2020-05

Prevalence and Associated factors of Intestinal Parasitic Infection among þÿ P r i m a r y S c h o o l C h i l d r e n s i n Woreda: A Cross-Sectional Studyin Northwest Ethiopia

Ahmed, Hussein

BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES, SCHOOL OF PUBLIC HEALTH, DEPARTMENT OF ENVIRONMENTAL HEALTH

PREVALENCE AND ASSOCIATED FACTORS OF INTESTINAL PARASITIC INFECTION AMONG PRIMARY SCHOOL CHILDREN'S IN GUANGUA WOREDA: A CROSS-SECTIONAL STUDYIN NORTHWEST ETHIOPIA

BY: AHMED HUSSEIN (BSc.)

A THESIS SUBMITED TO THE DEPARTMENT OF ENVIRONMENTAL, HEALTH SCHOOL OF PUBLIC HEALTH, COLLEGE OF MEDICINE AND HEALTH SCIENCE, BAHIRDAR UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR MASTER OF PUBLIC HEALTH IN WATER, SANITATION AND HYGINE

ADVIOSORS:

MESAFINT MOLLA (MPH)
TSION SAMUEL (MPH)

MAY, 2020

BAHIR DAR, ETHIOPIA

MASTER RESEARCH PROPOSAL SUBMITION FORM

Name of principal investigators.	Ahmed Hussein
Name of primary advisor	MesafintMolla (MPH)
Name of co- advisor	Tsion Samuel(MPH)
Full title of research proposal	Prevalence of intestinal parasitic infection and associated factors among primary school children in Guanguaworeda, Northwest Ethiopia, 2020: School based cross-sectional study
Duration of research	February 2020 to March 2020
Study Area	Guanguaworeda
Total cost of the project	34,385ETB (Ethiopian birr)
Address of principal investigator	Email: ahmedhusseinm869@gmail.com Cell phone:+251918741271/+251993032294

PRINCIPAL INVESTIGATOR

I, undersigned, agreed to accept all responsibilities for the scientific and ethical conduct of the research project and for the provision of required progress reports as per the terms and conditions of the requirements of the department. I wasproviding timely progress report to my advisors and seek the necessary advice and approval from my advisors in the course of the research.

Name of the student: Ahmed Hussein Signature: ---------- Date: ----

Name of the primary advisor: MesafintMollaSignature: ---------- Date: ------

Name of the co advisor: Tsion Samuel Signature: ---------- Date: -----

ASSURANCE OF EXAMINERS

Name of the external examiner: ---------- Signature: ---------- Date: --

Name of the internal examiner: ---------- Signature: ---------- Date: ---

ACKNOWLEDGEMENT

Firstly my deepest gratitude goes to Guanguaworeda health and education office for their giving necessary information supports or helpful for my proposal development. Secondly my heartfelt thank goes to my advisorsMesafintMollaand Tsion Samuel for their unreserved advice, devoting their expensive time and meticulous comments for my proposal development. Thirdly, my deepest acknowledgement also goes to Bahirdar University School of public health department of environmental health. I would like to extend, my deepest gratitude and appreciation goes to my wife Zeyneya Mohammed for her continuous and irreplaceable morale support starting from the inception of the topic selection till now. Finally, I will like to extend my boundless admiration and thanks to my friends giving comments and morale support. I would like to extend our gratitude my intimate friends to Almaw to help and to guide Epi data and SPSS software utilizations.

ACRONYMS

AOR – Adjusted odd ratio

COR – Crude odd ratio

EDHS – Ethiopian demographic health survey

HHs - Households

IPIs – Intestinal parasitic infections

IRB – Institutional review board

NTD – Neglected tropical disease

PC – Preventive chemotherapy

SAC – School aged children

SDG – Sustainable developmental goal

STH – Soil transmitted helminthes

WASH – Water Sanitation Hygiene

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Abstract

Background: Intestinal parasitic infections caused by pathogenic helminthes and protozoan species are endemic throughout the world. Intestinal parasitic infection is one of the ten top major public health problems in developing countries including Ethiopia and primarily affecting school children. School-children being major victims, therefore In our study area there is no previous study about the prevalence of intestinal parasitic infections with emphasis on S.mansoni. Due to this i am interested to the study aimed to assess the prevalence of intestinal parasitic infections and associated risk factors among school children.

Objectives: The aim of this study is to assess the prevalence of intestinal parasitic infections and associated factors among primary school children in Guangua woreda, Northwest Ethiopia.

Methods: School-based cross-sectional study was conducted in Guanguaworeda primary school children from February 01 – March 01/2020. The study participants were selected using multi- stage sampling method. A total of 553 school children were enrolled in this study. Socio-demographic data of the study participants, Environmental and Habits of child behaviors the possible factors for the occurrence of intestinal parasitic infection were collected using a pre-tested structured questionnaire. Bivariate and multivariate analysis was computed. In Bivariate cases p-value, less than 0.25 and for multivariate 0.05 was used considered statistically significant.

Result: Of 551 students examined for IPIs, 309 (56.1%) were positive for one or more intestinal parasitic infections. Ascaris lumburicoides was the most predominant parasites 920%) followed by Entamoeba histolytic a (14%).Among the risk factors Habits of swimming , fingernail trimming and shoe wear habits were found to be the most important predictors associated high risk of IPIs ($p< 0.005$).

Conclusion: High prevalence of intestinal parasitic infections among primary school children demands improved health education on regular shoe wearing habits, fingernail cleanness and not swimming with barefoot.

1. INTRODUCTION

1.1 Background

Intestinal parasitoid refers to a group of disease caused by one or more species of Protozoa, Cestodes, trematodes and nematodes. Intestinal parasitic infections (IPIs) caused by pathogenic helminthes and protozoan species are endemic throughout the world Globally, about 3.5 billion and over 450 million people are affected and ill with parasitic infections, respectively.(1).

Intestinal parasites are transmitted directly by water soil, and/or food contaminated with fecal materials or indirectly by inappropriate personal and social hygiene conditions. The high prevalence of intestinal parasites in children is associated with many factors, especially personal and environmental hygiene. The rate of intestinal parasitic infection is a useful index, especially in underdeveloped and developing countries. Such infection may lead to malnutrition and inadequate physical growth which cause undesirable consequences in learning and cognitive ability especially in school children.(2).

Intestinal parasites have their own characteristics; have different morphological and biochemical mechanisms to infect humans and animals. They are usually classified as protozoa and helminthes. The most important intestinal protozoan pathogens are Entamoeba histolytic, Cryptosporidium species, Giardia lambilia, Cystoisospora (Isospora) belli, Cyclosporacayetanensis, and members of the phylum Microsporidia. The predominant intestinal helminthes are Ascarislumburicoides, Trichuristrichiura, Schistosomamansoni, hookworm, Hymenolepis nana, Enterobiusvermicular is and Strongyloidesstercoralis(3).

School-age children usually defined as children’s aged 5–14 years, who may or may not be enrolled in school, compared with any other age group, school-aged children having the highest STH prevalence and heavy-intensity(4).

IPIs constitute to be one of the top ten major public health problems in developing countries primarily affecting school children (1)

Ethiopia 81 million people live in endemic areas, of which 25.3 million are school-age children (SAC) .Parasitic infections are more prevalent in populations with low-household income, poor practices of personal hygiene and environmental sanitation, over-crowded living conditions and limited access to safe water supply.

IPI's affect the physical and mental wellbeing of school children thereby leading to increased absenteeism, retarded cognitive development and thus learning disabilities. In spite of the increased public health importance of parasitic infections, but it was focused mainly on chemotherapy as a means of control while the study of social, cultural and economic factors underlying infection risk has been relatively neglected(5).

1.2 Statement of the problem .

Intestinal parasitic infection (IPIs) caused by pathogenic helminthes and protozoan's species are endemic throughout the world. Globally, about 3.5 billion and over 450 million people are affected and ill with parasitic infections, respectively(1). Among the leading cause it is estimated that Ascarislumburicoides, hookworm and Trichuristrichiura infect 1.5 billion, 1.3 billion and 1.1 billion people worldwide, respectively, while schistosomiasis affects over 200 million people. (Entamoebahistolytic a and Giardia lambilia are also estimated to infect about 60 million and 200 million people worldwide, respectively (6).

There are a number of reports on protozoan and helminthes infections in different African countries it is clear that unsanitary conditions, unclean water utilization and low health education service recommending African

IPIs constitute to be one of the top ten major public health problems in developing countries primarily affecting school children(1)
In Ethiopia 81 million people live in endemic areas, of which 25.3 million are school-age, children (SAC))(8).According to the Ethiopian Demography and Health Survey report of the year 2016, 97 and 57% of urban and rural households have access to an improved source of drinking water respectively. Only 60% of households had hand washing facility at home. One in three households has no toilet facility (39% in rural areas and 7% in urban areas, 56% of the rural households use unimproved toilet facilities. One in every three households in the country has no toilet facility(9).

The overall prevalence of IP in in Gob GobNorthwest Ethiopia (30.8%) was lower than results reported from Northern Gondar (79.8%) (14), Northwest Ethiopia (62.3%) and Southern Ethiopia (85.1%) (6).

In Amhara Region the prevalence of intestinal parasites Jawi town the overall prevalence of intestinal parasites 57.88% were positive for one or more intestinal parasites(1).

In Ethiopia main strategies are mass drug administration, case detection and transmission control. Information on the prevalence and distributions is incomplete and not updated periodically. There is lack of information on the prevalence of intestinal parasite and associated factors of their children on prevention and control in the present study area. Intestinal parasitic infections like Entamoeba histolytic a, Giardia lambilia, Ascharis lumburicoides,Hookworm,Trichuris Trichuris and Sistosoma mansoni are identified as causes of morbidity and mortality throughout the world particularly in developing countries including Ethiopia. They are more prevalent throughout the Amhara region, especially among poor communities. Records show that increasing trends of intestinal parasitic infections in developing countries. A high prevalence of intestinal parasite infections in human are positively correlated with poverty and poor personal hygiene, lack of safe water supply and contamination of the environment by human excreta and animal wastes.

1.3 Significance of the study

The results of the study were used for school children from grade 1-8 in Guangua woreda. Secondly,including for policy makers, health workers, teachers and management of education and health office. Third the results of the study wereused , for an input for local governmentor Guangua woreda. Finally the result also used for different NGOs implementing Guangua woreda intervention and baseline for researchers

2 .LITERATURE REVEIW

2.1 Prevalence of intestinal parasitic infections

The study conducted in Colombia among rural school children is revealed that the frequency of intestinal parasite infection was 100%. Endolimax nana (77.35%), Blastocystis sp. (71.1%), Giardia intestinal is (39.1%), Entamoeba coli (25.7%), and the Entamoebahistolytic a/dispar/moshkovskii complex (9.2%) were the most prevalent protozoa. Trichuristrichiura was the most prevalent helminthes (12.3%), followed by Enterobiusvermicular is (6.15%) and Ascarislumburicoides (5.1%)(11).

The study conducted in Kathmandu, Nepal the overall prevalence of intestinal parasites 12.4% (24/194) school children were infected with intestinal parasites where female were highly infected (70.8%) of the age group 9-11 years (58.3%). The most common protozoan and helminthes parasite detected in this study was E. histolytic a (33.3%, 8/24) and Taenia spp. (16.7%, 4/24) respectively(12).

A similarcross-sectional study conducted in Southern Iran showed that the overall prevalence of intestinal parasitic infection (6.5%). Prevalence of protozoan infections (6.2%) was significantly higher than helminthes infections (0.3%). The most common protozoan species were Giardia lambilia (2.9%) and Blastocystishominess (n 2.1%). Only two cases of Hymenolepis nana and two cases of Enterobiusvermicular were detected (2)

The other study conducted in Uzo-uwani Local Govern Area (L.G.A) of Enugu State, Nigeria, the prevalence of intestinal parasite 52.5% were infected with different intestinal parasites .The parasites found were Hookworm, A.lumburicoides,T.trichuria, E. histolytic and G.lamblia with prevalence of (14.0%), (14.0%), (11.5%), (10.5%), and (8.5%) respectively. Hookworm and A. lumburicoides had highest prevalence (14.0%) while G.lambilia had lowest (8.5%)(13).

The other similar study conducted in Nigeria the overall prevalence was 86.2% in school children. Intestinal parasitic infection shows that the highest to the lowest prevalence 62%,25%,12.3%11.8%,9.9%8.4% and 0.5% found in Ascarislumburicoides,Entamoeba histolytic a,GiardiaDuodinalis,Endolimax,Entamoebacoli,TrichurisTrichiura Blastocytis haminis and Hook worm infection respectively(14).

The other study conducted in A Rural Area at Beheira Governorate, Egypt revealed that the overall prevalence of parasitic infection among primary school children reached 38.3% (27.8% in males and 10.5% in females) with a prevalence rate of (22.5%), (12.8%) and (3%) for helminthes, protozoa and mixed infections respectively. The identified parasites were E. vermicular is (11.8%), H. nana (7.2%), G. lambilia (6.8%), E. histolytic a/dispar (6%), S. mansoni (1.7%), A. lumburicoides (1.2%), T. trichiura (0.3 %) and S. haematobium (0.3 %) while, mixed infection reached (3%)(5).

The study conducted in Berber locality, River Nile State, Sudan 2017,revealed that, Out of 100 students examined 87.2% had infection with intestinal parasites(15).

The other similar study conducted in AlhagYousif Area, Khartoum, Sudan Results shows that, (84%) stool samples were positive by the Formol-Ether Concentration technique. While (65%) were positive by the direct saline stool preparation. Intestinal parasites were more prevalent among the male students (80%) than the females (60%). Furthermore, they were more prevalent among the age group 5 to 7 years old (5%)(16)

The other cross sectional study conducted in Birbir town, Southern Ethiopia result shows that (27.1%) of them were tested positive for intestinal parasites. Helminthes and protozoa account 21.1% and 7.1% prevalence's respectively.

Seventy eight children were infected with a single parasite species while 17 were positive for double or triple infections. Ascaris lumburicoides (31, 8.8%) was the most frequently detected parasite followed by Trichuris trichiura (20, 5.7%) and hookworms(8)

The other similar study conducted in Gurage Zone, South Ethiopia revealed that the overall prevalence of intestinal parasitoids was (42.1%). Protozoa infections (59.5%) were more prevalent than soil-transmitted helminthes (STHs) infections (40.5%). The predominant parasites were Giardia lambilia (47.7%) followed by A. lumburicoides (18.9%), and E.histolytica/dispar (11.8%)(7, 17).

The study conducted in Tigray, Northern Ethiopia revealed that, the overall prevalence rate for intestinal parasites was 26.53%, where as for S. mansoni infection it was only 5.95%. A total of eight species of helminthes parasites were identified; the highest being Ascarislumburicoides (10.45%) followed by Enterobius vermicular is (8.52%)(18).

The other similar study conducted in Addiremets town, Western Tigray, Ethiopia revealed that the overall intestinal parasite prevalence was 51.3% (211/411). The most prevalent parasites were S. mansoni 26.3 % and Hookworm 23.1%. The prevalence of intestinal parasites among males and females were 54.1% and 47.3% respectively(19).

The study conducted in Delo-mena District, South Eastern Ethiopia revealed that an overall IPIs prevalence of 26.6% was found. The prevalence of S. mansoni, E. histolytic a/dispar, H. nana, A. lumburicoides, G. lambilia, T. trichiura, S. stercolaris, E. vermicular is, Hookworms and Taeniaspp were 9.6%, 7.7%, 5.3%, 3.7%, 2.0%, 1.6%, 1.4%, 1.2%, 0.8% and 0.2% respectively(20).hh

The community based cross-sectional study conducted in Gob Gob Rural School Children, Northwest Ethiopia, among school children, (30.8%) were infected with at least one parasite species. The predominant species identified were A. lumburicoides 28(33.3%), H. nana 12(14%), E. histolytic a/dispar 11(13%), G. lambilia 9(11%), hookworms 7(8.3%), Taeniaspp 6(7%), E. vermicular is 6(7%), T. Trichuris 4(4.8%) and S. stericoralis 1(1.2%)(1).

The Institution based cross sectional study was conducted in Debre- Elias Woreda primary school children East Gojjam Zone, Amhara Region, Northwest Ethiopia revealed that the overall intestinal parasite in the present study was (84.3%). The most prevalent intestinal parasite was Hookworm (71.2%), Entamoeba histolytic/dispar (6.7%) and Strongloidesstercolaris 13 (2.4%)(21).

School based cross-sectional study was conducted among students at Dona Berber primary school, Bahir Dar, Ethiopia, among the school children participated in the study, 65.5% were infected by one or more intestinal parasites. The rates of single and double parasitic infections among students were 49.6% and 16.2%, respectively. The most prevalent parasite detected in the study was E. histolytic a/dispar (24.5%) followed by hookworm (22.8%)(7).

A cross-sectional study conducted in Northwest Ethiopia revealed that among school children examined for IPIs, 57.88% were positive for one or more intestinal parasites. Single, double and triple infections were 41.9, 6.2 and 1.2%, respectively. Prevalence of Giardia lambilia was the highest (19.95%), followed by hookworm (13.8%), Schist soma mansoni (10.3%), Entamoeba histolytic a/dispar (5.9%), Hymenolepsis nana (4.2%), Taenia species (3%) and Ascarislumburicoides (0.73%),(1)

2.2 Associated factors of intestinal parasitic infection

2.2.1Socio - demographic characteristics

Different factors were associated with the occurance of intestinal parasitic infection among school age children's,Socio-demographyic characteristics like, Gender ,school location ,grade and residents(7)and educational level for care giver and family size is the factors of IPIs(6).

The study conducted in Colombia revealed that , the lifestyle conditions of the children's families, students who lived in crowded homes (six or more members in a single household) were significantly more likely to be infected with PP(11).

The other study conducted in southern Iran show that The parasitic infections were higher among the children whose parent's education was less than high school diploma and there was also a significant association between the parents' jobs and the intensity of parasitic infection(2).

The other similar study conducted in AlhagYousif Area, Khartoum, Sudan revealed that Intestinal parasites were more prevalent among the male students (80%) than the females (60%). Furthermore, they were more prevalent among the age group 5 to 7 years old (5%). The study concludes that intestinal parasites were more prevalent among the male students and among the age group 5to 7 years old(16).

The study conduct in Addiremets town, Western Tigray, Ethiopia show that Intestinal parasitic infection was significantly associated with age groups of 5–9 years, 10–14 years and 15–19 years(19).

The other cross-sectional study conducted in Rural School Children, Northwest Ethiopia shows that, the higher proportion of intestinal parasitic infection was recorded for boys (38.9%), the age group 6 - 10 years (38.9%)(6) and the study conducted in Jawi town Northwest Ethiopia) revealed that overall infection rate was slightly higher in males (51.85%) than in females (45.30%) so age were found to be the most important predictors associated with high risk of IPIs (1).

2.2.2 Environmental factors

2.2.2.1 Water supply

The cross-sectional study conducted in Colombia showed that consumption of untreated water increased the risk of acquiring PP (11).

The other study conducted in rural KwaZulu-Natal, South Africa: shows that caregivers' habit of bathing children in river water and source of domestic water supply were significantly associated with Schistosoma infection(22).

The cross-sectional study conducted in Addiremets town, Western Tigray, Ethiopia revealed that, individuals who swim three or more times a week had a higher rate of infection than who swim once a week (19).

A study conducted in Jawi town revealed that who had frequent water contact habit (swimming, crossing river, bathing and washing clothes in rivers), significantly associated with schistosomiasis(1).

2.2.2.2 Sanitation facilities

Another study conducted in Jawi town revealed that open field defecation is statically significance with the transmission of intestinal parasitic infection (1)

A study conducted in Northwest Ethiopia shows that availability of toilet is statically significance in the transmission of IPIs(6).

2.2.2.3 Child behavioral factors

A study conducted in South Iran revealed that the most prevalent intestinal parasite was G. lambilia; therefore, it is recommended that more emphasis is applied to controlling and preventing this parasitic infection by washing hands, particularly before each meal(2)

The other cross-sectional study conducted in Kathmandu, Nepal revealed that the children who don't wash hands with soap before meal (87.5%) and not taking anti helminthes drugs (95.8%) were more infected with parasitic infection. Further, children using direct tap water (45.9%) for drinking purpose were highly infected with parasitic infection(12).

The other study conducted in Gob Gob primary school South West Ethiopia ,shows that School children who washed their hands only occasionally prior to meal were also more affected by IPs than their counter parts (8).

The other study conducted inAddiremets town, Western Tigray, Ethiopia revealed that, individuals who wore open shoes had a higher rate of infection than who wore closed shoes. Similarly, individuals who swim three or more times a week had a higher rate of infection than who swim once a week (19).

A cross-sectional study conducted in Debr-elias primary school, Northwest Ethiopia revealed that the first most important significant associated factor with the occurrence of intestinal parasitic infection was shoe wear during interview. Those school children who do not wear shoe during interview had 1.38 times more likely to be exposed to parasitic infection than those school children who wore shoe(21).

A similar cross-sectional study conducted in Jawi primary school revealed that, among the risk factors assessed, hand washing habit before meals, open field defecation habit, consistency of wearing shoes, habit of eating raw and unwashed vegetables, and finger nail cleanliness and trimming habit were found to be the most important predictors associated with high risk of IPIs (1)

2.3CONCEPTUAL FRAME WORK

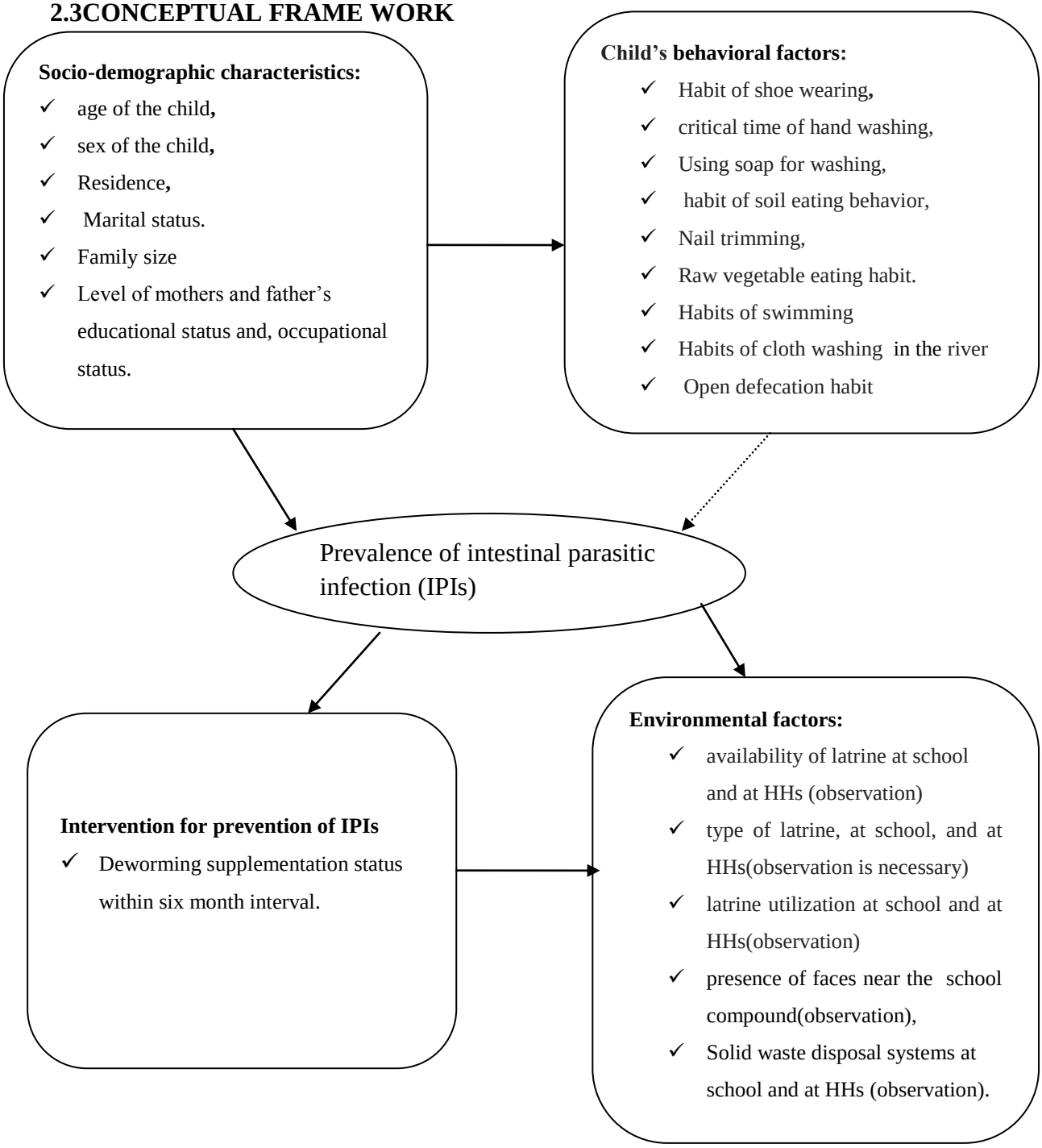


Figure 1:-Conceptual framework shows factors affecting the prevalence of IPIs among school children, Guanguaworeda, 2020

3. Objectives

3.1. General Objectives

To assess the prevalence of intestinal parasitic infection and associated factors among primary school children in Guanguaworeda, Northwest Ethiopia, 2020.

3.2 Specific Objectives

1. To determine the prevalence of intestinal parasitic infection among primary school children Guanguaworeda, north West Ethiopia.

2. To identify the associated factors of intestinal parasitic infection among schoolchildren in Guanguaworeda, Northwest Ethiopia.

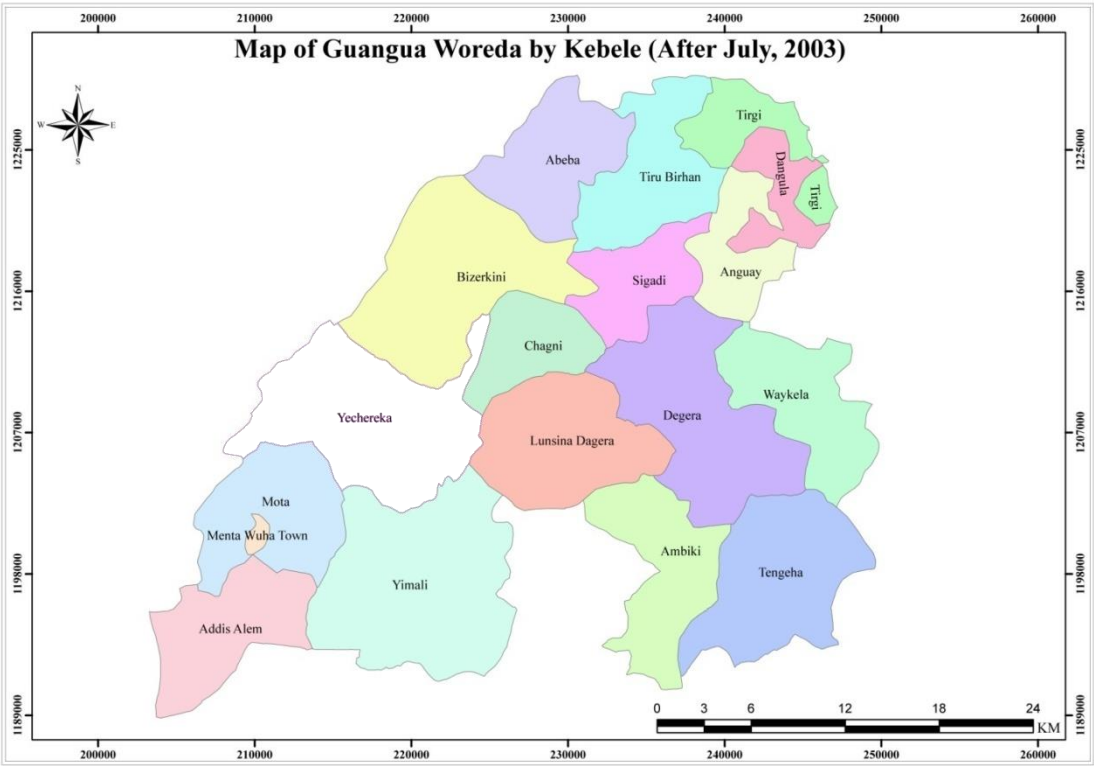
4. METHODS

4.1 Study Designed

School based cross-sectionalstudy design was conducted among Guanguaworeda primary schools children (from grade 1-8) from February 01/2020 to March 01/ 2020.

4.2 Study area.

GuanguaWoreda is one of the 106 woreda of Amhara regional state and found in zone Awi. The area is located 505 km Northwest of Addis Ababa the capital of Ethiopia. The district has been divided in to 20 rural and 2 urban 'kebeles'.The total number of primary schools is 12 and the total number of students is 3690.The woreda is bordered by Dangelaworeda in the North, Zigemworeda in the south, BenishangulGumuz in the west and Ankeshaworeda in the east. The total human population of the district was 141,543 and 32,916households in 2020. The altitude of the district ranged between 1850 and 2200 m above sea level. Mean annual precipitation was 1550 mm with mean maximum and minimum temperatures of 27°C and 22 °C.



Source-shape files of Ethiopia after July 2003

Figure 2:-. The map shows the study area of the Guanguaworeda, North West Ethiopia, 2020

4.3 Population

4.3.1 Source Population

The source population was all school children enrolled in Guangua primary school (from grades 1-8)the last six months in Guanguaworeda.

4.3.2 Study Population

The study population wasall school children enrolled in Guangua Primary School (from grades 1 to 8) found in the three randomly selected primary schools.

4.3.3 Study units

The study units were all systematically selected school children in each primary school.

4.3.4 Eligibility criteria

4.3.4.1 Inclusions criteria

- ✓ School Children is whose grade 1-8 enrolled in Guanguaworeda was included during the study period.

4.3.4.2. Exclusions criteria

- ✓ School Children who are coming or living from other woreda and school children who are started antibiotic drugs and also completed treatment before three days were excluded from the study.

4.4 Study Variables

4.4.1 Dependent Variables

- ✓ Prevalence of Intestinal Parasitic infection(IPIs)

4.4.2. Independent Variables'

- ✓ **Socio-demographic characteristics** – sex of child , age of child, occupation , residence, educational status,religion,marital status, level of education of mothers and fathers, and number of school children's..
- ✓ **Environmental factors** – type of latrine, availability of latrine, , open defecation, source of water, waste disposal sites, availability of live stock and live stock in the house.
- ✓ **Behavioral factors** – critical time of hand washing, habits of shoe wearing, using soap for hand washing, habits of swimming, habits of washing clothes in the rivers, habits of nail trimming, and habits of eating raw vegetables.

- **Deworming supplementation**:-Mass drug treatment like:-frequency of albendazole or mebendazole received dose, preventive chemotherapy and health education.

4.5 Operational definition

Parasites:-aredefined as organisms that get food and shelter from other organisms or the host and often harm it. For a parasitic have to be outlined as intestinal life cycle stage

  - IPIs –is defined when a person have positive at least by one parasites among for the purpose of study intestinal parasites mentioned below

- IPIs:-for the purpose of this study the following most common helminthes and protozoan's will be included:-

- ✓ Ascaris lumburicoides
- ✓ Hookworm
- ✓ Trichuris Trichiura
- ✓ Schistosoma mansoni
- ✓ Entamoeba histolytic a and
- ✓ Giardia lambilia

Preventive chemotherapy (PC):- use of anti- helminthes by six month interval to prevent helminthes infection, the most recommended for IPIs prevention.

School children:-children's from grade 1-8 who may be enrolled in school.

Improved sanitation facilities: -is a latrine have washable floor, hand washing facility at school.

Open defecation:-implies halting incidents where excreta of school children's are deposited directly by layer of earth in the bush afield River Sea**.**

Hand washing practice:-is school children have a practice of hand washing with water, and soap/ash at least one times within at critical times at school or HHs.

Latrine utilization:-school children are using latrines by either shared or private functional latrines disposed the faces of school children in a latrine at school or HHs,

- ✓ no observable faces in the compound,
- ✓ no observable fresh faces on the inner side of the squatting hole and
- ✓ the presence of clear foot-path to the latrine is uncovered with grasses or other barriers of walking

Availability of latrine: - school children does have either shared or private functional latrines at schools or HHs.

Private latrine:-are school children's had an individual functional latrines at household latrines.

Shared latrine:-is school children had grouped or public functional latrines at schools or house hold level.

Raw Vegetables eating: -school children eating vegetables like, tomato, peppers, mush room etc, without properly washing or without cooking. .

School solid wastes: Wastes generated by the school community such as pieces of paper, plastics, rags, dirt, dust and litters.

School waste disposal systems: -Solid wastes stored in a dust bin and disposed to refuse pit at school.

Habits of shoe wearing :-school children had a habits of shoe wearing(**Always** ,implies wearing shoe at least four times a week and **sometime**s ,implies wearing shoe one times a week).

Habits of swimming:-is school children had a habits of swimming in river, lake, or pond at least one times a week.

Habits of eating soil:-are school children having play by eating soil.

Habits of taking shower:-school children's have taking shower at least two times a week.

Plain water: - clean water either from the source of tape water or hand dug well for the purpose of hand washing of school children.

4.6 Sample size determination

The sample size was determined using single population proportion estimate formula

(Z2 p (1-p)/d2)

n= Z2 P (1-P)/d2 Where:

n= sample required

Z= 95% confidence interval (1.96) d= margin of error (5%) P= prevalence rate

Since the prevalence rate (p) of intestinal parasitic infection in Debre Elias primary schools was reported as 84.3% (27) prevalence rate was taken to be 84.3%%.For the calculation, 95% confidence level (z) and 5% sampling error (d), design effect of (1.5) was used because during multistage sampling at each stage they have errors so to minimize sampling error was taken design effect. Therefore, the final sample size was six hundred eight (608) school children were included with 10% none response rate.

Factors	Assumptions	Sample size	10% Non respon	Total	Ref
Dirty things infinger	AOR-1.89 CI-95% prev-56.7%, ratio=1:1	Expo=1 Non exp=1	37	368	Sitotaw et,al
Unable to wear shows	AOR 1.88,CI P-95%,prev =43.85	Expos=1 Non expo =1	34	344	Tilahun ,et,al,2014
Swimming in the river or pond	AOR=1.99,95%,29%	Expo=1 Unexpo=1	31	314	Tilahun ,et al

NB = so we taken the first large factors 405 times with a design effect 1.So 608 the total sample size was used.

4.7 Sampling methods and Procedures

Multi-stage sampling was used and total of 608 school childrenwere selected from the three representative primary schools (Mentaweha, Yechereka, andSigadi) in the woredawere selected randomly and multi-stage sampling technique was used.

First Stage

Three out of the twelve primary school in Guanguaworeda primary school were selected by simple random sampling.

Second Stage

The total sample size (n=608) was allocated to the three selected schools proportionately.

Study participants from each school wasallocated to grade 1-8 proportionately

A study participant of grade 1-8 of each school was allocated to their sections proportionately.

Third Stage

Using name of list of students each sections as sample frame, every fourth students were selected by systematic random sampling method and the first student were selected by lottery method and students was call for interview from their class. A student who is absent during the data collection period were replaced by others.

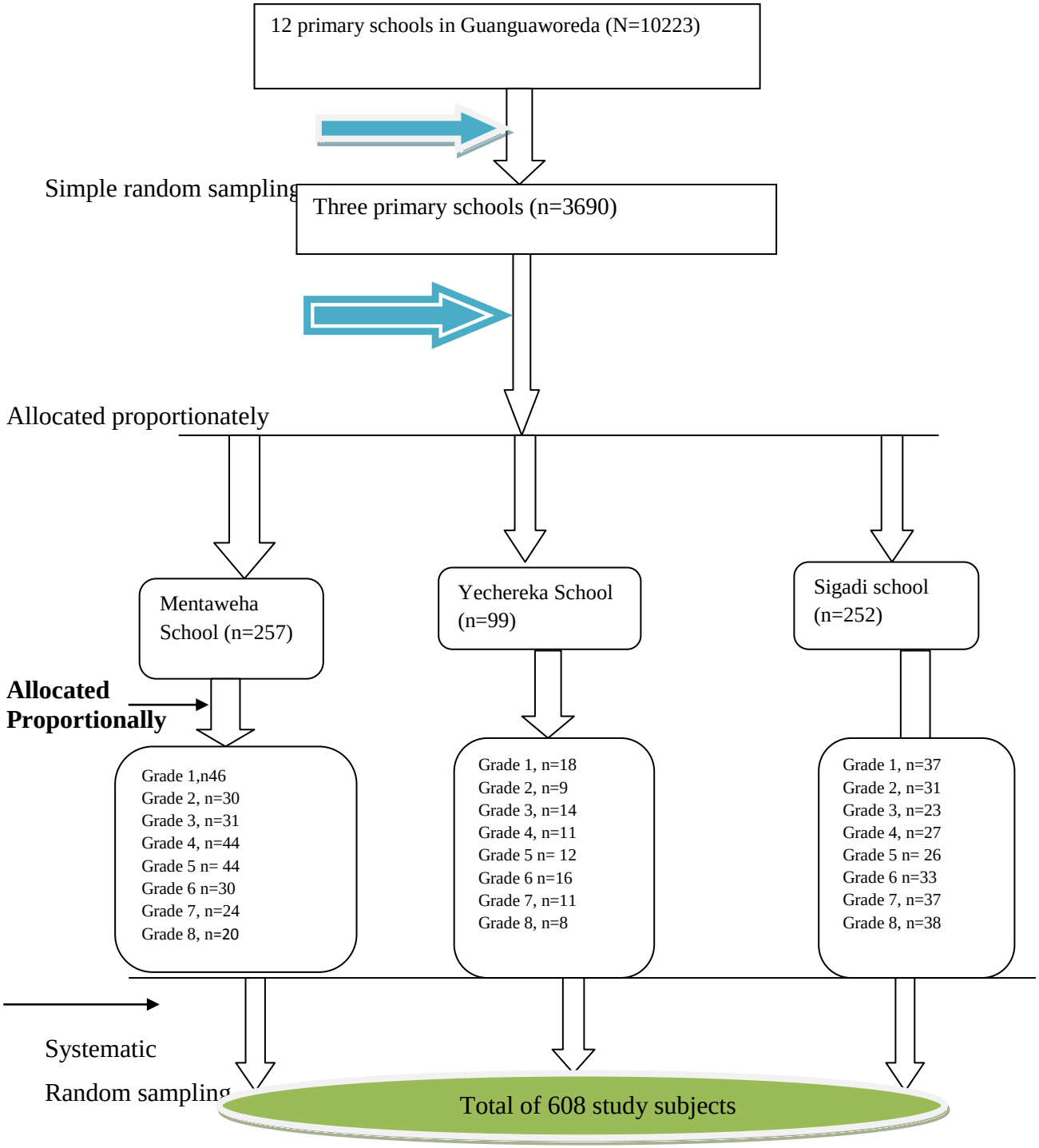


Figure 3:-- Schematic presentation of sampling procedure among school children in Guangua woreda, North West, Ethiopia, 2020

4.8 Data collection tools and Procedures

School based cross-sectional data was conducted and data about the socio demographic characteristics, environmental factors and child behavioral associated factors were collected using a semi structured based questionnaire. The questionnaire was developed in English then translated in to Amharic (local language) then back to English to check consistency and data quality control

The questionnaire consisted of five domains includes questionnaires about socio-demographic characteristics, environmental factors**,** child's behavioral factors, Interventions for prevention and control of IPIs and knowledge about IPIs .School survey data were collected from February to March 2020**.** Four public health officers was administered the survey by face to face interviewing primary school children's using a pretested structured questionnaire, Two laboratory technologists was collected the stool sample following the procedure. The supervision was performed by the supervisors. The interviewers also inspected whether they wore shoe or not.

Explaining the procedures to primary school children's are requested to provide stool samples into a tight fitting lid plastic cup. In cases where the stool is not available immediately, arrangements are made to pick the stool sample at an agreed time. Approximately 2 gram of stool specimen wascollected using clean, tightly corked, leak proof containers.

All stool specimens are properly labeled with the participant's identification number, age, sex and date of collection. Then stool samples was emulsified with, 10% formal-saline solution, then filtered through gauze into a centrifuge tube and add 3mL of ether finally add iodine and observe or examine by using direct microscopic method with Olympus (10x with 0.25 magnification power) microscopy. Formal-ether concentration method was used as the preservation of STHs parasites(21, 27).

4.9 Data quality control

To assure the reliability of data collected in the study the questionnaire was prepared in English and translated to the local language (Amharic) and retranslated to English to assure consistency. Training was given for both data collectors and supervisors on the purpose of the study, data collection technique and tool by the principal investigator for three days. Then, after providing the training, and before the questionnaire was used in the actual data collection it was pretested on 5%ofthesamplesizeinGuanguaworeda primary schooltocheck the quality of the questionnaire and the instrument prior to the actual data collection. Amendment of the questionnaires was done based on the findings of the pre-test, if necessary. The pre-test was conducted by the data collectors in order to improve their data collection during the actual data collection. Every day after data collection, questionnaires were reviewed by principal investigator for ensuring completeness of questions. In addition to the above, data will recheck during data entry into the computer software before analysis, to prevent missing of important data.

Oncedata was entered. First, if data are in spreadsheets or databases are sure they line up in their proper columns. Also it waschecked for any missing value. Stool sample collection and investigation was made according to a standard procedure according to annex 9.3 without any delay for more than 30 min after collection of the samples. Microscopic reading was made by two laboratory technologists and results were confirmed by a senior technologist**.**

4.10 Limitation of the study

The study was limited only students in Guangua woreda primary school. Included schools outside the woreda would have been better to get a bigger picture of the prevalence of IPIs in the area .The study was also limited to the presence or absence of infections without quantifying the parasite load , which may not show that the infected students were diseased.

4.11 Data processing and analysis

Data was entered in to Epi data version 3.5.1 and exported in to SPSS version 25 for analysis. The collected data was analyzed using SPSS program version 23.0. Descriptive (frequency distribution tables, mean and standard deviation) 0.2 for Bivariate and less than 0.05 multivariate logistic regression was used to assess the association between the dependent variables and independent variables and odds ratio was used to assess the strength of association. Multicollinearitydiagnoses were carried out using the correlation matrix method and Model fitnesswere checked using Hosmerlemeshow test with p-value >0.05.

4.12 Dissemination of findings

The finding of the result will be disseminated to the relevant organization that can make use of the findings, including regional health beauro and educational beauro, local health and educational office and nongovernmental organization. The result also submitted to Bahirdar University School of public health through four hard copy and soft copy presentation. The findings will be also presented in different seminars, workshops and scientific conferences and finally it will be published to be accessible for scientific communities in general.

5. Ethical Consideration

Letter of ethical approval was obtained from the Institutional Review Board (IRB) of Bahirdar University, College of Medicine and Health Sciences. Communication with theGuanguaWoredahealth office was made through formal letter obtained from Bahirdar University. After the purpose and objective of the study were informed, verbal consent was obtained from each study participants and written ascent was obtained from each

Participant parents or Guardians. In order to keep confidentiality of any information provided by study participants, the data collection procedure were anonymous. Study participants who were positive for intestinal parasitic infection was treated with appropriate treatment protocol for school children from grade 1-8by albendazole, mebendazoleandpraziquantine byHews if not referred to the nearest health facility.

6. Results

6.1 Socio-demographic characteristics of participants

Of the total expected 608, 551 were participated in the study making the response rate of 90.6%.The mean age of the respondents was 11.9 with a standard deviation ±2.2. From the total 551 study participants, 264(47.9%) were males and 287(52.1%) females.

From the study participants were, grade 1-4 and 5-8, 299(54.3%) and 252(45.7%) respectively .Regarding to their mother educational status 283 (51.4%) of the study participants were can´t read and write, 218 (39.6%) can read and write and 50(9.1%) were formal education.

The residence of the study participants were, 256 (46.5%) and 295 (53.5%) of study participant were, urban and rural dwellers respectively. Regarding to Fathers marital status of the study participants 13 (2.4%) single, 482 (87.5) married, 46 (8.3%) divorced and 10(1.8%) of study participants were widowed (see Table 1).

Table 1, Socio-demographic characteristics among primary school children in Guangua woreda, North West Ethiopia, 2020 (n=551).

Characteristics	Category	Frequency	Percentage
Age	5-8.	79	14.3
	9-14.	399	72.4
	≥15	73	13.3
Sex	Male	264	47.9
	Female	28	52.1
Grade	1-4.	299	54.3
	5-8.	252	45.7
Family size	2 families	3	0.5
	3 families	25	4.6
	4 families	135	24.5
	≥5 families	388	70.4
Mothers education	Can't read and write	283	51.4
	Can read and write	218	39.6
	Formal education	50	9.1
Fathers education	Can't read and write	194	35.2
	Can read and write	240	43.6
	Formal education	117	21.2
Mothers occupation	House wifes	130	23.6
	Farmers	269	48.8
	Merchants	125	22.7
	Government workers	27	4.9
Residence	Urban	256	46.5
	Rural	295	53.5

[Family size category source, Sitotaw et al, 2019]

6.2 Environmental factors

The availability of latrine at school in the study area were, 551 (100%) have latrine.. Concerning the typeof latrine at school were, all of the study participants were used shared latrine. The availability of latrine at household in the study area were, 335 (60.8%) and 110 (20%) of households were did have private and shared latrine respectively. The rest of households from the study participant didn't have latrine.

Concerning the availability of hand washing facility at school were, 22(4%) and 529(96%) of the study participants, had hand washing facility and had not hand washing facility respectively. The availability of hand washing facility at household, 205(37.2%) and 346 (62.8%) of the study participantswere, had, and had not hand washing facility respectively. Two hundred ninety one school children's have gotten water from hand dug well at school and two hundred twenty four school children among the study participants have gotten water from pipe water source at house hold(see table 2).

Table2. Environmental factors among school children of Guangua woreda primary schools, North West Ethiopia, 2020.

Characteristics	Category	Frequency	Percentage
Availability of latrine at school	Yes	551	100
	No	0	0
	Shared	551	100
Availability of latrine at HHs	Yes	445	80.8
	No	106	19.2
Type of latrine use at HHs	Private	335	60.8
	Shared	110	20
	Open defecation	106	19.2
Availability of hand washing facility near school.	Yes	22	4
	No	529	96
Methods of waste disposal systems	Public bin	214	38.8
	On the road/street	242	43.9
	Collecting truck	83	15.1
	Others	12	2.2
Presence of feces within the school compound.	Yes	153	27.8
	No	398	72.2
Source of water at school	Pipe water	247	44.8
	Protected spring	8	1.5
	Hand dug well	291	52.8
	Unprotected spring	5	0.9
	Others	0	0
Source of water at school	Pipe water	224	40.7
	Protected spring	43	7.8
	Hand dug well	159	28.8
	Unprotected spring	104	18.9
	Others	21	3.8

6.3Child behavioral or Hygiene practice factors

Of the total study participants almost, hundred percent of school children of the study participants were implement at least one times from the critical times had hand washing practice. Of the total 535 (97.1%) of the study participants had a habit of shoe wearing and the rest of the study participants had not a habit of shoe wearing.

From the total of 551 participants, 391 (71%), 160 (29%) of the study participants had, and had not, a habit of finger nail trimming respectively. Among the total participants, 148 (26.9%) and 403 (73.1%) of school children had and had not a habit of swimming respectively.

Table.3.Children Hygiene practice or behavioral factors of school children among Guangua woreda primary school, North West Ethiopia, 2020.

Characteristics	Category	Frequency	Percent
Hand washing practice	Yes	551	100
	No	0	0
Hand washing practice at critical times	Before preparing or cooking food	91	16.5
	After visiting a toilet	267	48.5
	After any waste contact	143	26
	Before any child contact	21	3.8
	Before child feeding	11	2
	Others	18	3.3
What use for hand washing	Plain water	146	26.5
	Clean water and soap	361	65.5
	Others	44	8
Habits of taking shower	Yes	551	100
	No	0	0
Frequency of using shower in a week	Once a week	121	22
	Two times a week	316	57.4
	More than two times a week	106	19.2
	Not washing in a week	3	0.5
	Other	5	0.9
Habits of shoe wear	Yes	535	97.1
	No	16	2.9
Time to wear shoe	Always	368	66.8
	During market day	98	17.8
	Sometimes	50	9.1
	Others	19	3.4
Habits of eating soil	Yes	60	10.9
	No	491	89.1
Habits of finger nail trimming	Yes	391	71
	No	160	29
Habits of swimming	Yes	148	26.9
	No	403	73.1

6.4 Intervention Measures about IPIs

From the total of school children, 548 (99.5%) of study participants have availed deworming supplementation program at schools. within six month intervals. The rest of study participants had not availeddewarming supplementation program atschool (see table 3).

Table.4. Intervention Measures of IPIs among school children of Guangua woreda primary school, North West Ethiopia, 2020.

Characteristics	Category	Frequency	Percentage
Deworming supplementation status within six month interval.	Yes	548	99.5
	No	3	0.5
Frequency of deworming supplementation in a year at school	One times	121	48.8
	Two times	316	7.8
	Three times	106	38.5
	Four and more times	3	3.4
	Others	5	1.5

6.5 Prevalence of intestinal parasitic infections among the study participants

Of the 551 students who were examined for IPIs, 309 (56.1%) were positive for one or more intestinal parasites. Prevalence of Ascaris lumburicoides was the highest 110 (20%), followed by Entamoeba histolytic a 77(14%), Giardia lambilia 55 (10%), Trichuris trichiura 30 (5.4%),Hookworm 28 (5.1%) and Schistosoma mansoni 9(1.6%) in that order (Table7). Single, double and triple infections were identified at the rate of 48.8%, 5.5% and 1.8%, respectively. The overall prevalence of intestinal parasitic infection in Guangua woreda was 309 (56.1%).

Table.5. Prevalence of intestinal parasitic infections among school children in Guangua woreda primary school, North, West, Ethiopia, 2020.

Types of parasites	Frequency	Percentage
Ascariasis	110	20%
Entamoeba histolytic a	77	14%
Giardiasis	55	10%
Trichuriasis	30	5.40%
Hookworm	28	5.10%
Schistosoma mansoni	9	1.60%
Total	309	56.10%

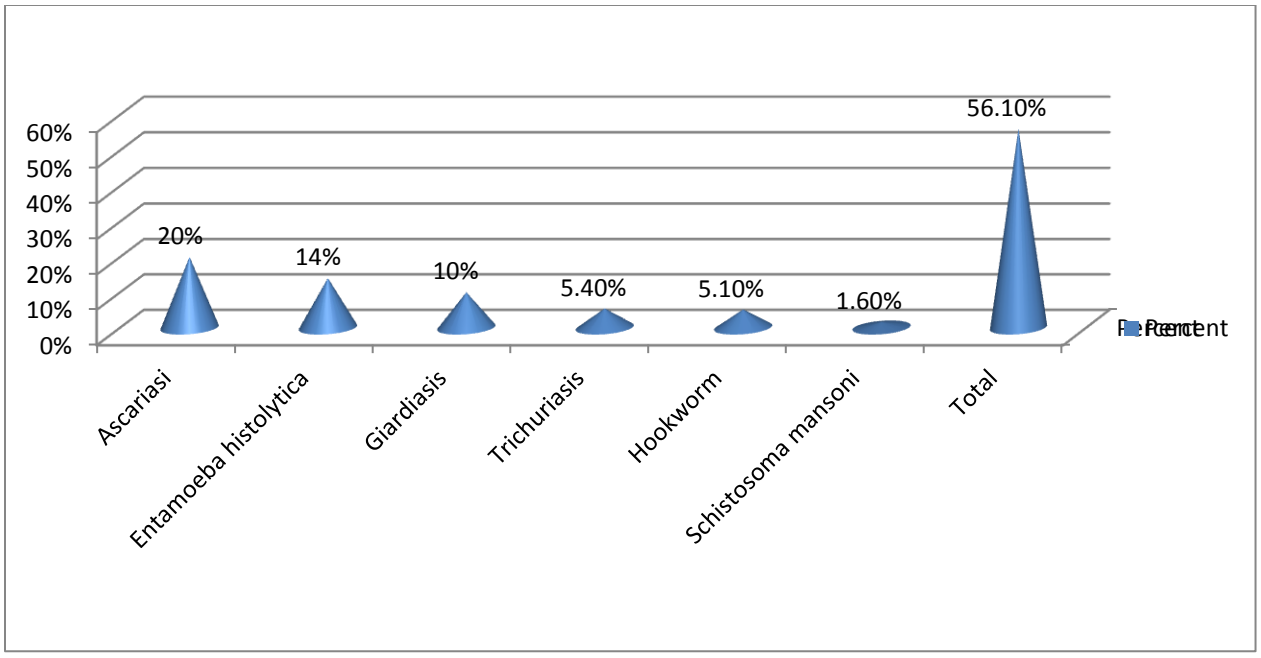


Figure 4 Prevalence of Intestinal parasitic infections among school children in Guangua woreda, North West Ethiopia, 2020.

6.6 Factors associated with intestinal parasitic infections

During bivariable logistic regressions: age, grade, sex, mothers education, residence, nail trimming, shoe wear and habits of swimming were candidate (P<0.25) for multivariable analysis among school children.

Whereas the multivariable analysis revealed:grade habits of swimming,nail trimming and habits of shoe wear are significantly associated factors of intestinal parasitic infections.

Table.6Multivariate logistic regression analysis of potential risk factors associated with IPIs among school children at Guangua woreda primary school in Guangua, Ethiopia, 2020.

Characteristics	Category	Intestinal parasites		COR (CI 95%)	AOR (CI95%) ≠
		Positives	Negatives		
Age	5 –8 yrs.	57(10.3%)	22(4%)		1
	9 -14 yrs.	227(41.2%)	172(31.2%)	0.509(0.300, 0.866)	1.65(0.646,4.218)
	≥ 15 yrs	25(4.5%)	48(8.7%)	2.534(1.503,4.273)	1.588(0.813,3.102)
Residence	Urban	128(23.2)	128(23.2)		1
	Rural	181(32.8)	114 (20.7)	1.588(1.131, 2.229)	1.160(0.736, 1.828)
Sex	Male	159(28.9%)	105(19.1%)		1
	Female	150(27.2%)	137(24.9%)	0.723(0.516,1.014)	1.485(0.971,2.271)
Mother educational status					
	Can't read and write	171(31%)	112(20.3)		1
	Can read and write	110(20%)	108(19.6)	0.667(0.467, 0.953)	0.966(0.448,2.084)
	Formal education	28(5.1%)	22(4%)	0.834(0.454, 1.530)	0.858(0.390,1.885)
Swimming habits	Yes	128(23.2%)	20(3.6%)		1
	No	181(32.8%)	222(40.3%)	7.85(4.711, 13,079)	0.189(0.105,0.340)**
Nail trimming	Yes	169(30.7%)	222(40.3%)		1
	No	140(25.4%)	20(3.6%)	0.109(0.065, 0.181)	7.195(4.05,12.779)**
Shoe wear	Yes	295(53.5%)	240(43.6%)		1
	No	14(2.5%)	2(0.4%)	0.176(0.040,0.780)	6.149(1.131,33.43)*

Note: 1=reference value, *=statistically significant at p<0.05, *= p < 0.05, **= p < 0.01, *** =p < 0.001, #= adjusted,AOR=adjusted odds ratio (multivariate regression model).

7. Discussion

Epidemiological studies on the prevalence of intestinal parasitic infections and predisposing risk factors among school children are essential to design appropriate strategies. The present studies were therefore aim to assess the prevalence of intestinal parasitic infection and associated factors among school children in Guangua woreda primary school ,North West ,Ethiopia. The overall prevalence of intestinal parasitic infections in present studies was 56.1%. This was relatively higher than the study done among school children in Gob Gob lay Gaynet woreda which was 30.8% (1) .And, it was lower than a previous study done in Kartthom Sudan school children that indicate 84 %(16). Higher prevalence rates of intestinal parasitic infections have also been reported from other developing nations including in Engu state Nigeria 52.5%(13) , Egypt 38.3%(5) ,Karthom Sudan 84% (16) and even 100% of prevalence was reported on Colombia (11) showing that IPIs are still big threats to poor society.

The present studies was the most predominant IPIs were Ascaris Lumburicoides, 110(20%) followed by Entamoeba histolytic a 77(14%) and Giardia lambilia 55(10%). These finding were similar to the study done in Meska destrict Gurage zone with a prevalence of 18.9% A .lumburicoides(17) , in Gob Gob Laygaynet woreda reported with a prevalence of 13% Entamoeba histolytic a and 11% of Giardia lambilia (1) . The inconsistency in prevalence of intestinal parasitic infection among different studies might happen due to sample size determination, methods employed and geographical and / or economical / social differences in the study participants.

Ascaris lumburicoides being the most prominent parasites 20% in our study .this with consistent with the previous studies in other parts of South Ethiopia, Gurage zone Meska Destrict, 18.9% (17). These was relatively higher than the study donein Donaber school children Bahirdar town which was 13.6% (7) and in Engu state Nigeria 14 %(13). And, it was lower than the study done in Berber town South West Ethiopia(31.8%)(8)and in Nigeria 62%(14)The possible reasons for high prevalence of Ascaris could be their

embryonated eggs that have an enormous capacity to withstand environmental extremes. Furthermore, the eggs are coated with a mucopolysacharide that renders them adhesive to a variety of surfaces, like vegetables, fruits, door handles, and money.And, the distribution is affected by altitude, being more common in higher and more humid than lower and dry areas. It is mostly associated with poverty, illiteracy, crowding, poor sanitation and personal hygiene (1).

The second predominant IPIs was Entamoeba histolytic a 14 %, this with consistent with the previous studies in other parts of North West Ethiopia, Gob Gob rural school ,13%(1) and in Nigeria 11.5% (13). These finding was relatively higher than the study done in Jawi town which was 5.9%(1).And, it was relatively lower than the study done in Donaber school children Bahirdar town which was 24.5% (7) and in Nigeria 25% (14) .The higher rate of infection of Entamoeba histolytic a may be due to the presence of farming land contaminated with fecal matters resulted due to open defecation, lack of awareness and use of contaminated water.

Low socio economic status ,low family educational level ,individual behavioral and personal conditions of the participants, the level of environmental sanitation ,source of drinking water and low personal hygiene are widely recognized risk factors accountable for elevated prevalence of IPIs among communities in poor societies. In this study sex was not found to be associated with the rate of IPIs ($p>0.005$)(see Table-). Similar observations were reported by previous studies in Jawi (North West Ethiopia) and in Addiremets town, (Western Tigray Ethiopia)(1,19) though there is much evidence supported that males are more exposed to IPIs than females (5,16,19) mainly related to differences in gender role. This is obliviously related to their behavioral activities such as playing in contaminated soil and water, and level of awareness of the transmission of intestinal parasitic infections.

In the attempt to identify the associated risk factors for prevalence of IPIs among school children in Guangua woreda, primary school factors including: Grade, habits of

swimming ,nail trimming and shoe wore were significantly associated with the prevalence of IPIs($p<0.05$) .This more or less occurs with previous studies conducted elsewhere in Ethiopia (1, 8).

Multivariate logistic regression analysis was conducted to determine the degree of association between IPIs and the demographic variables as well as other risk factors. Habit's of swimming, fingernail trimming and shoe worewere found to be predicators of IPIs among the participants of the study.Similarly, shoes wearing habit of students were strongly associated with IPIs. Student who did not wear protective shoes were six times likely to be infected than those who wore protective wear .The finding was supported by other findings in jawi town(1). Lack of regular shoe wearing habit is known to be the major contributing factor that leads to high hookworm infection. This finding indirectly indicates the contamination of locality and playground of students with human fecal matters (7)

Finger nail trimming is strongly associated with IPIs. Students who had not fingernail trimming were more likely exposed to IPIs than those children who had habits of fingernail trimming. The finding was supported by others findings in Bahirdar Donaber primary school (7).

Habits of swimming were strongly associated with IPIs. School children who had not swimming habits were greater at risk of IPIs than those children who had swimming habits. The finding was supported by others findings in Jawi, Addiremets town and Egypt .This might indicate the presence of infested water body/ies in the study area. (1, 2, 16, and 19).

8. Conclusion.

Generally the present study showed that school children in Guangua woreda were heavily infected with IPIs, implying that IPIs continue to be the major public health problems in the target primary school. Ascaris lumburicoides, Entamoeba histolytic a and Giardia lambilia were the most predominant intestinal parasites detected among the school children. Among different potential risk factors assessed in the study habits of swimming, unclean finger nail habits and hand washing facility at house hold level were strongly associated with intestinal parasitic infections.

9. Recommendations

Urgent actions are needed to, at least, reduce intestinal parasitic infections through concerted approach's involving politicians (decisions makers) , health extension workers , school teachers , the local mass media ,community and religious leaders . All these bodies should be design practical actions plan for effective prevention and control of IPIs in the study area and, to create awareness among school children and their parents in particular. It also recommended regular inspection be conducted on school children for personal hygiene practice and swimming safety. There is a need for integrated control program including Periodic deworming program , creating awareness regarding the importance of hand washing facility at HHs ,Finger nail trimming and the impact of swimming contaminated water to have a lasting impact of transmission

10. REFERENCE

1.Sitotaw B, Mekuriaw H, Damtie D. Prevalence of intestinal parasitic infections and associated risk factors among Jawi primary school children, Jawi town, north-west Ethiopia. BMC infectious diseases. 2019;19(1):341.

2.Turki H, Hamedi Y, Heidari-Hengami M, Najafi-Asl M, Rafati S, Sharifi-Sarasiabi K. Prevalence of intestinal parasitic infection among primary school children in southern Iran. Journal of Parasitic Diseases. 2017;41(3):659-65.

5.Bayoumy A, Abd El Raheem MA, Hashim A, Anwar H, Al Saadawy AS, Al Karyony IM. Parasitic Profile among Primary School Children in A Rural Area at Beheira Governorate, Egypt. Egyptian Journal of Hospital Medicine. 2018;70(12).

6.Alemu M, Anley A, Tedla K. Magnitude of Intestinal Parasitosis and Associated Factors in Rural School Children, Northwest Ethiopia. Ethiopian journal of health sciences. 2019;29(1).

7.Hailegebriel T. Prevalence of intestinal parasitic infections and associated risk factors among students at Dona Berber primary school, Bahir Dar, Ethiopia. BMC infectious diseases. 2017;17(1):362.

8.Alemu G, Abossie A, Yohannes Z. Current status of intestinal parasitic infections and associated factors among primary school children in Birbir town, Southern Ethiopia. BMC infectious diseases. 2019;19(1):270.

10.Kumma WP, Meskele W, Admasie A. Prevalence of intestinal parasitic infections and associated factors among food handlers in Wolaita Sodo University Students Caterings, Wolaita Sodo, Southern Ethiopia: A cross-sectional study. Frontiers in Public Health. 2019;7.

11.Hernandez PC, Morales L, Chaparro-Olaya J, Sarmiento D, Jaramillo JF, Ordoñez GA, et al. Intestinal parasitic infections and associated factors in children of three rural schools in Colombia. A cross-sectional study. PloS one. 2019;14(7).

12.Dahal1 C. Intestinal Parasitic Infection among the School Children of Kathmandu, Nepal 2018.

13.Odo G, Agwu J, Ekeh F, Ezea C, Aguoru G, Anya C, et al. Prevalence of intestinal parasites among school children in Uzo-Uwani local governemnt area of Enugu State. 2016.

14.Gyang VP, Chuang T-W, Liao C-W, Lee Y-L, Akinwale OP, Orok A, et al. Intestinal parasitic infections: current status and associated risk factors among school aged children in an archetypal African urban slum in Nigeria. Journal of Microbiology, Immunology and Infection. 2017.

15.Hamad M, Mokhtar A, Alameldin M. Prevalence of intestinal parasitic infections among school aged children in Berber locality, River Nile State, Sudan 2017. J Microbiol Exp. 2019;7(2):85-6.

16.Siddig HS, Mohammed IA, Mohammed MN, Bashir AM. Prevalence of intestinal parasites among selected group of primary school children in Alhag Yousif Area, Khartoum, Sudan. Int J Med Res Health Sci. 2017;6(8):125-31.

17.hile a. Factors Among Primary School Children in Gurage Zone, South Ethiopia 2017.

18.Dejenie T, Asmelash T. Schistosomiasis mansoni among school children of different water source users in Tigray, Northern Ethiopia. Momona Ethiopian Journal of Science. 2010;2(1).

19.Gebreyohanns A, Legese MH, Wolde M, Leta G, Tasew G. Prevalence of intestinal parasites versus knowledge, attitude and practices (KAPs) with special emphasis to

Schistosoma mansoni among individuals who have river water contact in Addiremets town, Western Tigray, Ethiopia. PloS one. 2018;13(9):e0204259.

20. Tulu B, Taye S, Amsalu E. Prevalence and its associated risk factors of intestinal parasitic infections among Yadot primary school children of South Eastern Ethiopia: a cross-sectional study. BMC research notes. 2014;7(1):848.

21. Workneh T, Esmael A, Ayichiluhm M. Prevalence of intestinal parasitic infections and associated factors among Debre Elias primary schools children, East Gojjam Zone, Amhara Region, North West Ethiopia. J Bacteriol Parasitol. 2014;15(1):1-5.

22. Sacolo-Gwebu1 H. Prevalence and risk factors of schistosomiasis and soil-transmitted helminthiases among preschool aged children (1–5years) in rural KwaZulu-Natal, South Africa: a cross-sectional study 2019.

24. Central Statistical Agency AA, Ethiopia. Ethipian Demographic and Health Survey. 2016.

25. Anteneh A, Kumie A. Assessment of the impact of latrine utilization on diarrhoeal diseases in the rural community of Hulet Ejju Enessie Woreda, East Gojjam Zone, Amhara Region. Ethiopian Journal of Health Development. 2010;24(2).

26. Agudo A, Pera G. Vegetable and fruit consumption associated with anthropometric, dietary and lifestyle factors in Spain. Public health nutrition. 1999;2(3):263-71.

27. Kisavi PM. Prevalence and factors associated with soil transmitted helminth infection among primary school children in Kikumuni sub-location, Machakos County, Kenya 2015.

11. ANNEXES

11.1 Information sheet

Annex 1: Informed consent and consent form

Participant Information sheet, English version

Good morning/afternoon. My name is _____and I am from _____. I am a member of a data collector team on behalf the study conducted by Ahmed Hussein, who is a MPH. student in Bahir Dar university.

Title: -Prevalence of intestinal parasitic infection and associated factors among primary school children in Guanguaworeda: School based cross-sectional study, Northwest, Ethiopia, 2020.

Introduction: My name is Ahmed Hussein and I am a student at the Bahirdar University, college of public health. I am here with my team to conduct a research on factors associated with IPIs among grade 1-8 primary school children in selected kebeles inGuanguaworeda. I would like to seek your cooperation regarding this exercise.

The purpose of the study: The aim of this study is to assess the prevalence and risk factors associated with intestinal parasitic infections among primary school children in Guanguaworeda in Amhara region Northwest Ethiopia

Procedure: The method of this research is a school -based cross-sectional study design. The expected duration of the study participant for one time contact with the interviewer will not be more than 30 minutes. You will be asked to participate in this research since the truthful information which you will provide is important for the understanding of the proposed research project. However, your particular participation is affirmed by the procedure of probability sampling technique which provides equal chance of selection.

Confidentiality: Strict confidentiality will be maintained, all the personal identifiers will be removed from the data. Participants in the study will be identified only by specific numbers. No data will be released outside the study without explicit consent of my study team. After the research defense and final work is approved by Bahirdar university senate, the original data questionnaire will be incinerated in a secure manner.

Risk and benefit: Apart from the inconveniences caused by taking part of your time, the process is safe and there are no risks involved. There are no direct benefits to you by choosing to participate in this study. However, the results of this study will be communicated back to the health facility for necessary action by the health authority.

The information, you providewill, therefore be of benefit not only to you but also other people and aid in planning strategic interventions for prevention and control of intestinal parasitic infections in Ethiopia.

Theresults will be also used in writing my thesis as part of requirements by the university. If you want to participate in the study, you have also the full right to withdraw from the study at any time you wish without any penalty. Nobody will ask or enforce you to explain the reason for withdrawal.

Contact information: For any inquiries in the event of any research related questions, comments or complaints, the following persons will be available for contact:

Principal Investigator: Ahmed Hussein

Telephone: 0918741271/0993032294

Email*:* *ahmedhusseinm869@gmail.com*

Data collector name ----------

11.2 Consent form

Title of the thesis project: Prevalence of intestinal parasitic infection and associated factors among primary school children in Guanguaworeda:,Northwest, Ethiopia, 2020. I am aware that this research undertaking is a post graduate MPH, degree research project which is fully supported and coordinated by Bahir Dar University and Amhara Regional Health Bureau and the designate principal investigator is Ahmed Hussein.

I have been also fully informed in the language I understood and about the research project objective to assess the prevalence and associated factors of intestinal parasitic infection among primary school children from grade 1- 8 in GuanguaworedaNorthwest Ethiopia. I have been informed that all the information I shall provide to the interviewer will be kept confidential. I understood that the research has no any risk and no compensation. I also know that I have the right to withhold information, skip questions to answer or to withdraw from the study any time. I have been informed that nobody will impose on me to explain the reason of withdrawal. It is also clear that there will be no effect at all in my health benefit or other administrative effect that I get from the district. I have been assured of the right to ask information that is not clear about the research before and/or during the research work by contacting:

1. Bahir Dar University, Office phone:

2. Principal investigator name and address: **Ahmed Hussein, cell Phone: +251918741271**. Supervisor name and address: _____

I have read this form, or it has been read to me in the language I comprehend, and I understood the condition stated above; therefore, I am willing and confirm my participation by signing this consent form. Mothers/caregivers agreed to participate in the study: (Mark one of them for verbal/oral consent) Yes _____ No _____

Name of interviewer signature _____

Signature _____Date _____ English Questionnaire

Name of data collectors----------Signature----------Date

Date of of data collection ----------

Starting time of data collection ---------- End time of data collection----------

Name of School ---------- Code of respondents ----------

Part I: Socio-demographic characteristic

S/No	Questions	Answer	Code
101	Age of the child	5-8 9-14 ≥ 1	1 2 3
102	Sex of child	Male Female	1 2
103	Grade of a child	1-4 5-8	1 2
105	Family size of the child	2 3 4	1 2 3
106	Mothers educational status	Can't read and write Can read and write Formal education	1 2 3

107	Fathers educational status	Can't read and write Can read and write Formal education	1 2 3
108	Occupational status of mothers	House wife Farmers Merchant Govt. workers	1 2 3 4
109	Residence	Urban Rural	1 2

Part 2: Environmental factors

S/No	Questions	Answers	Code
201	Do you have latrine at school	Yes No	1 0
202	If "yes"to Qes 201,What type of latrine used at school(observe)	Private Shared Open defecation	1 2 3
203	Do you have latrine at HHs	Yes No	1 0
204	If "yes" to Qes 203,What type of latrine used at HHs(observe)	Private Shared Open defecation	1 2 3
205	Is there hand washing facility near the toilet at school(observe)	Yes No	1 0
206	Is there hand washing facility	Yes	1

	near the toilet at HHs(observe)	No	0
207	Where do you usually put away the waste	In public bin On the road/street Whencollecting truck coming Others specify	1 2 3 4
208	Presence of faces within the school compound(observe)	Yes No	1 0
209	Source of water at school	Pipe water Protected spring Hand dug well Un protected spring Others	1 2 3 4 5
210	Source of water at HHs	Pipe water Protected spring Hand dug well Un protected spring Others	1 2 3 4 5

Part 3. Child's behavioral or hygiene practice factors

S/No	**Questions**	**Answer**	**Code**
301	Do you wash your hands every time	Yes No	1 0
302	If "yes" to Qes 301, When do you wash your	Before preparing or cooking food	1

	hand?	After visiting a toilet After any waste contact Before any child contact Before child feeding Specify other----	2 3 4 5 6
303	What do you use in washing your hands?	Plain water clean water and soap Specify other----	1 2 3
304	Do you take shower	Yes No	1 0
305	If "yes" to Qes no 304, How often in a week?	Once a weak Two times a week > 2 times a week Not washing within a week Others (specify)-----	1 2 3 4 5
306	What is the nature of the water for bathing?	Flowing water Water in a basin At the home Anywhere that is safe for me Others(specify)	1 2 3 4 5
307	Do you wear Shoe?	Yes No	1 0
308	If " yes" to Qes 307, When do you wear shoe?	Always During market day and holy day Sometimes Specify others---	1 2 3 4
309	Doyou play with by eating	Yes	1

	soil	No	0
310	Does the child is trim the nail?	Yes No	1 0
311	Habits of swimming of a child	Yes No	1 0
312	Main findings of IPIs	Ascaris lubricoidsds Trichuris Trichuria Hook worms Entamoeba histolytic a Giardia lambilia Schistosoma mansoni More than two species None	1 2 3 4 5 6 7 8

Part 4: -Interventions of IPIs

S.no	**Questions**	**Answer**	**Code**
401	Deworming is supplemented at schoollevel?	Yes No	1 0
402	If "yes" to Qes 401, How many times in a year the child has received albendazole/mebendazole?	Not received yet One time Two times Three times Four and more times	1 2 3 4 5

ለጥናቱተሳታፊዎችየሚሰጥመረጃ፤በአማርኛየተተረጎመ

እንደምንአረፈዳችሁ/ዋላችሁ፡-ስም ----------

ደባላል፡፡የመጣሁትከባህርዳርዩኒቨርሲቲበውኃ፣በአካባቢእናበግልንፅህናየ2ኛድግሪተማሪየሆነዉንአሀመድሁሴ ንወክየመረጃስመሰብሰብነዉ፡፡ስጥናቱአባልስሆንየጥናቱየጥናቱርዕስም፡-

በንንጓረዳበሚገኙየመጀመሪያደረጃት/ቤት ውስጥ ክፍሳቸው ከ አንድ እስከ ስምንት በሆኑ ሕፃናት ሳይ የሚከሰተዉን የአንጀት ጥገኛ ትሳትሎች በሽታ ስርጭት እና ተያያዝ ወሳኝ መንስኤዎች መለየትነው ነዉ; የጥናቱ ተመራማሪ ሙሉ ስም፡- አህመድ ሁሴን

የጥናቱ አሳማ፡ የጥናቱ አሳማ በንንጓ ወረዳ በሚገኙ የመጀመሪያ ደረጃ ት/ቤት ውስጥ ክፍሳቸው ከ አንድ እስከ ስምንት በሆኑ ሕፃናት ሳይ የሚከሰተዉን የአንጀት ጥገኛ ትሳትሎች በሽታ ስርጭት እና ተያያዝ ወሳኝ መንስኤዎች ለመለየት ነዉ፡፡ ጥናቱ የሚሰራው ለ2ኛ ድግሪ በውኃ፣በአካባቢ እና በግል ንፅህና የመመረቂያ ጹሁፍ ጥናት ማሚያ ነዉ፡፡

የጥናቱጥቅምናጉዳት፡ ጥናቱ ለሕጭር ጊዜ የሚሆን የገንዘብ የጤና እና የአቅም ግንባታ ድጋፍ አያደርግም፡፡ ነገር ግን ከተወሰነ ጊዜ በኃላ የጥናቱ ዉጤት ለሚመለከተታቸው መስሪያቤቶች፤ለህግ አርቃቂዎች፡ለእቅድ አውጭዎች የሚያገለግል ሲሆን ይህም ክፍሳቸው ከአንድ እስከ ስምንተኛ በሆኑ ሕፃናት ሳይ የሚከሰተዉን የአንጀት ጥገኛ ትሳትሎች በሽታ ስርጭት ለመከላከል ትልቅ አስተዋፅኦ ያደርጋል፡፡ጥናቱ ምንም አይነት ጥቅማጥቅም እና ማካካሻ አይኖረዉም ምክንያቱም ጥናቱ ምንም አይነት ጉዳት የማያስከትል መሆኑ ነዉ፡፡ በመጨረሻም በዚህ ጥናት ለመሳተፍ ፈቃደኛ ከሆኑ፤ መጠየቁ በሚካሄድበት ጊዜ ደስተኛ ካልሆኑ በማነኛውም ሰዓት መረጃ መስጠቱን የማቋረጥ መብተዎ የተጠበቀ ነዉ፡፡ ሲያቋርጥም ምንም አይነት ተፅእኖ አይደረስብዎትም፡፡

የጥናቱ አካሄድ እና ተሳትፎ፡ የጥናቱ መስሪያ መንገድ በሕጭር ጊዜ መረጃ በመሰብሰብ የሚካሄድ ነዉ፡፡ ከጥናቱ ተሳታፊዎች መረጃ የሚሰብሰበው አንድ ጊዜ ሲሆን ይህም ከ 20 እስከ 30 ደቂቃ በላይ ጊዜ ቆይታ አይወስድም፡፡ በት/ቤትዎ ውስጥ ካሉ ክፍሳቸው ከአንድ እስከ ስምንተኛ በሆኑ ሕፃናት ውስጥ የአንጀት ጥገኛ ትሳትሎች በሽታ የሰገራ ምርመራ የሚደርግለት ሲሆን እርስዎ የሚሰጡት ተዓማኒነት ያለው መረጃ ጥናቱን ሰርቶ ለማጠናቀቅ በጣም አስፈላጊ ነዉ፡፡ በጥናቱ እንዲሳተፉ የተመረጡት ለሁሉም የአካባቢው ተማሪዎች እኩል የመሳተፍ እድል በሚሰጥ የምርጫ ሂደት ውስጥ ነዉ፡፡

ምስጢራዊነት፡ የሚሰጡት መረጃ በደንብ የሚያዝ ሲሆን ስማንም ሰው ተሳልፎ አይሰጥም፡፡ ከዚህ በተጨማሪም ከመረጃው ጋር የእርስዎ ስም አይያዝም፡፡ ስለዚህም መረጃ ሰብሳቢው የሚጠቀመው ኮድ/ ሚስጥር ቁጥር ነዉ፡፡ የሚሰጡት መረጃ ተቆልፎ በመረጃ መያዣ የሚቀመጥ ሲሆን ከጥናቱ ተመራማሪ ከመረጃው ሰብሳቢዎች ተቆጣጣሪ ውጭ ማንም አያገኘውም፡፡ የጥናቱ ተመራማሪ መረጃውን ከሚፈሰገው አላማ ውጭ አይጠቀምበትም፤ጥናቱ ተሰርቶ ሰልቆ የጥናቱ ተመራማሪ ከተመረቀ በኃላ መረጃ የተሞላበት መጠይቅ በጥንቃቄ ይቃጠላል፡፡

ግንኙነትን በተመለከተ፡ ተጨማሪ መረጃ ማግኘት ከፈለጉ በማንኛውም ጊዜ መጠየቅ ይችላል፡፡ስለዚህም የጥናቱን ተመራማሪ ወይም የመረጃ ሰብሳቢዎችን ተቆጣጣሪዎችን ማነጋገር ይችላሉ፡፡ከዚህ በተጨማሪም ጥናቱ የሚሰራው የባህር ዳር ዩኒቨርሲቲ በሰጠው ፈቃድ ስለሆነ የሚፈልጉትን መረጃ ለመጠየቅ የሚከተለውን አድራሻ መጠቀም ይችላሉ፡፡

1. የባህር ዳር ዩኒቨርሲቲ የቢሮ ስልክ ቁጥር፡- _____
2. የጥናቱ ተመራማሪ ሙሉ ስም እና አድራሻ፡ አህመድ ሁሴን

   ስልክ ቁጥር፡ +251 918741271/0993032294

   E-mail:ahmedhusseinm869@gmail.com
3. የመረጃ ሰብሳቢው ተቆጣጣሪ ሙሉ ስም እና አድራሻ _____

የስምምነት መግለጫ ቅፅ፤

የጥናቱ ርዕስ፡-በጓንጓ ወረዳ ውስጥ በሚገኙ የመጀመሪያ ደረጃ ት/ቤት ክፍሳቸው ከአንድ እስከ ስምንተኛ በሆኑ ሕፃናት ላይ የሚከሰተዉን የአንጀት ጥገኛ ትሳትሎች በሽታ ስርጭት እና ተያያዥ ወሳኝ መንስኤዎች ለመለየት ነዉ፡፡

እኔ ጥናቱ ለ2ኛ ድግሪ ማሚያ እንደሆነና በባህርዳር ዩኒቨርሲቲ የገንዘብ ድጋፍ ተደርጎለት የሚሰራ እና አቶ አህመድ ሁሴን የጥናቱ ተመራማሪ እንደሆነ አውቃለሁ፡፡ የጥናቱም አላማ በሚገባኝ ቋንቋ በመረጃ ሰብሳቢው የተገለፀልኝ ሲሆን አላማውም በጓንጓ ወረዳ በሚገኙ የመጀመሪያ ደረጃ ት/ቤት ክፍሳቸው ከአንድ እስከ ስምንተኛ በሆኑ ሕፃናት ላይ የሚከሰተዉን የአንጀት ጥገኛ ትሳትሎች በሽታ ስርጭት እና ተያያዥ ወሳኝ መንስኤዎች ለመለየት ነዉ፡፡

እኔ የምሰጠው መረጃም በጥንቃቄ እንደሚያዝና ለሌላ ሰው ተሳልፎ እንደማይሰጥ ተነግሮኛል፡፡ ጥናቱ በኔም ሆነ በልጄ ምንም አይነት ጉዳት እንደማያደርስና ምንም የአጭር ጊዜ ጥቅምም ሆነ ማካካሻ

እንደሌለው አምኛለሁ፡፡ መረጃውን በምሰጥበት ጊዜ የማልፈልገውን ጥያቄ መልስ ያለመስጠት ወይም ሙሉ በሙሉ መጠይቁን የማቋረጥ ሙሉ መብት እንዳለኝ ተነግሮኛል፡፡ ስለ ጥናቱ ያልገባኝን ነገር ቢኖር መረጃው ከመሰብሰቡ በፊትም ሆነ በሌላ ጊዜ ከዚህ በታች የተጠቀሱትን አድራሻ በመጠቀም መጠየቅ እንደምችል ተነግሮኛል፡፡

1. ባህር ዳር ዩኒቨርሲቲ; የቢሮ ስልክ ቁጥር፡- _____

2. የጥናቱ ተመራማሪ ሙሉ ስም እና አድራሻ፡- አህመድ ሁሴን

ስልክ ቁጥር፡ +251 (0) 918741271/0993032294

E-mail:ahmedhusseinm869@gmail.com

3. የመረጃ ሰብሳቢ ተቆጣጣሪ ሙሉ ስም _____ አድራሻ _____

ከዚህ በላይ ያለውን ቅፅ አንብቢያለው ወይም በሚገባኝ ቋንቋ ተነቦልኝ የምጠየቀዉን ጥያቄ ለመመለስ ፈቃደኛ ሆኜ ተስማምቻለው፡፡

1. አዎ ፈቃደኛ ነኝ ☐ ፊርማ_____

2. ፈቃደኛ አይደለሁም አመስግነዉ ይለፉ ☐

የአማርኛ መጠየቅ

የመረጃ ሰብሳቢ ስም_____ፊርማ _____ቀን_____

መጠየቁ የተሞላበት ቀን----------

መጠየቁ የተጀመረበት ሰዓት ---------- መጠየቁ የተጠናቀቀበት ሰዓት ----------

የት/ቤቱ ስም_____

የተማሪው መለያ ቁጥር_____

ክፍል 1:የሶሽዮ-ዲሞግራፊመረጃመጠይቅ

ተ/ቁ	ጥያቄ	መልስ	ኮድ
101	የህጻኑ/ኗ ዕድሜ	5 - 8 9 - 14 ≥ 15	1 2 3
102	ፃታ	ወንድ ሴት	1 2
103	የህጻኑ/ኗ ክፍልና ሴክሽን	1 -4 5 - 8	
104	የቤተሰብ ብዛት	2 3 4 ≥	1 2 3 4
105	የሕፃኑ/ኗ እናት የትምህርትደረጃ	ማንበብና መጻፍ የማይችሉ ማንበብና መጻፍ የሚችሉ መደበኛ ት/ት የተማረ	1 2 3
106	የሕፃኑ/ኗ አባት የትምህርትደረጃ	ማንበብና መጻፍ የማይችሉ ማንበብና መጻፍ የሚችሉ መደበኛ ት/ት የተማረ	1 2 3

107	የእናትህ/ሽ ሥራ ምንድን ነው	የቤት እመቤት ግብርና ነጋዴ የመንግሰት ሰራተኛ	1 2 3 4
108	የመኖሪያ ቦታ	ከተማ ገጠር	1 2

ክፍል 2 - የአካባቢ ሁኔታ

201	በት/ቤታችሁ ግቢ ውስጥ መጸዳጃ ቤት አለ ወይ (በምልከታ ደረጋገጥ)	አዎን የለም	1 0
202	በት/ቤትግቢውስጥ የትነው የምትጸዳዳው/ጅው	በጋራ መጸዳጃ ቤት	1
203	በመኖሪያ ቤታችሁ መጸዳጃ ቤት አለ ወይ(በምልከታ ደረጋገጥ)	አዎን የለም	1 0
204	በመኖሪያቤታችሁ የትነው የምትጸዳዳው/ጅው(በምልከታ ደረጋገጥ)	በግል መጸዳጃ ቤት በጋራ መጸዳጃ ቤት ሜዳ ላይ	1 2 3
205	በት/ቤታችሁ ከመጸዳጃ ቤት አጠገብ የእጅ መታጠቢያ አለ ወይ(በምልከታ ደረጋገጥ)	አዎን የለም	1 0
206	በመኖሪያ ቤታችሁ ከመጸዳጃ ቤት አጠገብ የእጅ መታጠቢያ አለ ወይ	አዎን የለም	1 0
207	ከመኖሪያ ቤትዎ የሚፈጠረውን ደረቅ ቆሻሻ በየትኛው መንገድ ያሰወግዳሉ	በተዘጋጀ የደረቅ ቆሻሻ ጉድጉድ መንገድ ላይ በመወርወር በመዘጋጃ ቤት መኪና ሌላ ካለ ይጠቀስ	1 2 3 99
208	በመኖሪያ ቤቱ ዙሪያ የሰዎች ፅዳጅ መኖሩ በምልከታ ደረጋገጥ(በምልከታ ደረጋገጥ)	አዎን የለም	1 0
209	በት/ቤት ውስጥ ውሃ የምታገኙት ከ የትነው	ከጊንጊውሃ ከጎለበተ ምንጭ ከእጅጉድጉድ ካልተጠበቀ ምነጭ ሌላ ካለ ይጠቀስ	1 2 3 4 99

210	በመኖሪያ ቤት ውስጥውሃ የምታገኙት ከ የትነው	ከቧንቧውሃ ከጎለበተ ምንጭ ከእጅጉድጉድ ካልተጠበቀ ምነጭ ሌላ ካለ ይጠቀስ	1 2 3 4 99

301	አጅህን/ሽን ሁልጊዜ ትታጠባለህ/ሽ ዎይ	አዎን የለም	1 0
302	አጅህን/ሽንመቼመቼነው የምትታጠቡት	ምግብ ከ ማብሰሌ በፊት ከሽንትቤት መልስ ማንኛውንም ቆሻሻ ከነካሁ በኃላ ህጻናትን ከመንካቴ በፊት ህጻናትን ከመመገቤ በፊት ሌላ ካለ ይጠቀስ	1 2 3 4 5 99
303	አጅህን/ሽን በምን ትታጠቢያለሽ	ንጹህ ባልሆነ ውሃ በሳሙና እና ንጹህ በሆኑ ውሃ ሌላ ካለ ይጠቀስ	1 2 99
304 305	ገላህን/ሽን ትታጠቢያለሽ በሳምንት ምን ያህልጊዜ ትታጠባለህ/ሽ	አዎን የለም አንድ ጊዜ ሁለት ጊዜ ከሁለት ጊዜ በላይ በሳምንትአልታጠብም ሌላ ካለ ይጠቀስ------	1 0 1 2 3 4 5
306 307	ገላህን/ሽን የት ነዉ ምትታጠቢዉ ጫማ ትለብሳለህ/ሽ	ከወራጅ ወንዝ ሻወር ቤት ቤትዉስጥ በማንኛዉምቦታ ሌላ ካለ ይጠቀስ------ አዎን የለም	1 2 3 4 5 1 0
308	መቼ መቼ ነዉ ጫማ የምተለብሰዉ/ሽው	ሁልጊዜ በገበያ ቀን አልፎ አልፎ ሌላ ካለ ይጠቀስ------	1 2 3 4
309	በምትጫወትበት/ችበት ጊዜ አፈሩን በማኘክና በመዋጥ ትጫወጣላችሁ	አዎን የለም	1 0
310	ህፃኑ/ኗ ጥፍሯን አሳጥራለች	አዎን የለም	1 0
311	ህፃኑ/ኗ ዋና ይዋኛል/ትዋኛለች	አዎን የለም	1 0

312	በላብራቶሪ ምርመራ የተገኘ የአንጀት ጥገኛ ትላትሎች አይነት	Ascaris lumburicoides Trichuris trichiura Hookworms Entamoeba histolytic a Giardia lambilia Schistosoma mansoni More than two species None	1 2 3 4 5 6 7 8

ክፍል 4፡-የአንጀት ጥገኛ ትላትሎች ብክለትን ለመከላከል እየተሰረ ያሉ ስራዎች

401	በቀበሌም ደረጃ የአንጀት ጥገኛ ትላትሎች መድሀኒት ይሰጣል	አዎን የለም	1 0
402	የአንጀት ጥገኛ ትላትሎች መከላከያ መድሀኒት ስንት ጊዜ ወስዶ/ዳ ታውቃች?	ወስዶአያውቅም አንድጊዜ ሁለት ጊዜ ሶስት ጊዜ አራት ጊዜ እና ከዚያበላይ	1 2 3 4 5