feces gave a geometric mean of 67.9 EPG [29].

According to a cross-sectional community-based study conducted in five provinces in Yemen among 400 children aged ≤15 years, the prevalence of *S. mansoni* was (9.3%). Male children had higher prevalence of *S. mansoni* than females. With regards the intensity of infections, 8.1% *S. mansoni* infection was heavy intensity [30].

Many studies were also conducted on prevalence of intestinal schistosomiasis. Acording to survey carried out among primary school pupils between the ages of 6 – 17 years, from ten primary schools, in Birnin Gwari Local Government Area of Kaduna State. Out of the 300 stool samples examined, the overall prevalence of Schistsoma mansoni was 61 (20.3%) of the study population were positive. The intensity of the disease was light (1-18 eggs per gram of stool). The disease occurred in 40(13.3%) males and 21 (7.0%) females. The highest prevalence in males (4.0%) and females (2.3%) were both recorded in the 12 – 14 years age group. Other intestinal parasites encountered in the faecal samples were Hookworm (8.3%), *Hymenolepis nana* (2.3%), *Enterobius vermicularis* (1.3%) and *Ascaris lumbricoides* (0.7%). [20].

Another cross-sectionl survey conducted targeting primary school children in Sengerema District, North Western Tanzania, and Prevalence of *S. mansoni* in school children Of the 400 stool specimens examined, *S. mansoni* eggs were found in 64.3% (257/400). Out of 257 schoolchildren positive for *S. mansoni*, 35.4 % (91/257) of them had light infection intensity [31].

In the study conducted in rural North Ghana determined the prevalence of Schistosomiasis infection among in-school and not-in-school children resident in communities along the Tono irrigation canals in northern Ghana. The overall prevalence of infection (*S. haematobium* plus *S. mansoni*) was 47.7% (439/920). Many more males (51.7 %;) than females (41.2 %;) were infected. Forty-six (5.0%, 46/920) children were infected with both *S. haematobium* and *S. mansoni [32]*.

A national based cross-sectional study conducted in Sierra Leone in order to facilitate the scheduling of mass drug administration for both schistosomiasis and STH. The overall point prevalence of *S. mansoni* infection in 5–16 year-old school children within the country was 18.4% [33].

Another study conducted in two primary Schools in BO district southern Sierra Leon, the prevalence for *Schistosoma mansoni*, (33.8%); Lewabu (12.8%) higher than Korwama (10.6%). The prevalence of Hookworm was (21.3%) and Ascaris (17.7%). The prevalence was for Hookworm (11.3%) and Ascaris (9.2%) in Korwama, and (9.9%) and (8.5%) for Lewabu respectively. The intensity of helminthes in primary school children,ACBC, Korwama Primary School were *Schistosoma mansoni* (559.2), *Schistosoma haematobium* (24.9), Ascaris (644.3) and Hookworm (396); while in children in SLMB Primary School, Lewabu, were *Schistosoma mansoni* (393), *Schistosoma haematobium* (42.3), Ascaris (284.1) and *Hookworm* (192.5) EPG respectively[7].

According to the study conducted in school-aged children in two different endemic areas of the Niger River Basin, Mali, Stool examination for the presence of *S. mansoni* and intestinal helminth infections was performed in 279 children in Koulikoro and 296 in Selingué. Of these,

only 3 (1.1%) children were found infected with *S. mansoni* in Koulikoro whereas in Selingué 37 (12.5%) children were infected [34].

A cross-sectional descriptive study was conducted among School Children of Raya Alamata District, Northern Ethiopia, to determine the prevalence, intensity of infection and transmission potential of intestinal Schistosomiasis. Out of the examined children, 101(20.2%) were infected by *S. mansoni*. High prevalence of infection observed among children of 10-14 years old. Intensity of *S. mansoni* infection was low, only 3.96% had heavy infection intensity. Children of 10-14 years age have high infection intensity than the rest age groups [35].

A research conducted in Tigray, Northern Ethiopia, revealed that overall prevalence rate for intestinal parasites was 26.53%; whereas for *S. mansoni* infection was only 5.95%. The prevalence and intensity of *S.mansoni* infection showed the highest rate in the longstanding areas (13.73%), followed by the recently started irrigated areas from recently constructed dams (6.18%) and the least in areas where the schoolchildren wait in un-irrigated area (0.61%) [36].

Another cross-sectional study conducted on status of soil transmitted helminths and Schistosoma mansoni infection among schoolchildren in two primary schools in North Gondar, Northwest Ethiopia: The prevalence of *S. mansoni* was ascertained to be 33.7% [37].

A cross sectional parasitological survey conducted for intestinal Schistosomiasis in two primary schools in Hayk area, Northeastern Ethiopia. The prevalence and intensity of intestinal schistosomiasis among schoolchildren in Hayk Number 1 Primary School was 13% and 78 epg, respectively, while the respective prevalence and intensity among schoolchildren in Hayk Number 2 Primary School was 61% and 179 epg. The overall prevalence and intensity of infection was 45% and 161 epg, respectively. The prevalence and intensity of infection was higher in males than in females for the two schools [38].

School based study done in Amibera elementary school students, of 828 stool and urine samples confirmed that 68 (8.2%) students were found to be infected by Schistosomiasis. From the total positives, 61 (7.4%) and 7 (0.8%) of the students were infected by *S. haematobium* and *S.*

mansoni respectively. The prevalence of *S. mansoni* indicated that 5(0.6%) and 2 (0.2 %) for males and females respectively [39].

Acording to parasitological survey conducted among school children in Kime and Langano Society of International Missionaries (SIM) primary schools in southeast of Lake Langano indicated that, the prevalence of *S. mansoni* foud in Kime School (30.6%) and in Langano SIM School (3.4%). The prevalence of STH in Kime school, *Hookworm* (67.7%), *A.lumbericoides* (8.2%), *T.trichiura*,(18.2%), Taenia sp. (17.6%), *E. vermicularis (2.9%)* and in Langano SIM School (51.7%),(2.2%),(6.7%),(6.7%) and (2.2%) were positive respectively [40].

The study conducted from different geographically located parts of Ethiopia showed that, in Wondo Genet, 65.5% of the males and 55% of the females found positive for *S. mansoni*. The minimum and maximum egg per gram of feces count was 24 and 8472, respectively, with a geometric mean of 252. (In Kemissie, 91% of males and 83.3% of females found positive for *S. mansoni*. The minimum and maximum eggs per gram of feces were 24 and 5208, respectively. In Sille-Elgo the proportion of *S. mansoni* positive males and females was 32.8% and 30.2%, respectively. The minimum and maximum egg per gram of feces was 24 and 3960, respectively, with a geometric mean of 91 EPG. The highest proportion of *S. mansoni* heavy intensity of infection with respect to age was observed among the 5-14 years age groups of Wondo Genet followed by Kemissie and Sille- Elgo, the prevalence of STH was determined *Ascaris lumbricoides* and *Trichuris trichiura (* 40 %,) ,(27%) were observed in wondo Genet,(14%), (3.7%) in Kemise and (5.8%),(9.5%) in Sille-Elgo [41].

Another parasitological study has been conduct in Finchaa Sugar Estate (Wollega), western Ethiopia, found that prevalence of *S.mansoni* infection was 37.5% and its prevalence and intensity higher among the study population within the age group of 11-20 [42].

A School-based cross-sectional study conducted among schoolchildren of three primary schools in Jimma zone, in Manna District reveled that the overall prevalence of *S. mansoni* among students was 24 % (120/500. The prevalence was 25.6 % (61/238) and 22.5 % (59/262) for the

male and female students, respectively. The prevalence ranged from 7.6 to 41.4 % among the schools with the highest prevalence 41.4 % in Kore Konjo Schoo .Majority of the infection intensity was classified as low with maximum EPG of 1848 [43].

Health facility based cross-sectional study conducted at Assendabo Health Center, which is located nearby Gilgel Gibe hydroelectric dam in Jimma zone. The overall prevalence rate of *S. mansoni* infection was 10.61 %(21/198). Among the infected individuals > 50 % was under the age of 15 years old [46].

According to the study conducted among individuals living nearby three rivers of Jimma town, the overall prevalence rate for one or multiple intestinal parasites was 68.7%. The most frequent parasites encountered in the study were *T. trichuria*, *A. lumbricoides* followed by *S. mansoni and Hook worm.* The prevalence of *S. mansoni* was found to be 26.3 % with mean of intensity infection (108 EPG) [6]. School based cross-sectional study conducted in Jimma town; the prevalence of *S.mansoni* indicated that 8.4%, the prevalence of *S.mansoni* between males and females 13.4% and 3.4% respectively, with low infection intensity [48].

In conclusion, it can be inferred from the above literature that the spread of *S.mansoni* is related to availability of water resources. Proximity to water resource sites and exposure to water resources for different activities, such as agricultural practices, swimming, fetching water, bathing etc increases the risk being infected by *S.mansoni*.

Many of the researches conducted on schoolchildren and the results indicated significant prevalence and intensity of *S.mansoni* infection among school age children. It is also observed that, there is a difference in prevalence and intensity of *S.mansoni* infection among males and females and this depends on the activities of the individuals related to water contact. Moreover, the age distribution of the prevalence and intensity of the infection is attributed to the high levels contact with contaminated water cercariae in school aged children and adolescents followed by less contact with water and the development of a protective acquired immunity against infection in older adolescents and in adulthood.

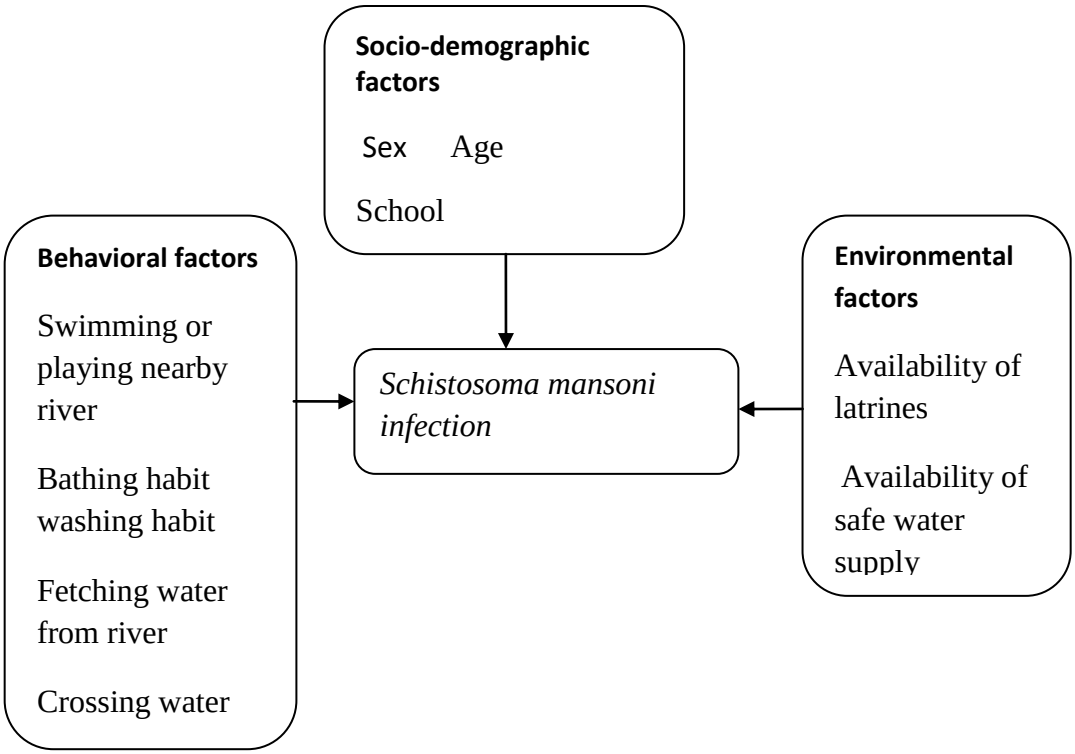
2.1. Significance of the Study

In this study, as schoolchildren were the target subjects to be carefully looked at for evaluating the prevalence and risk factors of schistosomiasis, because schistosomiasis has detrimental effects on their growth and development, and the early diagnosis and treatment reduces the risk of severe disease and childhood disability.

Hence, in our study area, studies of the prevalence and infection intensities of *S. mansoni* among primary school children may help in contribution for prevention and control of *S.mansoni* by pointing potential risk factors.

The research report can be used as background information for other researchers interested in this area of study.

2.2. Conceptual Framework



CHAPTER THREE

3. OBJECTIVES

3.1. General Objective

To determine prevalence and intensity of *Schistosomia mansoni* infections among school children in selected primary schools nearby rivers in Jimma town, Southwest Ethiopia.

3.2. Specific Objectives

1. To determine the prevalence and intensity of *Schistosoma mansoni* infection among school children nearby rivers in five selected primary schools.
2. To identify the associated risk factors for the prevalence and intensity of *Schistosoma mansoni* infection in five selected primary schools
3. To determine the prevalence of Soil-transmitted infection among school children in five selected primary schools.
4. To determine the intensity of *A.lumbricoides, T.trichuria &* H.worm infection among school children in five selected primary schools.
5. To identify clinical findings /sign and symptoms of *S.mansoni* infection among school children in five selected primary schools.

CHAPTER FOUR

4. METHODS AND MATERIALS

4.1. Study Area

The study was conducted in Jimma Town, the capital city of Jimma Zone, located at alatitude 1780 meters above sea level and longitude of 7° 40’N, 36° 50’E, 352 Km, to the Southwest of Addis Ababa. It is characterized by a warm climate with an average annual rainfall of 800–2,500 mm. Temperature in Jimma is within a comfortable range, with the daily mean temperature between 20°C and 25°C year-round and it has a tropical rainforest climate. It features a long annual wet season from March to October. Based on the 2007 Centeral Stastics Agency census report, the projected total population of the town was 134,040. Based on Jimma town health office recorded, there are two governmental hospitals, four health centers, and seventeen urban health extensions are found in the town. The rivers nearby selected primary schools were .Awetu River crossing the town and near to Jimma primary school, Seto and Kaba river near to Seto yido school, Kito river is near to Hamile 19 and Kito primary schools. According to information obtained from Jimma town educational office, there are 40 primary schools in the town, 22 governmental and 18 non-governmental primary schools.

4.2. Study Periods

The study was conducted from March to April 2017 in selected primary schools near by rivers in Jimma town.

4.3. Study Design

Institutional based cross-sectional study was employed

4.4. Population

4. 4. 1. Source of Population

All school children attending primary schools in Jimma town, in the academic year of 2017.

4. 4. 2. Study Participants

The study participants were all primary school children attending classes in selected primary schools near by to rivers in Jimma town during the study period, namely students in Hamle19, Tesfa Tewahido, Kitto, Yiddo Seto, and Jimma primary school.

4.5. Sample Size and Sampling Technique

4. 5.1. Sample Size

The sample size was calculated using single population proportion formula given by

$$n = \frac{\left(z\frac{\alpha}{2}\right)^2 p(1-p)}{d^2},$$

Where, n is the sample size, Z is statistics for level of confidence, P is expected prevalence or proportion, and d is measures the Precision of the estimate.

To determine the sample size we have used P value of 26.3% from the research done on communities living in Jimma town near by three rivers in the town [6].

Therefore the total sample size was determined as follows by using the above mentioned formula

p=0.263

Q=1-p=0.737

Z=1.96 at 95% confidence interval,

d=0.05.

d= margin of error (5%)

Therefore, the value of n was calculated as follows

$$n = \frac{1.96^2\ (0.263)(0.737)}{0.05^2} = 298,$$

n=298

Considering of the 10% non-response rate, the total of the sample size was 328.

4. 5 .2. Sampling Technique

Five primary schools in Jimma Town were purposively selected based on proximity to the rivers and allocation of students is made for each of the sample of the corresponding schools indicated in the fig.1 below. Proportionate number of sample was allocated for school and class/grade. Following allocation of sample, the students in each class were ordered alphabetically using class roaster/attendance that contains complete student lists by the principal investigator before commencing data collection. Then students were selected by systematic random sampling. The primary first students were selected in random starting point and the next students were included in a fixed periodic interval. When the selected student was absent, the student after the indicated one was sampled for replacement. The result is indicated in the fig.1 below.

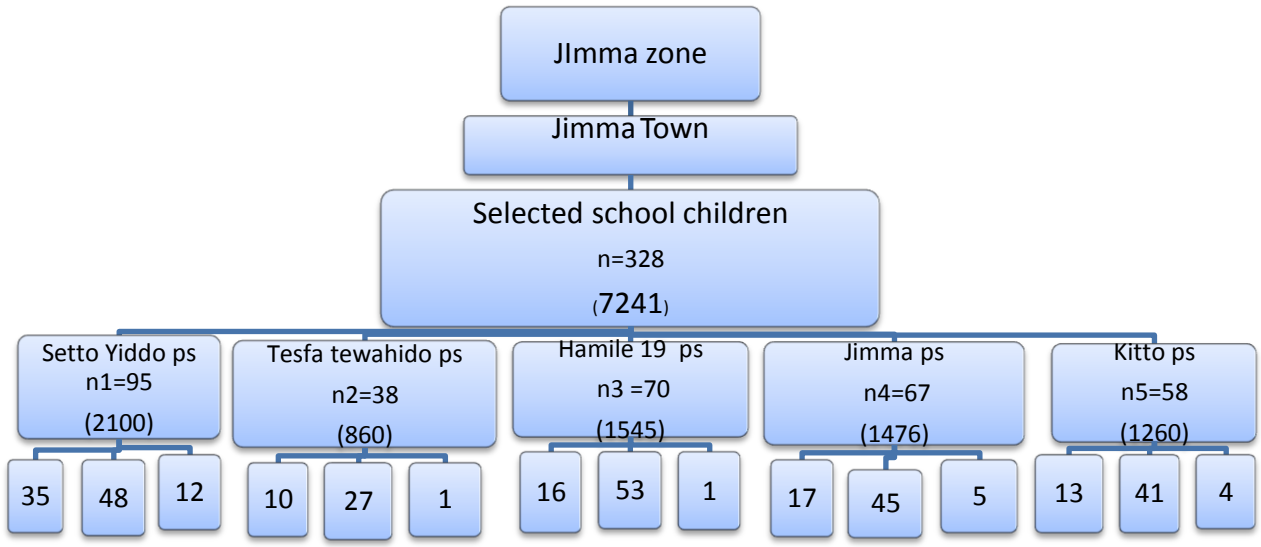


Figure 2: How study participants were selected from the five-slected primary schools in Jimma town.

4.6. Inclusion /exclusion Criteria

4. 6. 1. Inclusion criteria

The inclusion criterion was all selected students attending primary schools nearby rivers and from whom consent was obtained from their parents and guardians.

4.6.2. Exclusion Criteria

School age children with history of taking Praziquantel medication within three months prior to start of the study or collection of data was not included in the study. Children who have complain of watery diarrhea also excluded from study.

4.7. Study Variables

4. 7.1. Dependent Variables

- *S. mansoni* infection
- Nearby rivers

4. 7.2. Independent Variables

Age, Sex, school , Sign and symptoms, Physical examination, Source of drinking and cooking water, Availabilty of latrine, Swimming habit in river/ water sources, habit of crossing rivers on bare foot, Washing clothes in the river, habit of bathing in the river.

4.8. Methods of data Collection and Processing

4. 8.1. Socio Demographic Data

Socio demographic characterstics such as sex and age, school and associated risk factors for *S. mansoni* infection such as swimming habit, washing clothes in the river, any river/water contact during crossing on bare foot, source of water for cooking and drinking were collected by trained data collectors using -structured questionnaires (AnnexII) .

4.8.2. Clinical Examination

Experienced nurses checked the presence or absence of signs and symptoms of *S. mansoni* infection like, abdominal pain, fever, headache, palpable splenomegally, palpable hepatomegally, and fatigue.

4.8.3. Sample Collection and Parasitological Investigation

The schoolchildren were supplied with dry and clean-labeled plastic container cup and tissue paper in addition, advised to bring proper stool samples with the container. All the specimens were checked for their label, quantity, and time. After collection, wet mount microscopic examination was done at the site of collection to examine motile stage (trophozoite) of protozoan parasitic infection for the benefit of children.

Then the sample was transported to Jimma University School of Medical Laboratory Sciences, Medical Parasitology laboratory. The Kato-Katz technique, recommended by the WHO was applied for the quantification of *S. mansoni* eggs in stool. The stool samples were processed for microscopic examination. A double Kato -Katz slides were prepared from single stool collected from each child and the the preparation was examined after 24hrs for quantification of ova of *S. mansoni* and other STH except hookworm which should be examined between 30’minutes to 1hr.

4. 8.4. Data Analysis and Interpretation

Data were coded, after checking for the completeness and entered to the computer. Data were cleaned by using Epi-Data version 4.0.2.101 and analyzed using SPSS version 20.0 statistical software packages. Different variables were presented by frequency distribution, Prevalence in perecent (%) and intensity of *S. mansoni* infection was reported as low, moderate and heavy infection intensity as WHO guide line and mean egg count reported by geometric mean respectively.

The association between *S. mansoni* infection and associated risk factorts were statistically tested using binary logistic regression and the level of significance was set at p-value(P= value<0.05). The magnitude of association was measured using adjusted odds ratio (AOR), at 95% CI.

4.9. Data Quality Assurance

Training was given to the data collectors on the objective of the study and each item on the questionnaire. Pre-test was conducted to check the structure of our questionnaires on small number of students. The questionnaire was checked during data collection and at the end of the day for the completeness and consistency. For quality purpose proper Kato-Katz techniques was prepared using standard amount of reagents used for preparation and examined within a given time. Standard operating procedure was followed during specimen processing and diagnosis .Fresh working solution of malachite-green was used regularly to maintain the quality of the smear. Medical laboratory technologists and technicians who are experienced in kato-katz technique was processed and examined the samples and 10% of them were randomly selected every day and rechecked who was blind for the first examination result. Finally, the result of laboratory examination was recorded on well-prepared format carefully and it was attached with the questionnaire.

4.10. Ethical Considerations

Ethical clearance and letter of permission was obtained from Jimma University Institute of Health. An official letter was written to Jimma town health office, Jimma town educational office and primary schools. The objective of the study, procedure of the research and confidentiality letter was attached to each of the participats monitoring sheet. The participant was informed that they have full right to participate or withdraw at any time. The directors and teachers of the schools were informed about the purpose and procedures of the study. All the necessary permissions secured from the school children and their corresponding parents or guardians before starting data collection from the sample population

All information that was obtained during the study was kept confidential. At the end of the study children who were positive for *S.manni* were treated with praziquantel at a single dose of 40mg/body weight and soil transmitted helminths treated with Albendazole single dose (400mg) and protozoan were treated with Metronidazole 250mg/dose orally devided in three doses for 7 days .

4.11. Operational Term Definition

Primary school children: -Children attending schools from grade 1-8.

Schools nearby rivers:-The purposefully selected schools located from rivers at distance range of 150 meter up to 600 meter**.**

CHAPTER FIVE

5. RESULTS

5.1 Socio-demographic characteristics of the study participnts

This study conducted in March and April 2017. 328 schoolchildren were participated in the study from five purposively selected primary school children nearby rivers of Jimma town. The number of males and females Schoolchildren were 196 and 132 respectively. From the age, group of 7- 17 years with mean of age 11.63. The largest number of study participants were 214(65.24%) from the age group of 11-14 years old.

The overall prevalence of *S.mansoni* was 28.65 %(94/328) where as that of males and females were 39.28 %(77/196) and 12.87% (17/132), respectively [Table 1]. This result indicates that, there is a significant difference of *S.mansoni* prevalence between males and females. The prevalence of *S.mansoni* in school ranges from 12.0% to 38.9%. The highest prevalence of *S.mansoni* was in Seto yiddo 37(38.94%) and the least in Kitto (12.0%) [Table2].

Table1: Prevalence of *S.mansoni* infection by sex and age among school children in five selected primary schools in Jimma town, southwest Ethiopia, 2017

Variables		*S. mansoni*		Total
Sex	Age	Positive (%)	Negative (%)	
Male	7–10 years	17(30.9)	38(69.1)	55
	11–14 years	53(40.8)	77 (59.2)	130
	15–17 years	7(63.6)	4(36.4)	11
Female	7–10 years	4(11.1)	32(88.9)	36
	11–14 years	11(13.0)	73(87.0)	84
	15–17 years	2(17.0)	10(83.0)	12
Total		94(28.65%)	234(71.34%)	328

Table 2: Prevalence of *S.mansoni* infection among schools in five selected primary schools in Jimma town, southwest Ethiopia, 2017

Variables		*S.mansoni*		Total
Schools		Positive (%)	Negative (%)	
	Seto Yiddo	37(38.9)	58(61.0)	95
	Jimma primary school	16 (24.8)	51 (76.1)	67
	Hamile 19	26(37.1)	44 (62.9)	70
	Kitto	7(12.0)	51(87.9)	58
	Tesfa Tewahido	8(21.0)	30 (78.9)	38
Total		94(28.65%)	234(71.34)	328

5.2. Infection intensity of *Schistosoma mansoni*

The infection intensity is checked by counting the EPG of feces and the result showed out of 94, light infection was obseved in 53.2% (50) of the sample, with the range of 1-99 EPG, moderate infection in 35.1% (33) and heavy infection in 11.7% (11) of the sample with the range of 100-399 EPG and $\geq$400 EPG respectively (Figure 3). The geometric mean of egg count was 102.27 EPG.

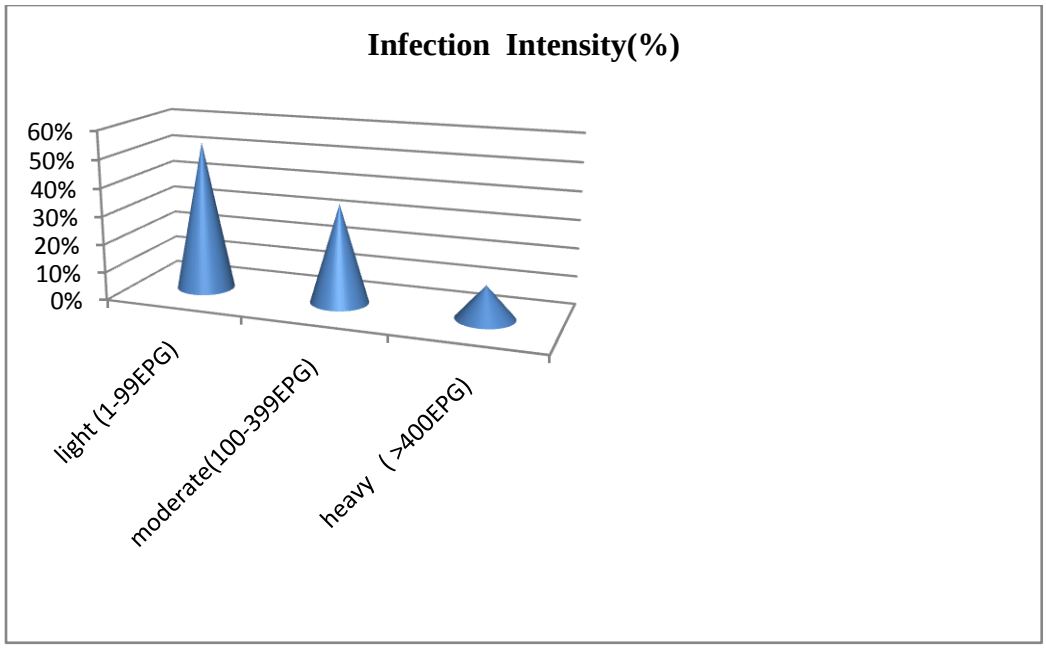


Figure 3: Infection Intensity of *S.mansoni* among selected primary School children in Jimma town, southwest Ethiopia, 2017.

The maximum number of egg count per gram of faeces (EPG) for *S. mansoni* was 1728, observed only in one student from Tesfa tewahido. The geometric mean intensity of *S.mansoni* infection among male students showed that, from range of 77.90-114.29 EPG, while among female students from range of 24.00-92.78 EPG. The highest geometric mean intensity of *S.mansoni* infection was recorded in males from the age group of 7-10 (114.29 EPG) followed by 11-14 age group (112.57 EPG) [Table 3]. The mean intensity infection was observed among schools and the high intensity observed in Tesfa Tewahido (182.40 EPG) followed by Seto Yiddo (112.27 EPG) [Table 4].

Table 3: Prevalence and intensity of *S.mansoni* infections by sex and age among school children in five selected primary schools in Jimma town, southwest Ethiopia, 2017

Variables		No.of examined	No. of infected (%)	Intensity (epg) by geometric mean
Sex	Age			
Male	7-10	55	17(30.9)	114.29
	11–14 years	130	53(40.8)	112.57
	15–17 years	11	7(63.6)	77.90
Female	7–10 years	36	4(11.1)	77.72
	11–14 years	84	11(13.0)	92.78
	15–17 years	12	2(17.0)	24.00
Total		328	94 (28.65%)	102.27

Table 4: Prevalence and intensity of *S.mansoni* infections among schools in five selected primary schools in Jimma town, southwest Ethiopia, 2017

Variables		No.of examined	No.of infected (%)	Intensity (epg) by geometric mean
Schools	Seto Yiddo	95	37(38.9)	112.27
	Jimma primary school	67	16 (23.9)	87.17
	Hamile 19	70	26(37.1)	86.42
	Kitto	58	7(12.1)	86.90
	Tesfa Tewahido	38	8(21.1)	182.40
Total		328	94(28.65%)	102.27

5.2.1. Clinical Findings

Experineced nurses conducted clinical examination for the 328 selected primary school children. During the study period, the frequency of clinical findings among schoolchildren who were investigated for *S.mansoni* indicated that, abdominal pain 162 (49.4%) and history of headache 74(22.6%) were the most frequent complained clinical symptoms (figure 4). Among this out of 200/328 (60.9%) had one or more clinical sign and symptoms of *S.mansoni* infection. The rest 128(39.02%) had not shown clinical manifestations. Out of 200 subjects those with clinical presentation 49/200 (24.5%) were positive for *S.mansoni* and 151/200 (75.5%) those with clinical complain were found to be negative for *S.mansoni* infection respectively, from those who had not Shawn clinical manifestation 45/128 (35.15%) were positive and 83/128 (64.85%) were negative respectively [figure 5, 6].

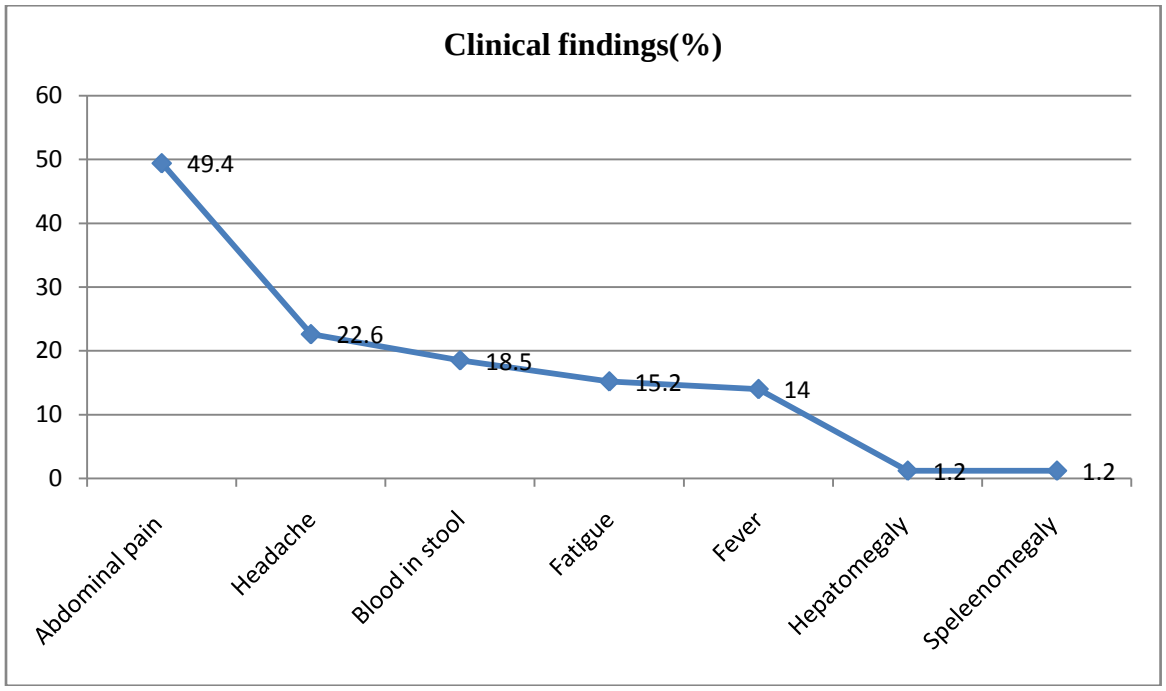


Figure 4: Frequency of clinical findings among selected primary school children who had sign and symptoms of *S.mansoni* infection, Jimma town, Southwest Ethiopia, 2017.

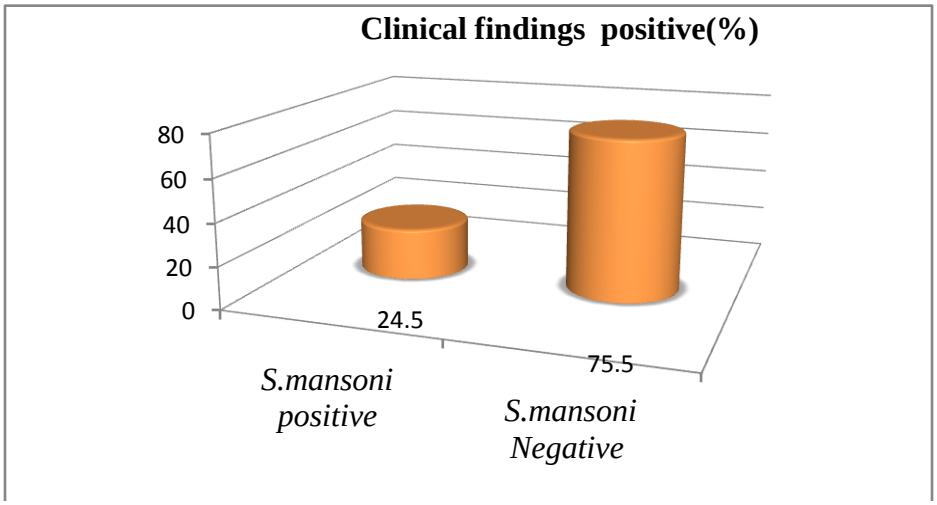


Figure5: Prevalence of *S.mansoni* infection among selected school children who Showed that sign and symptoms, Jimma town, southwest Ethiopia, 2017.

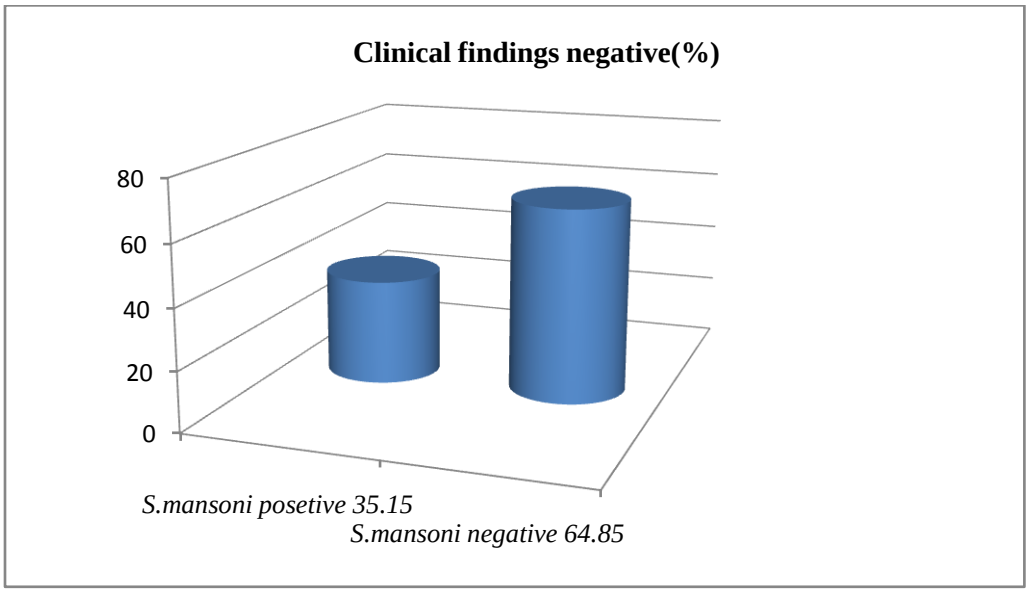


Figure 6: Prevalence of *S.mansoni* infection among students who had not showed sign and symptoms, Jimma town, southwest Ethiopia, 2017

The overall prevalence of STH among selected primary school children who screened for *S.mansoni* was 75(22.9%) with the highest prevalence of *T.trichiura 66 (*20.12%), *A.lumbricoides* 16(4.9%), Hookworm 1(0.30%) among STH and others *H.nana* 10 (3.04%), *Taenia species* 1(0.30%), *Giardia lamblia* 15(4.57%) and *E.histolytica/dipar* 10 (3.04%) [Table 5].

Table5: Prevalence of STH and other intestinal parasites among school children in selected from five primary schools.

STH and other intestinal parasites		Prevalence of STH		Total
		Positive (%)	Negative (%)	
S.mansoni	Male	77(39.28%)	119(60.71%)	196
	Female	17(12.87%)	115(87.1%)	132
Ascaris lumbricoide	Male	10(5.1%)	186(94.9%)	196
	Female	6(4.5%)	126(94.5%)	132
Trichuris trichiura	Male	42(21.4%)	154(78.5%)	196
	Female	24(18.9%)	108(81.8%)	132
Hookworm	Male	0(0%)	196 (100.00)	196
	Female	1(0.30%)	131(99.2%)	132
Hymenolepis nana	Male	7(3.57%)	189(96.45%)	196
	Female	3(2.27%)	129(97.72%)	132
Teania species	Male	1(0.30%)	195(99.49%)	196
	Female	0(0%)	132(100%)	132
Giardia lamblia	Male	9(4.59%)	187(95.40%)	196
	Female	6(4.54%)	126(95.45%)	132
Entamoeba histolytica/dispar	Male	8(4.08%)	188(95.91%)	196
	Female	2(1.51%)	130(98.48%)	132

The mean egg per gram of stool (EPG) of *A. lumbricoides*, *T .trichiura* and *Hookworm* infection was observed 6213.00 EPG (Range: 96 to 50364), 133.48 EPG (Range: 24 to 1020) and 84 EPG respectively. Out of 16 (4.9%) school-aged children positive for *A. lumbricoides*, 3.65% had light infection intensity while 0.91% had moderate infection intensity and 0.30% had heavy infectin. Out of 66 (20.12%) school children positive for *T. trichiura* 19.8% had light infection intensity, while 0.30% had moderate infection intensity. The intensity of hookworm infection was 0.30% light [Table 6].

Table 6: The infection intensity of STH in the five selected primary school children

Infection Intensity	*Trichuris*	*Ascaris*	Hookworm
	n (%)	n *(%)*	n (%)
Light	65 (19.8%)	12 (3.65%)	1 (0.30%)
Moderate	1 (0.30%)	3 (0.91%)	0 (0%)
Heavy	0 (0%)	1 (0.30%)	0 (0%)
Posetive	66 (20.12%)	16 (4.9%)	1 (0.30%)
Negative	262 (79.88%)	312 (95.1%)	327 (99.7%)
Total	328 (100%)	328 (100%)	328 (100%)

5.2.2. Multiple parasite infections

The prevalence of multiple parasite infections of *A. lumbricoides* and *T. trichiura was 7(2.13%*), *A.lumbricoides* and *S.mansoni 7(2.13%), T. trichiura* and *S.mansoni* was 25(7.6. %), *A. lumbricoides, T. trichiura* and *S. mansoni* was 4(1.2%) [Fig 5].

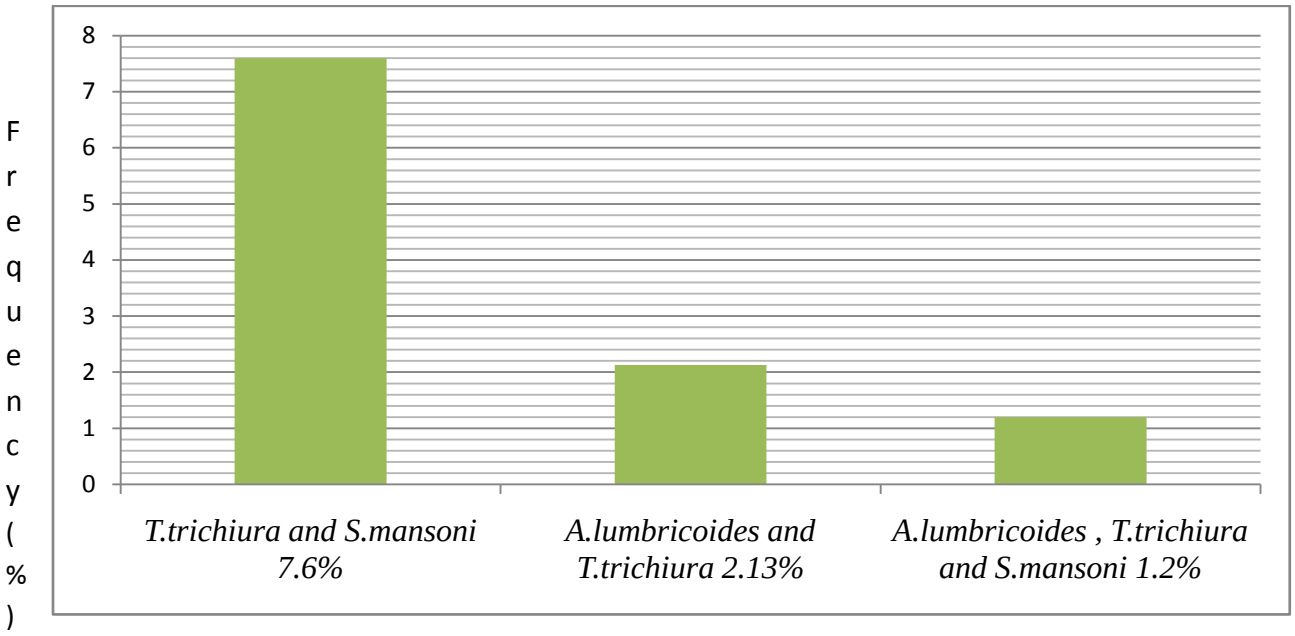


Fig 7: Multiple and triple parasitic infection among school children inJimma town, south west Ethiopia, 2017

5.2.3. Risk Factors Associated for *S.mansoni* Infection

Bivariate analysis was carriedout to examine factors associated with *S.mansoni* and p-value less than 0.025 was considered as cut off point for considering variables for entry in to multiple logistic regressions (Table 7). Based on the result , Sex, distance of school from river, river water contact while crossing, swimming or playing nearby river has a significant association with *S.mansoni* infection ($p<0.05$) and variables with p-value< 0.025 decided to multivariate logistic regression to see independent outcome of variables.

Table 7*:* Association between *S.mansoni* infection and risk factors in the five selected primary school children nearby rivers using bivariate logistic regression in Jimma town, Southwest Ethiopia, 2017

Risk factors		No. of infected	No. of not infected	Bivariate			
					95% C.I.for COR		
				Total	Odds ratio	95% C.I	p-value
Age in year	7-10	21	70	91	1:00		
	11-14	64	150	214	1.422	0.805-2.512	0.225
	15-17	9	14	23	2.143	0.813-5.647	0.123
Sex	Male	77	119	196	4.377	2.440-7.852	0.000
	Female	17	115	132	1:00		
Distance of School from river	School 1	37	58	95	4.648	1.906-11.331	.001
	2	8	30	38	1.943	0.640-5.896	0.241
	3	26	44	70	4.305	1.704-10.878	0.002
	4	16	51	67	2.286	0.867-6.025	.095
	5	7	51	58		1.00	
Source of water for drinking	Pipe	85	197	282		1.00	
	River and pipe	1	4	5	0.579	0.64-5.26	0.628
	Well and pipe	0	3	3	0.000	0.000	0.999
	Spring and pipe water	8	30	38	0.618	0.027-1.404	0.250
Source of water for cooking	Pipe	82	188	270		1.00	
	River and pipe	2	8	10	0.573	0.119-2.758	0.487
	Well and pipe	0	5	5	0.000	0.000	0.999
	Spring water and pipe	10	33	43	0.695	0.327-1.476	0.695
Defecate nearby river	Yes	32	58	90	1.566	0.931-2.634	0.91
	No	62	176	238		1.00	
Swimming habit	Yes	80	124	204	5.069	2.718-9.453	0.000
	No	14	110	124		1.00	

Swim in river	Awetu	29	53	82	0.547	0.146-2.048	0.370
	Seto	10	6	16	0.666	0.162-2.216	0.444
	Kitto	36	60	96	1.667	0.336-8.258	0.532
	Others	5	5	10		1.00	
Swimming frequency	Daily	7	26	33	0.365	0.762-5.664	0.26
	Weekly	73	98	171		1.00	
River contact while crossing	Yes	66	85	151	4.132	2.466-6.923	0.000
	No	28	149	177		1.00	
Washing cloths in the river	Yes	40	83	123	1.348	0.827-2.197	0.232
	No	54	151	205		1.00	
Habit of bath in the river	Yes	27	55	82	1.312	0.765-2.249	0.324
	No	67	179	246		1.00	
Total		94	234	328			

In multivariate logistic regression, variables with *p-value*≤ 0.25 analyzed to determine the independent predictors for *S.mansoni* infection. Sex, distance of school from river, river water contact while crossing, swimming habit nearby rivers are independent predictors for *S.mansoni* infection among the schoolchildren (p= value <0.05).

Male schoolchildren were 3.312 times higher odds of infected by *S.mansoni* than female schoolchildren (AOR=3.312, p=0.000, 95% CI: 1.691-6.486). Those schoolchildren in school 1and 3 were 5.111and 7.254 times higher being infected than those in school 2 and 4. In addition, school children those have swimming habit in the river were 4.679 times higher odds of being infected than those had not swimming habit (AOR=4.679, p=0.001, 95%CI: 2.372-9.231). Schoolchildren those who having any river water body contact while crossing were 3.166 times higher odds of being infected than those who had not river water body contact (AOR= 3.166, p=0.001, 95%CI: 1.729-5.800) [Table 8].

Table 8*:* Association between *S.mansoni* infection and risk factors in the five selected primary school children nearby rivers using multivariate logistic regression in Jimma town, southwest Ethiopia, 2017

Varibles		No.of infected	No.of not infected	Total	Multivariate	
					95%C.I for AOR	p-value
sex	Male	77	119	196	3.312(1.691-6.486)	0.001
	Female	17	115	132	1:00	
Distance of school from river	School 1	37	48	95	5.111(1.985-13.163)	0.001
	2	8	30	38	5.389(1.564-18.563)	0.008
	3	26	44	70	7.254(2.668-19.721)	0.001
	4	16	51	67	3.433(1.233-9.559)	0.018
	5	7	51	58	1.00	
Swimming habit	Yes	80	124	204	4.679(2.372-9.231)	0.001
	No	14	110	124	1.00	
River contact while crossing	Yes	66	85	151	3.166(1.729-5.800)	0.001
	No	28	149	177	1.00	

CHAPTER SIX

6. DISCUSSION

In the present study, the prevalence of S.*mansoni* among five selected primary school children in Jimma town was 28.65% and it was 39.28% in males and 12.87 in females. Majorities of infection intensity were classified as low with maximum of 1728 EPG count.

The prevalence rate in the present study was comparable with other results reported from Jimma ,26.3%, [6], 25.3% in Jimma town and Kore village [47], 24% in Jimma zone, Manna District, [43], 33.7% in Gondor [37] and 30.6% in Awasa [40] .

The prevalence rate in the present study was higher than researchs reported from Jimma zone, nearby Gilgel Gibe dam, 10.61% [46], 20.2% in Raya, Alamata [35], 5.9% in Tigray [36], 0.8% in Amibera [39], 3.4% in Langano SIM School [40]. Similarily in different part of African lower than prevalence from this study, 18.9% in Sierra Leone [33] and 1.1%, 12.5% in two endemic area of Niger River basin [34]. The difference might be attributed to the study period and the method of laboratory diagnosis employed or research design and environmental factors.

On the other hand, the prevalence of *S.mansoni* infection in the present study lower than from reports Sengerema District, North Western Tanzania 64.3% [31]. Similarly, higher prevalence rates reported from Wello, Hayk, 45% [38], 65.5%, 55% in Wondo Genet [41] and 37.5% in Fincha'a Wollega [42]. This variation is possibly because of water source development, behavior of children towards water body contact, ecological differences, and duration of endemicity in that area.

Infection intensity of *S. mansoni* in this study showed that, low among the total *S.mansoni* positive schoolchildren. The infectiaon intensity result obtained from this study is comparable with reports from Hayke, Wollo [38], Wondo Genet [41], and Jimma town [6], in Jimma, Manna woreda [43]

The infection intensity of present study is different from research reported from Kamissie,Wollo [41] , Sierra Leon [7] and Yemen [30]. The difference can be attributed to diagnosis method used and low exposure to infested water.

In the present study the prevalence of *S.mansoni* infection with the age group from 15-17 and 11-14 years old was 39.13% and 29.29% respectively. As a result, the higher prevalence observed in the age groups of 15-17 years old, which agrees with the result reported from Gorgora [5] and Southwest Ethiopia [48]. The reason for the prevalence being higher in the age goup of 15-17 might be due to high exposure to water body contact while crossing, swimming, and washing clothes.

The overall results indicated that male students were highly infected than female students with prevalence of 39.28% and 12.8% respectively. This result shows there is a significance difference between gender ($p<0.05$). The prevalence result of this research related to gender difference is relatively similar to results reported from Jimma town [6], Hayk area [38] , Amibera [39] and North Ghana [32], these findings could be due to increased water-contact activities by male children than female. It could be also due to the fact females are mostly restricted to household responsibilities whereas males are affectionate of moving around freely therefore becoming more vulnerable to infection.

A total of 141 (42.98%) school children were found to be infected with at least one parasite species. For *S.mansoni 94 (28.65%)*, *T.trichiura 66* (20.12%), *A.lumbricoides* 16 (4.9%), *H.nana* 10 (3.04%), H.worm 1(0.30%), *Taenia spp* 1(0.30%), *Giardia lamblia* 15 (4.57%) and *E.histolytica/dispar 10* (3.04%). In this study the prevalence is low when compare to the study conducted in Wondo Genet [41]. Simmilar with the study conducted in Sill-Elgo, Kamise [41]. The prevalence of Soil transmited helminthes infection was low when compared to the previous study. According to national-level control programs, mass drug administration (MDA) conducting two times a year in this study area, due to this reason the prevalence of STH become to low.

In the present study infection intensity of light, moderate, and hevy was observerd for *A.lumbricoideds* 3.65%, 0.91%, and 0.39% respectively, where as light and maderaate for *T.trichiura* 19.8% and 0.30%, in H.worm only light infection intensity observed. This study similar with the study reported from in BO district, southern Sierra Leon [7].

Risk factors assessment between prevalence of *S. mansoni* and distance of School from river was analyzed and there is statistical significant association between *S.mansoni* infection and schools proximity to rivers. In the present study, infection decreases with the increase of the distance of school from rivers. This finding is in agreement with the study conducted in Nigeria [20] and in Yemen [30] and proximity to the transmission site one of the factors associated with *S.masoni* infection.

Further analysis which was made on habit of defecate nearby river during their swimming or playing time .out of 90 those had history of defecate nearby rivers 32 study subjects were infected with *S.mansoni* and these contribute to transmission of *S.mansoni* infection among community . People living in poor unhygienic conditions may not be aware of the disease and may not have received any health education on the Control of schistosomiasis; therefore, they may likely continue to contaminate the water bodies by indiscriminate defecation [20].

Another analysis was made on water contact habits of the study subjects confirmed that, swimming in the river and river water contact during crossing was statically significant associated with high risk of *S. mansoni* infection .This findings agree with the study conducted in Israel [28], Jimma town [6].

Washing clothes and habit of bathing in the river 1.348 and 1.312 times odds of being infected with *S.mansoni* respectively than who did not washing clothes and taking bath in the rivers .there was no significant association between *S.mansoni* infection and washing clothes and habit of bathing in the rivers.

CHAPTER SEVEN

7. CONCLUSSION AND RECOMMENDATIONS

7.1. Conclussion

The prevalence of *S. mansoni* in this study was 28.65% in which the school children were at moderate risk for morbidity of *S.mansoni* infections and low infection intensity among school children in Jimma town. The prevalence of *S.mansoni* infection between males and females was significantly different.

The prevalence of soil-transmitted helminthes was moderate with light infection intensity

Swimming in rivers, water body contact while crossing, and distance of school from river was independently predictor for *S. mansoni* infection among the school children in the five selected primary schools.

7.2. Recommendations

Based on the result of this study the following recommendations forwarded:

- Since the prevalence for *S.mansoni* for the school children is found out to be moderate, a strong and continues deworming program once every 2 years is required, which is of course in line with WHO's recomendation.The deworming need to be considered by all stakeholders and especially by Jimma Town Health Bureau. Moreover, based on the conclusion given above strengthning on going intervention on MDA for STH every six months seem to compulsory.
- There is a need to promote health education to develop the awareness on *S.mansoni* and other intestinal parasite infection and promote behavioral changes in children towards their body contact with open river water.
- Local bridge construction on Awetu River, nearby Jimma primary school and on Seto River nearby Seto Yiddo School, can also reduce body contact of school children with river water.
- Improving envirnmental sanitation and personal hygien via construction of latrines in schools

- Making this research report as a steping stone, other students or interested professionals in the area should study on control of intermediate host snails.

STRENGTH AND WEAKNESS OF THE STUDY

STRENGTH OF THE STUDY

- Focusing on school children nearby water bodies.
- Stool sample testing immediately at the study area.

WEAKNESS OF THE STUDY

- Single stool sample collected per study participant.
- Malacological study was not done.
- Unable to assess the physico-chemical nature of water bodies in the study area.

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ANNEX I: - PROCEDURE OF KATO- KATZ EGG COUNTING TECHNIQUE

KATO- KATZ EGG COUNTING TECHNIQUE

1. Place a small amount of faecal material on scrap paper and press the small on top.
2. Scrap with flat-sided spatula across the upper surface of the screen to collect the sieved faeces.
3. Place template with 41.7mg hole size on the center of a microscope slide and add faeces from the spatula so that the hole is completely filled. Pass the side of the spatula over the template to remove the excess faeces from the edge of the hole.
4. Remove the template carefully so that the cylinder of faeces is left over the slide.
5. Cover the faecal material with the pre-soaked cellophane strip.
6. Invert the microscope slide and firmly press the faecal sample against the cellophane strip on another microscope slide or smooth hard surface.
7. Carefully remove the slide by gently sliding it side ways to avoid separating the Cellophane strip or lifting it off.
8. For all except hookworm eggs, keep the slide for one or more hours at ambient temperature to clear the faecal material prior to examination under the microscope.
9. Examine the smear systematically and count the number of eggs of each species of the parasite. Multiply the number of eggs a factor depending on size of the template to report egg per gram of stool.

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ANNEX II-QUESTIONNAIRE

Annex ii .Questionnaires for the school children based study to asses factors related to schistosoma mansoni infection in Jimma town, Southwest Ethiopia (English Version).

Introduction

My name is Azalech Tefera from Jimma University; I am here to study about *Schtosoma mansoni.*

The main objective of this study is to determine the prevalence and intensity of *Schistosoma mansoni* in selected school children nearby rivers in Jimma Town, Southwest, Ethiopia. This questionnaire is proposed to evaluate the associated risk factors related to Schistosoma mansoni. If you agree, I would like to get stool sample in plastic cup from you, which would be used only to detect the presence of intestinal *Schistosoma mansoni* .You will not get any risk in participating in the study .When you will found to be positive for *Schistosoma mansoni*, You will receive Praziquantel free of charge. The information in your records is strictly confidential. Your participation in this study is completely voluntary and you can refuse to participate or free to withdraw yourself from the study at any time. The study findings will be used to design and implement control strategies in the study area in the future.

I thank you in participation in the study.

Are you volunteer to participate in the study? 1 Yes 2 No

Date_____

Code of interviewee_____

Name of the interviewer_____

Supervisor name _____

School name _____

An interviewer guided questionnaire for risk factor evaluation to *Schistosoma mansoni* infection among school age children in Jimma town primary schools.

Encircle the response of the respondents for the following multiple choice question

Questionnaire part one;- Socio-demographic characteristics of the school-children.

S/no.	Questions	Response	Remark
101	Age	1.7-10 2. 11-14 3. 15-17	
102	Sex	1.Male 2. Female	
103	School	1. Sexo Yiddo 2. Tesfatewahido 3. Hamile 19 4. Jimma primary school 5. Kitto	
104	Distance of school from river	1.Seto yiddo 150.32 meter 2.Tesfa tewahido 246.8 meter 3.Hamile 19 159.33meter 4.Jimma primary 181.58 meter 5.Kitto 500.32 meter	

Questionnaire part two;-This questionnaire is proposed to assess clinical history and physical examination of schoolchildren related to *Schistosoma mansoni***.**

S/no.	Questions	Response	Remark
201	Abdominal pain	1.Present 2.Absent	
202	Palpable Hepatomegally	1.Present 2.Absent	
203	Palpable Splenomegally	1.Present 2.Absent	
204	Diarrhoea	1.Present 2. Absent	
205	Head ache	1.present 2.Absent	
206	Fever	1.Present 2.Absent	
207	Fatigue	1.Present 2.Absent	
208	finger nails status	1.Trimed 2 .Untrimed	

Questionniare Part Three;-This questionnaire is intended to assess risk factors related to schistosoma mansoni.

	Questions	Response	Remark
301	Source of water for drinking	1.Pipe water 2.River and pipe 3.well and pipe 4.Spring water and pipe 5.Others	
302	Source of water for cooking	1.Pipe water 2.River and pipe 3.Well and pipe 4.Spring water and pipe 5. Others	
303	If you bring water for cooking from river, where do you fetch it?	1.Awetu 2.Kitto 3.Setto 4.Others	
304	Do you have habit of defecate nearby river?	1. Yes 2. No	
305	Do you have latrine?	1. Yes 2. No	
306	If you answered Q305 yes, do the whole families use it?	1. Yes 2. No	

307	Do you have swimming or playing in nearby river?	1. Yes 2. No	
308	If yes answered Q 307, where do you swim?	1.Awetu 2.Kitto 3.Setto Others_____	
309	How often you swim to the river?	1.Daily 2.Weekly	
310	Do you have contact to the river while you are crossing it?	1.Yes 2.No	
311	If you answered yes to Q310, which river?	1.Awetu 2.Kitto 3.Setto 4.Spring water 5.Others	
312	Do you wash cloths in the river?	1. Yes 2. No	
313	If you answered yes to Q312, where?	1.Awetu 2.Kitto 3.Setto 4.spring water 5.Others	
314	Do you have habit of bathing in the	1.yes	

	river?	2. No	
315	If the answer to question 314 is yes which river?	1.Aawetu 2.Kitto 3.setto 4.Spring water 5.Others	

I am from Jimma University, institute of health, Faculity of health science, School of medical laboratory science .I am here to study about *Schitosoma mansoni*.

The objective of the study is to assess the prevalence and intensity of *Schistosoma mansoni* infection in five selected primary schools of children nearby rivers.

The information generated from this study will provide the current status of intestinal *schistosoma mansoni* in five selected schools in Jmma town.

I am asking you to participate in the study for schistosoma mansoni investigation. The investigation will involve collection of faeces for parasitological examination and interview through pre-structured questionnaire for demographic and associated risk factors of infection.

If the investigation is confirmed for *Schistosom mansoni* infection, you will be treated with appropriate drug. Dissemination of the results will be forwarded, we assure you the confidentially of all collected information in the questionnaire and faecal examination. Additionally it is your right to withdraw from this study if you are not interested to participate in the study. Finally, if you have understood the explanation very well I am asking you kindly to participate in this study, and put your signature below.

It is with full understanding of the situation that I agreed to give the informed consent voluntarily to researcher. I agree that I am contributing to prevention and control of the disease my fellows and myself by participating in the research.

Signature (participant) _____ Date_____

Signature (Investigator) _____ Date _____

Thank you for your participation

YUNIIVERSITII JIMMA

INSTIITUUTII FAYYA

FAAKAALIITII SAAYINSII FAYYA

MUMME SAAYINSII LAABORATOORII MEDIKAALAA

ANNEX III:-QUESTIONNAIRE(Afaan Oromo Version)

Seena

Kayyoon guddan qorannichaa haalli tamsa'ina fi ciminaa dhukkuba Bilaaharziiyaa mar'imaanii ijoollee mannen baruumissa nanno lagatti dhi'ataanii jiran irrattii sakatta'uufi.

Akkasumas gaafannoon kun wantoota dhukkuba bilaaharziiyaa mar'imaanii namatti fidan irratii hubanno fi ilaalchaa uumatin qabu madaaluuf kan qopha'eedha.Kana keessatti hirmannan keessan baa'ee barbachisaadha. Yoo waali galttan, fakkisa boolii guddaa qoodaa laastikii kubbaayya qoopha'ee jiru kanatti isin irra argachuun barbada,kunis jiirachuu bilaharziiyaa mar'immanii keessaa sakkata'uf ta'a. Qoranno kana keessatti hirmachuun keessan balaa isinttii fiduu hinqabuu.Yoo dhuukubin kun isin keessatti argaame qorchaa isaa tola fudhatu. Odeefannon isin kennitan dhimma qorannoo kanaatiif qofa kan fayyadamnnu fi qaama birootti kan hin himamne wan ta'eef soda tokko illee hinqabatinaa. Ittidabalees qorannicha keessati hirmaachuu dhiisunii fi yeroo barbaaaddan addaan kutuun mirga keessani.Hirmaannaa keessaniif isin galateeffanna.

Qorannicha keessatti hirmaachuuf fedhii guutuu qabdduu?

1. Eyyee 2. Lakki

Guyya _____

Maqaa gaafatichaa _____

Maqa to'ataa _____

Maqaa mana Barumssa _____

Af-gaaffii1ffaa qoratadhan dursamuun haalota faalama Bilaaharziiyaa mar'imaaniif nama saaxilan qorachuuf barattotaa mannen barnoota sadarkaa 1ffa magaala Jimmaa keessatti adeemsifamu.

Gaaffilee filanoo armaan gadiitif deebii hirmatoota itti mari.

Af-gaaffii kutaa tokkoffa:- Halaa hawaasa-dinagddee baratoota.

	Gaaffilee	Deebii	Yaada
101	Umurii	1. 7-10 2. 11-14 3. 15-17	
102	Saala	1.Dhiira 2.Dhalaa	
103	Mana barumssa	1.Saxoo Yiddoo 2.Tasfatawahido 3.Haamilee 19 4.Jimma sadarkka 1ffa 5.Kittoo	
104	Fageenya mana baruumssa laga irra	1. Saxoo Yiddo m.150.32 2. Tasfatawado m.246.8 3. Hamilee 19 m.159.33 4. Jimma sadarkka 1ffa m.181.58 5. Kittoo m.500	

Af-gaaffii kutaa 2ffa:- Gaaffileen Kun haloota faalama Bilaaharziiyaa mari'maanii seena fi qama Ijoollee sakata'udhan walttii dhufeenyaa isaani qorachuu.

	Gaaffilee	Deebii	yaada
201	Garaa dhukubbi	1.Jira 2.Hinjiru	
202	Dhiitoo tiruu	1.Jira 2.Hinjiru	
203	Dhiitoo rajoo	1.Jira 2.Hinjiru	
204	Garaa-yaasaa	1.Jira 2.Hinjiru	
205	Mataa cabssa	1.Jira 2.Hinjiru	
206	Qaama gubaa	1.Jira 2.Hinjiru	
207	Humnna dhabuu	1.Jira 2.Hinjiru	

Af-gaaffi kutaa 3ffa: - gaffileen kun haloota falama Bilaaharziiyaa mar'imanii wajjin hidhata qaban qorachuuf qophaa'ani.

	Gaaffilee	Deebii	Yaada
301	Bishaan dhugaatii eessaa fayyadamtuu?	1.Boombaa 2.laga fi boombaa 3.Bishaan boolla fi boombaa 4.Bishaan burqaa fi boombaa 5.Kan biroo_____	
302	Bishaan nyata qophessuf e'essa arggattu?	1.Boombaa 2.Laga fi boombaa 3.Bishaan boolla fi boombaa 4.Bishaan burqaa fi boombaa 5.Kan biroo_____	
303	Bishaan nyata qopheessuuf yoo laga fiddan, e'essa warabddu?	1.Aweetuu 2.Kittoo 3.Saxoo	
304	Laga bukkeetti ni boolatu?	1.Eeyyee 2.Lakki	
305	Mana fincaani qabddu?	1. Eeyyee	

		2. Lakki	
306	Yoo deebiinkeessan gaffi 305”Eyyee”ta’e, matiin hunduumtu ni fayyadamu?	1. Eeyyee 2. Lakki	
307	Laga nannoo keessan jiru nidakituu?	1. Eeyyee 2. Lakki	
308	Deebiin keessan gaaffi 307“Eyyee”yoo ta’e, laga isa kam daktuu ?	1.Aweetuu 2.Kitto 3.Saxoo 4.Kanbiroo_____	
309	Laga yeeroo meeqa daaktuu?	1. Guyya hunda 2.Torbeeti tokko	
310	Yoommu laga qaxamurttan qamin keessan bishaan hintuqa?	1.Eyyee 2.Lakki	
311	Deebiin keessan gaaffi 310 “Eyye” yoo ta’e ,Laga isa kam ?	1.Aaweetu 2.Kitto 3.Saxoo 4.Kabiro_____	

312	Wayyaa lagatti micittuu?	3. Eyyee 4. Lakki	
313	Deebiin keessan gaaffi 312 “Eyyee” yoo ta’e lagaa isaa kam ?	1.Aweetuu 2.Kittoo 3.Saxoo 4.Kanbiroo_____	
314	Qaamaa keessan lagatti dhiqatu?	1.Eyyee 2. Lakki	
315	Deebiin keessan gaffi 314 eyyee yoo ta’e laga isa kam ?	1.Aweetuu 2.Kitto 3.Saxoo 4.Kanbiroo _____	

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የህክምና ላቦራቶሪ ሳይንስ ትምህርት ቤት

ANNEX III:- QUESTIONNAIRE(Amharic version)

መ□በ□

የዚህ ምርምር ዋና አላማ የብላሀርዚያ በሽታ በወንዝ አቅራቢያ በሚገኙ ትምህርት ቤቶች በህ□ናት ተማሪዎች መሀከል ስርጭቱንና የሚያደርሰዉ ጉዳት ምን ያህል እአንደሆነና አንድሁም አጋላጭ ምክንያቶችን ይዳስሳል ::በተጨማሪ ለዚህ ጥናት ያገለግል ዘንድ የሰገራ ናሙና ከልጆዎ የሚወሰድ ይሆናል ስለዚህ የአርሶዎ ልጅ በዚህ የጥናት ምርምር መሳተፉ በምርምር □ጤት ላይና በጅማ ከተማ ዉስጥ የብላሀርዚያ በሽታ ለመቀነስ የጎላ አስታዎዖ አለዉ:: በመጠየቁ ወቅት የሚሰጡት መልሶችና አስተያየቶች በሙሉ በምስ□ር □ዙ□በቁ ይሆናሉ:: ይሁን እንጂ የሚሰጡት መልሶች ሁሉ አዉነትነት ያላቸዉ ሲሆኑ ለምርምሩ በ□ም □ቃሚ ናቸዉ:: በዚህ የጥናት ምርምር ላለመከፈልና በመሀል በማንኛዉም ጊዜ ለማቆም መብትዎ የተጠበቀ ነዉ:: ስለዚህ አስከሁን የተባለዉን ግንዛቤ ዉስጥ አስገብተዉ መልከም ፍቃደኝነትዎን በፊርማዎ አንድገልጹልኝ በትህትና አጠይቃለሁ::

በጥናትና ምርምር በመሳተፈዎ በጣም አናመሰግናለን::

በ□ህ የጥናትና ምርመር ለመሳተ□ □ቃ□ኛ ኖዎት ? 1.አዎ 2. አይደለም

ቀን ----------

□ዙ□□ቂ□ ስም ---------- □ርማ ----------

□ዙቆ□□ሪ ስም ---------- □ርማ ----------

የትምህርት በቱ ስም ----------

□ዙ□□ቂ□ መለ□ ቁ□ር----------

□

የተጠየቀዉን መልስ ከተዘረዘሩት አማራጮች ያክብቡት

መ□□ቅ □□ል 1፡- ማህበራዊና ሥነ ሕዝባዊ መረጃዎች□□

	□□ቁ	መልስ	አስተያየት
101	ክ□ሜ	1. 7-10 2. 11-14 3. 15-17	
102	ያታ	1. ወንድ 2. ሴት	
103	ት/ቤት	1. ሰ□ □□ 2. ተስ□ ተ□ህ□ 3. ሐምሌ 19 4. □ማ አንደኛ □ረ□ 5. ኪቶ	
104	ት/ቤቱ ከወንዝ ያለዉ ርቀት	1.ሰ□ □□ 150.32ሜ 2.ተስ□ ተ□ህ□ 246.8ሜ 3. ሐምሌ 19 159.33ሜ 4. ጅማ አንደኛ □ረ□ 181.58ሜ 5. ኪቶ 500ሜ	

መ□□ቅ □□ል2፡- □ህ መ□□ቅ □ብላሀር□□ በሽታ በአካል ላይ የሚያመጣዉን ችግር □እና ምልክቶችን ይዳስሳል፡፡

201	**□ሆ□ ህመም**	**1.አለ** **2.□ለም**	
202	**የጉበት እብጠት**	**1. አለ** **2.□ለም**	
203	**□□□□ እብጠት**	**1. አለ** **2.□ለም**	
204	**ተቅማ□**	**1. አለ** **2.□ለም**	
205	**ራስ ምታት**	**1.አለ** **2.□ለም**	
206	**ትኩሳት**	**1.አለ** **2.□ለም**	
207	**□ካም**	**1.አለ** **2.□ለም**	
208	**የጥፍር ሁኔታ□□**	**1.□ተቆረ□** **2.□ልተቆረ□**	

መ□□ቅ □□ል 3፡-□ህ መ□□ቅ ለብላሀር□□ በሽታ አጋላጭ ምክንያቶችን ይዳስሳል፡፡

	□□ቁ	መልስ	አስተያየት
301	ለመጠጥ ዉሃ ከየት ያገኛሉ ?	1.ከቧንቧ 2. ከወንዝ እና ቧንቧ 3.ከ□□ዝ□እና ቧንቧ 4.ከምንጭእና ቧንቧ□□ 5.ሌላ----------	
302	ምግብ ለማዘጋጀት ዉሃ ከየት ያገኛሉ?	1.ከቧንቧ 2. ከወንዝ እና ቧንቧ 3.ከ□□ን□ እና ቧንቧ 4. ከምንጭ እና ቧንቧ 5..ሌላ----------	
303	ምግብ ለማዘጋጀት ዉሃ ከወንዝ ይቀዳሉ?ከቀዱ ከየትኛዉ ወንዝ?	1.አዋቱ 2.ኪቶ 3.ሰ□	
304	ወንዝ ዳር ይፀዳዳሉ?	1.አዎ 2.አይደለም	
305	ሽንት ቤት አለዎት?	1.አዎ 2.አይደለም	

306	**ለ□□ቁ ቁ□ር 305 መልሶዎ አዎ ከሆነ ፤ሁሉም ቤተሰብ ይጠቀማሉ?**	**1.አዎ 2.አይደለም**	
307	**ወንዝ ይዋኛሉ?**	**1.አዎ 2.አይደለም**	
308	**ለ□□ቁ ቁ□ር 307 መልሶዎ አዎ ከሆነ፤ የት ይዋኛሉ?**	**1.አዊቱ** **2.ክቶ** **3.ሰ□** **4.ሌላ--------**	
309	**ምን ያህል ጊዜ ዉሃ ይዋኛሉ?**	**1. ሁሌ □□** **2.በሳምንትአንድ ቀን**	
310	**ወንዝ ሲ□ቋር□· ከ□ሃ ጋር ንክኪ አለዎት?**	**1.አዎ** **2.አይደለም**	
311	**ለ□□ቁ ቁ□ር 311 መልሶዎ አዎ ከሆነ፤ የትኛዉ ወንዝ?**	**1.አዊቱ** **2.ኪቶ** **3. ሰ□** **4. ሌላ----------**	
312	**ልብሶዎን ወንዝ ያጥባሉ?**	**1.አዎ** **2.□□ለም**	

314	**ለ□□ቁ ቁ□ር 313 መልሶ አዎ ከሆነ፤ የትኛዉ ወንዝ?**	**1.አዊቱ** **2.ኪቶ** **3.ሰ□**	
315	**ገላዎን ወንዝ □ታ□ባሉ?**	**1.አዎ** **2. አይደለም**	

ANNEX IV: CONSENT FORM (To be translated in the participant language Afaan Oromo and /or Amaharic)

For the participation as volunteer in the research undertaking

Code number--------

Name of the study subject----------

Age---------- Sex----------Investigators' name---------- Site----

Explanation on procedures and condition of the agreement

We are from Jimma University, institute of health, faculity of health science, School of Medical laboratory science .We are here to study about *Schitosoma mansoni*.

The objective of the study is to assess the prevalence and intensity of *Schistosoma mansoni* infection in five selected primary schools of children nearby rivers.

The information generated from this study will provide the current status of intestinal *Schistosoma mansoni* in five primary selected schools.

We are asking you to participate in the study for *Schistosoma mansoni* investigation. The investigation will involve collection of faeces for parasitological examination and interview through pre-structured questionnaire for demographic and associated risk factors of infection.

If the investigation is confirmed for schistosom mansoni infection, you will be treated with appropriate drug. Dissemination of the results will be forwarded, we assure you the confidentially of all collected information in the questionnaire and faecal examination.

Additionally it is your right to withdraw from this study if you are not interested to participate in the study.

Finally, if you have understood the explanation very well we are asking you kindly to participate in this study, and put your signature below.

It is with full understanding of the situation that I agreed to give the informed consent voluntarily to researcher. I agree that I am contributing to prevention and control of the disease my fellows and myself by participating in the research.

Signature (participant) _____ Date_____

Signature (Investigator) _____ Date _____

Thank you for your participation

ANNEX IV : UNKA FEDHA (Afaan oromoo version)

Qoannoo kana keessatti fedhaan hirmaachuuf

Lakkoofsa Addaa/koodii _____

Maqaa hirmaata _____Umurii _____Saala _____

Maqaa namichaa qoratee _____ Teesso _____

Ibsa adeemsaa haala walii galtee irratti

Nuti kan dhufinne Yuunivarsitii Jimma ,Institutii Fayya , Fakaalitii Saayinsii Fayya, Muummee Saayinsii labooratorii Medikaalaa irrati, kan dhufinnefis rakoole Bilahaarziiyaa mar'immaanii qorachuuf. Kaayyoon qoannichaas ciminaa fi faffaca'insa bilaaharziiyaa mar'immanii qabata bishaan lagatiin daddarban ijoollee mananen baruumssa shan irrati adeemisisuu dha. Odeeffannoon qorannoo kana irra argaamu haala bilaaharziiyaa mar'immani yeeroo amma mannen baruumssa magala Jimma keessa nannoo lagatti dhi'atanii jiran gidduti maal akka fakkatuu ibsuuf fayyadaa. Kan nuti isin gaafanuu akka qoraannoo bilaaharziiyaa mar'immanii irrati hirmmaattanuf. Qorannichii boolii qoraannoo fuchuun akkasumas af-gaaffii taasiffame immoo haala ummataa fi haaloota dhukuba kanaf nama saaxilaan qorachuf gargaru of keessaa qaba.Yoo qorannoo kanan rammoo kana qabachuun keessan mirkana'e tola niyaalaamitu .Bu'aa qorannoo kana ni raabsiina ,garuu iciittin odeeffanno qorannoo boolii fi af-gaaffii irra funaanamu hundumtuu ni eegama.

Kaayyoo qorannoo kana ilaalchise gaaffii kamiyyuu yoo qabaattan gafaachuu fi ibsa argachuuf mirga guutuu qabdu.Yoo irratti hirmachuu fedhii hin qabanne qorannicha addaan kutuuf mirga qabdu.Dhumarrattii ibsa kenname sirritti hubattaniittu yoo ta'e, qoraanicha keessati akka hirmaattan kabajan isin gafanna . Kan ani fedha kootiin odeeffannoo qoratichaaf kenne haala jiru guutummattii sirritti hubachuudhaan qoraanichaa kana keessatti hirmaachuudhaaf waalii nan gala .

Mallattoo hirmaata _____ Mallattoo qorataa _____ Guyya_____

Hirmaannaa keessaniif isin galateeffanneera

ANNEX IV:-CONSENT FORM (Amharic version)

የስምምነት ቅፅ

መለ□ ቁ□ር----------
ት/ቤት ----------
□ተሳታ□□ ስም ---------- ክ□ሜ ----------ያታ----------
የህክምና ባለሙያዉ ስም ---------- ቦታ ---------
□አኔ ---------- የጅማ ከተማ ነዋሪ በከተማችን ዉስጥ በሆ□ ብላሀረ□□ በሽታ ጥናት ዉስጥ አንድሳተፍ ፍቃደኛ መሆኔን አለመሆኔን ተጠይቃለሁ ::የጥናቱ ዋና አላማዉ ይህ በሽታ በከተማችን ዉስጥ አንዲከሰት የሚያደርጉ አጋላጭ ምክንያቶችን ለማጥናት በርግጥም አነዚህን ምክንያቶች ለሆድ ብላሀር□□ በሽታ የሚያጋልጡ ሆኖ ከተገኙ አስፈላጊዉን ጥንቃቄ በመዉሰድ የሆድ ብላሀር□□ በሽታን ለመቀነስ የሚረዱ መሆኑን በቅድሚያ ተነግሮኛል::
ለዚህ ጥናት ያገለግል ዘንድ በፍቃደኝነት ላይ የተመሰረተ የሰገራ ምርመራ አንዳደርግ ተ□□ቃለሁ::በሰ□ራ □ስ□ □ሆ□ □□ኛ ትላትል የተገኘ አንደሆነ አስ□ላ□ዉን□ መድሀኒት በነፃ አንደሚሰጠኝ ተነግሮኛል::በዚህ መሰረት ምርመራዉን ለማድረግ የሰገራ ናሙና ለመስጠት ተስማምቻለሁ::በተጨማሪ ማንኛ□ ም □□ት በሚስጢር አንደሚያዝ ተነግሮኛል::
□ተሳታ□□ ስም ---------- □ርማ ---------- ቀን ----------
የአጥኚ□ ስም ---------- □ርማ ---------- ቀን ----------

በጥናቱ በመሳተፈዎ በጣም አናመሰግናለን ::

ANNEX V: LABORATORY RESULT REPORTING FORMAT

School name ---------- Grade -------- Student code no. ------- Sex --------Age-------

I.Macroscopic examinations

1. Consistency of the stool

- Hard_____
- Loose _____
- Watery_____
- Soft _____
- Formed_____

2. Appearance of stool

- Bloody_____
- Mucous _____
- Normal_____

3. Colour of stool

- Clay_____
- Yellow_____
- Black_____
- Green _____
- Red _____

II. Microscopic examinations

1. Kato thick method

a. No ova of *S. mansoni*

b. Ova of *S. mansion* & report the number of ova per gram of faeces

c. Ova of other intestinal parasites

ANNEX VI: INFORMATION SHEET

Name of the principal investigator: Azalech Tefera

Name of the organization :Jimma University

Introduction

This information sheet is prepared by group of researchers whose main aim is to assess the prevalence and intensity of *Schistosoma mansoni* infection in Jimma town ,Jimma zone, in five selected primary schools children. It will indicate a true value about the prevalence and intensity *schisosoma mansoni* infection and factors associated with such infection in the study area .The investigator include a second year medical parasitology graduate student and academic advisors from Jimma University, Institute of health, faculity of health science ,School of medical laboratory science.

Purpose

The purpose of this research is to determine the prevalence and intensity of schistosoma mansoni infection in Jimma town, in five selected primary schools children. Most of the studies showed that the prevalence and intensity of *S.mansoni* infection is related with proximity to water resource sites and exposure to water resources for different activities. Many of the researches were conducted on school children and the results indicated significant prevalence and intensity of *S.mansoni* infection among school age children. Therefore we have planned to conduct a study in Jimma town to assess the prevalence and intensity of *Schistosoma mansoni* infection as well as associated risk factors.The finding of this study may contribute on designing strategies to control *S.mansoni* infection.

Procedure

You are kindly invited to take part in this study which is aimed to determining the prevalence and intensity of *S. mansoni* infection .If you are willing to participate in this study ,you need to understand and sign the agreement form .you will be then asked to provide some information associated with the risk of *S. mansoni* infection. For laboratory

examinations, you will provide about 2g of stool, in which it will be collected following standard protocol. The laboratory results will be kept confidential using coding system whereby no one will have access to your laboratory result .If the result of the laboratory examination show positive, you will be treated for *Schistosoma mansoni* infection; you will be only communicated to the health professional attending you for further treatment.

Risk and discomfort

There will be no discomfort and pain when stool sample is collected.

Benefits

If you involve yourself in this study research, you will obtain anti-helminthic drugs for schistosoma and soil-transmitted helminths drugs free of charge. In addition your participation will help us in determining the prevalence and intensity of *Schistosoma mansoni* infection which is contribution to plan control strategies of such infection.

Incetives:

You will not be provided any intensives to take part in this research except getting treatment for individuals with schistosoma infection.

Confidentiality:

The information we collect from this research project will be kept confidential. Information about you that will be collected from the study will be stored in a file, which will not have your name on it, but a code number assigned on it. It will be kept under lock and it will no be exposed to anyone except the principal investigator and the health professional and the health professional following you.

Right to refuse or withdraw

You have full right to refuse from participating in this research if you do not desire to participate.

Whom to contact:

If you have any questions contact any of the following individuals and you may ask at any time:

1. Azalech Tefera (B.Sc) Jimma university, Institute of health , Faculity of health science, School of medical laboratory science.

   Phone no +251-0912-191-125

2. Mitiku Bajiaro (B.Sc,M.Sc) Jimma University, Institute of health , Faculity of health science, School of medical laboratory science.
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ANNEX VII: UNKAA ODEEFFANNOO (Afaan oromoo version)

Maqaa dura bu'aa qorannoo:- Azaleech Tafarra

Maqaa dhaabbataa Yuunivarsitii Jimmaa

Seensa:-

Waraqaa odeeffannoon kun garee qo'attoota kaayyoon isaasi faca'iinsaa fi cimina faalama dhukubaa Biilaharziya mar'imaanim magaala jimma keessatti qorataniidha.

Qorannoon kun faffaca'iinsaa fi cimina faalama Biilahaarziyaa magalaa Jimma bakka mannen barumssa nannoo biishani jiran irratti raga haqa argisiisa.

Qorannon kun barattuu mastersii paarasytooolojii wagga lammaffaa,gorsitoota akkadaamii yuuniversitii Jimmaa ,Inistuutii fayyaa, Fakaalitii saayinsii fayyaa, Muummee saayinsii labooratorii meedikaala.

Kaayyoo:-

Kaayyoon qorannoo kana kibba dhiha itiyoophiyaatti godina Jimmaa ,Magaala Jimma ijoolle mannen baruumssa nannoo lagatti dhihatanii jiran gidduutti faffaca'iinsaa fi cimina falama Bilaahaarziyaa hubachuu ta'a.

Qorannoon bayyeen akka agarsisaanitti faffaca'iinsa fi cimina dhukuba bilahaarziiyaa bishaan lagatti dhihataanii jiraachuu fi hojii adda- addatiif bishaan lagattif saaxilamuun walttii dhufeenya akka qaban agarsiisuu. Qorattoon heddun ijoolle mannen baruumssa gidgdutti nanno lagatti dhihoo jiran fi bishaan lagatif saxilaman qorannon gageeffame akka agarisutti faffaca'iinsi fi falaman bilaahaarziiyaa gudda akka ta'e agarsiisuu. Kanaafuu,hallota isaaniin wal-qabatan irratti qo'annoo gaggeessuuf karoorffannerra. Bu'an qoranno kanaas istraateejii haala fayyaa hawaasichaa fooyyeessu fi karoora basuuf fayyaduu danda'a.

Adeemsa:-

Qo'anno falama dhukuba bilaaharziiyaa ciminaa fi faffaca'iinsa isaanii magala Jimma mannen baruumssa keessatti hubachuudhaf godhamu kana irratti akka hirmaattanuuf kabajan afferamtaniittu.

Qo'anno kana keessatti yoo hirmaachuu feetan,unka wali galtee hubattani mallattessuu qabdu.Sana booda haalota dhukkuba bilaaharziiyaa wajiin wal-qabatan irratti odeeffannoo tokko tokko kennuuf ni gafatamtu.Qorannon laabooratooriitif ,boolii hamma graama 3(sadii) kan hala sirrii ta'een fudhamee lattuu.Bu'an laabooraatoorii iccitidaan qabuuf koodiin adda ni kennama,kanaaf namnin tokkollee bu'aa laaboraatoorii keessani beekuu hindanda'u.

Yoo bu'an laabooratoorii pozitiivi ta'e yaaliin isinif godhama ogeessa fayya isin yaalu qofaattis dhimichii himama.

Midhaafi haala namatti hintolle.

Yeeroo booliin fudhamutti midhaas ta'ee dhukkubbin hin jiru.

Bu'aa

Yoo qo'annoo kana keessattii hirmatan qoricha farra bilaaharziiyaa kafaltii malee argattu.Akkasumas bu'aa qoranno kana istraateejii to'annoo dhukuba Bilaaharziiyaa to'achuuf oolu karoorsuuf gargaaruu danda'a.

Faayidaa /kaffaltii/

Namoota faalamaniif yaalii kennuudhaan alaatti bu'aan kaffalti ittin argatan qo'anno kan keessatii hirmachuu keessanif argattan hinjiru.

Iccitii Eegdummaa

Odeeffaanoon nuti qoranno kana irra funannu hunduu iccitidhaan qabamu.Odeeffanno keessan kana irra funee koodii addatu kennamaaf malee maqaan keessan hinbarreffammu.Mana furtudhan cufame keessa waan ta'uuf qorata abba dhimma fi ogeessa fayyaa si hordofu irra kan hafe eenyullee arguu hindanda'u.

Mirga diduu yookin giddutti kutuu:-

Qo'anno kana keessatii hirmachuuf fedha hinqabdan tanan hirmaachuu diduuf mirga guutuu qabduu.

Namoota qunnamttan

Yoo gaffi qabaattan namoota armaan gadii keessa yeeroo feetan gafachuu dandeessu.

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