



PREVALENCE OF INTESTINAL PARASITIC INFECTION AND THEIR
ASSOCIATED FACTORS AMONG PRE AND PRIMARY SCHOOL
CHILDREN IN ADDIS ABABA CITY,ETHIOPIA,2018

MPH THESIS

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CITY,ETHIOPIA,2018

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LIST OF ACRONYMS/ABBREVIATIONS

AIDS	Acquire Immune Deficiency syndrome
EPHI	Ethiopian Public Health Institute
IPI	Intestinal Parasitic Infection
Lab.	Laboratory
MAM	Moderately Acute Malnutrition
NGO	Non-Governmental Organization
OPD	Out Patient Department
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SPHMMC	Saint Paul's Hospital Millennium Medical College
WHO	World Health Organization

ABSTRACT

Introduction: Intestinal Parasitic Infection (IPI) is one of the major health problems globally and up to 3.5 billion people are infected and around 450 million people are ill due to intestinal parasites. IPIs are responsible for high levels of morbidity including malnutrition. This study was conducted to Assess the prevalence of intestinal parasitic infections and their association with Nutritional Status of Pre and Primary school children found in Addis Ababa Region.

Methods: A cross sectional study design was employed. A total of 480 children aged 3 to 12 years were participated from November to December, 2017. Data was collected using standardised questionnaire, stool examination and anthropometric measurements. Stool examinations for parasitic protozoa and helminths were carried out. Logistic regression was done to evaluate the association between nutritional status and parasitic infections. EpiInfo 7 for data entry and SPSS 21 was used for analyse.

Results: Six percent of the participants were found to have a helminthic infection, while 10.34% were found to have a protozoan infection. Approximately 17.6% of the students were stunted, 5.3% were wasted, and 7.6% were underweight. Hand nail hygiene (AOR: 0.016; 95%CI (0.005-0.050); $P < 0.001$), cut Nail periodically (AOR: 0.076; 95%CI (0.027-0.213), Household income < 1500 (AOR: 11.31; 95%CI (4.322-29.624), adequate knowledge about IP (AOR: 0.028; 95%CI (0.009-0.086) and Mother Education (AOR: 0.146; 95%CI (0.067-0.317).

Conclusion: Intestinal parasitic infections and Malnutrition were prevalent and important health problem among Preschool and primary school children of Addis Ababa region. E.A. Histolytic and H. Nana were the most frequently Encountered parasites. Encourage Mother education, House hold income generation activity ,Initiatives aimed at improving personal hygiene of student by providing WASH facilities and to keep short their nail every time. Access to health education on IPIs issues, practices to prevent the spread of parasitic diseases. Initiatives aimed at improving the nutritional status of school children are also needed

Key words: intestinal parasitic infection; protozoan infection; nutritional status; School Children

Words count: 300

1. INTRODUCTION

1.1 Background

Intestinal parasitic infections (IPIs) are parasites that can infect the Gastro Intestinal tract of humans and other animals, live most prefer the intestinal wall, and means of exposure include ingestion of undercooked meat, drinking infected water and skin absorption(1). These infections are most prevalent in populations with low household income, poor handling of personal and environmental sanitation, overcrowding, and limited access to clean water (2).It's remain a serious public health problem globally and have usually been associated with human malnutrition. Protozoa and helminthes infections are widespread and antagonistic to certain aspects of intestinal physiology and thus of importance with respect to nutritional status in humans (3). Intestinal helminthes are more prevalent throughout the tropics, especially among poor communities (4). Intestinal parasitic infections (IPI) constitute a global health burden. They are estimated to affect approximately 3.5 billion persons worldwide and cause clinical morbidity in 450 million, many of these being children in developing countries. Intestinal parasitic infections, mostly helminthes, have been linked with poorer nutritional outcomes, including an increased risk for nutritional anemia's ,protein-energy malnutrition (PEM), and growth deficits in children(5).

The prevalence of *Entamoeba histolytica*, for example, ranges from 5% to 81% and is estimated to involve around 480 million people worldwide. *Giardia lamblia* is the most common intestinal parasite in the United States (6). Of the 3% to 7% of the population with *G. lamblia* in Australia, 1.6% were asymptomatic (7). In a study in China, *Enterobius vermicularis* (47.0%), *Trichuris trichiura* (18.8%) and *Taenia Saginata* (17.2%) were the most frequent causes of intestinal parasitic infections (8). Estimates of the global prevalence of intestinal nematode infections transmitted through soil are: 1000 million cases of *Ascaris lumbricoides*, 900 million of hookworms (*Ancylostoma duodenale* and *Necator americanus*) and 500 million of *Tr. trichiura* (9). Studies have shown that the prevalence of intestinal parasitic infection is higher in younger people, especially children (10). For example, an extensive survey in Malaysia reported the overall prevalence of intestinal parasitic infections as 39.6% with as many as 89.0% in children between the ages of 2 and 12 years (11).

1.2 Statement of the Problems

Studies have shown that the prevalence of intestinal parasitic infection is higher in younger people, especially children (10). For example, an extensive survey in Malaysia reported the overall prevalence of intestinal parasitic infections as 39.6% with as many as 89.0% in children between the ages of 2 and 12 years (11). Up to 270 million preschool and 600 million school children are living in area where high transmission of parasitic worm (12).

Intestinal parasitic infections are among the major diseases of public health problems in sub-Saharan Africa. Apart from causing mortality and morbidity, infection with intestinal parasites has been associated with stunting of linear growth, physical weakness and low educational achievement in schoolchildren (13-16). Protozoa and helminthic parasites are the known parasites that affect the gastrointestinal cavity. Intestinal parasites such as *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm are the most prevalent and affect about one-sixth of the world population (17). *A. lumbricoides* is responsible for about 1.2 billion infections globally while *T. trichiura* and hookworm infection accounts about 795 million and 740 million, respectively (18).

High prevalence of intestinal parasitic infection were reported among school children in Sub Saharan African countries including 27.7% to 95% (19–25) in Ethiopia, 90% in Central Sudan (26), 50.0% in Rwanda (27), 48.7% in Tanzania (28) and 84.7% in Burkina Faso (29). In Ethiopia, IPIs prevalence can be as high as 86.2% in Jimma (6) whereas in Babile as low as 27.2% (7).

In Ethiopia, based on the Central Statistical Agency (CSA), 2016: underweight, wasting, and stunting in children aged under-five years was 31%, 13%, and 56%, respectively; In Addis Ababa (5%) underweight, (3.5%) wasting, and (14.6%) stunting (30). Focusing on IPI is one of strategic method to reduce malnutrition in children. The contributing factors are different in related household income, poor handling of personal and environmental sanitation, overcrowding, and limited access to clean water. Previous studies conducted in Ethiopia were largely focused on the magnitude of intestinal parasitic infections (31) but not on the association with the nutritional status. Hence, this study was conducted to Assess the Magnitude of intestinal parasitic infections and their associated risk factors among Pre and Primary school children found in Addis Ababa (A.A), 2018.

1.3 Significance of the study

This study would have a significant input for the stakeholders and policy makers involved in Intestinal Parasitic Infection, WASH and Nutrition programs in School intervention; to design appropriate strategy or to modify and facilitate the planning, intervention and evaluation of prevention programs of IPIs, Nutrition/school feeding program and associated risk factors of IPIs. Epidemiological information on the occurrence of IPIs and the associated risk factors is a pre- request to develop appropriate control strategies. It also encourages other researchers to carry out additional research in this particular area.

2. LITERATURE REVIEW

2.1 Prevalence of IPIs

Intestinal parasitic infection is one of the major health problems globally and up to 3.5 billion people are infected and around 450 million people are ill due to intestinal parasites (5).

A study done in Orang Asli school children in Malaysia: .Fecal samples were collected from 498 school children (50.6% boys and 49.4% girls), and examined by using direct smear, formalin-ether sedimentation, trichrome stain, modified Ziehl Neelsen stain, Kato-Katz, and Harada Mori techniques. Overall, 98.4% of the children were found to be infected by at least one parasite species. Of these, 71.4% had polyparasitism. The overall prevalence of *Trichuris trichiura*, *Ascaris lumbricoides*, hookworm, *Giardia duodenalis*, *Entamoeba* spp. and *Cryptosporidium* spp. infections were 95.6%, 47.8%, 28.3%, 28.3%, 14.1% and 5.2%, respectively(32).

A study done in Yemen: The overall prevalence (95% CI) of the IPIs was estimated at 52.8% (46.1%; 59.4%), i.e. 115 positive out of 218. About 43% of samples contained a single parasite and 10% contained multiple parasites. *Giardia lamblia*, being the most common IP, was present in 63 samples (28.9%) followed by *Ascaris lumbricoides* present in 36 samples (16.5%), *Blastocystis hominis* in 22 samples (10.1%), *Hymenolepis nana* in 2 samples (0.9%), *Endolimax nana* in 4 samples (1.8%), *Entamoeba coli* in 5 samples (2.3%) and *Iodoamoeba butschlii* in 7 samples (3.2%) were identified from the stool samples(33).

A study done in Wakeso, Central Uganda: A total of 432 school children were investigated. The mean age of children was 10.9 years. Female 224(51.9%) and Male 208(48.1%) The majority (78.5%) were aged between 10–14 years The study shows that majority of the 69 infected children had hookworms (67%) followed by *Trichiuris Trichiura*(19%), *Schistosoma Mansoni*(12%) and *Ascaris Lumbricoid*(2%). Female 28(6.5%) and Male 41(9.5%) infected. The prevalence of stunting, underweight and moderate acute malnutrition (MAM) was 22.5%, 5.3% and 18.5% respectively. Wasting was found among 50(11.6%) of the boys and 30(6.9%) of girls. Stunting was found among 54(12.5%) of the boys and 43(10.0%) of girls. Underweight was found among 17(3.9%) of the boys and 6(1.4%) of girls (34).

A study done in Angolala primary School, Ethiopia: The study population consisted of 664 students aged from 6 to 21 years. Stunting was found among 10.2% of the boys and 12.1% of

the girls, while wasting was found in 19.5% of boys and 19.7% of girls. Nearly 11% of the students were stunted, 19.6% were wasted, and 20.8% were underweight. Under nutrition was observed to be prevalent among both boys and girls. One-third of the participants were found to have a protozoan infection, while 7.1% were found to have a helminthic infection (2).

A study done in Enemorena-Ener District, Gurage Zone, Ethiopia: A total of 641 students from grade 1 to 4 were enrolled in the study. Male 342 (53.4%) and female 299 (46.6%) students constituted the study participants. The overall IPI rate (the presence of at least one IPI) was 40.2%. Of the individual parasites, the most prevalent was *E. histolytica/dispar* (12%) followed by *G. lamblia* (7.66%). Nutritional status determination of the study participants revealed that 262 (40.9%) had thinness (<-2 SD of BAZ) and 250 (39%) stunted (<-2SD of HAZ). For underweight index determination only students below 11 years old were included in the analysis and among these 148 eligible students, 71 (48%) were underweighted (<- 2 SD of WAZ). The mean z score of weight for age, height for age and BMI for age of the total study population were found to be -1.9, -1.86 and -1.76 that was found to be below the WHO Multicenter Growth Reference Study Group 2006 values for each anthropometric measure respectively (35).

A study done in Birbire primary schools in the Delo-Mena district, Bale Zone, Ethiopia: The mean age of the respondents was 10.93 years (std. deviation + 2.5) and male to female ratio of 1.04:1. Majority (77.1%) of the students reported that they were suffering from abdominal pain and 19.9% of them were even experiencing abdominal pain during the study. The overall prevalence of IPIs are 26.6%, a total 10 different intestinal parasites were investigated in this study. The most prevalent parasites were *S. mansoni* 9.6%, followed by *E. histolytica/dispar* 7.7%, *H. nana* 5.3%, *A. lumbri-coides* 3.7%, *G. lamblia* 2.0%, *T. trichiura* 1.6%, *S. stercoralis* 1.4%, *E. vermicularis* 1.2%, Hook-worms 0.8% and *Taenia* spp 0.2%. The overall malnutrition was reported among 21.0% of the children. The prevalence of stunting, thinness/wasting and underweight was found to be 4.5%, 17.1% and 13.6%, respectively. Stunting, underweight and thinness/wasting were found to be higher in boys than girls (31).

A study done in Dona Berber primary school, Bahir Dar, Ethiopia: Among the 359 students participated in the study, 235 (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* (24.5%) followed by hookworm (22.8%) (36).

A study conducted in Homesha District school children, Northwest Ethiopia: Out of the 395 school children examined, nine species of intestinal parasites were identified with an overall prevalence of 140 (35.44%). The most prevalent intestinal parasites identified were *E. histolytica/dispar* 30 (7.59%), *G. lamblia* 26 (6.58%), Hookworm 23 (5.82) and followed by *E. vermicularis* 7 (1.77%) and *T. saginata* 7 (1.77%) as single infections (37).

A study conducted in Adigrat, Ethiopia: from a total of 309 school children examined, 157 (50.81%) were found to be positive by various IPIs. The frequently encountered parasites included *A. lumbricoides* (19.1%), Hook worm (10.03%), *S. stercoralis* (7.77%), *E. histolytica* (4.5%), *E. vermicularis* (3.56%), *T. trichiura* (3.24%) and *Giardia lamblia* (2.29%) (38).

2.2 Associated Risk Factors

A study done in Wakeso, Central Uganda: Males had a threefold risk of being underweight (OR 3.2, 95% CI 1.17–9.4, $p = 0.011$) and 2 fold risk of suffering from MAM (OR 2.1, 95% CI 1.21–3.48, $p = 0.004$). Children aged 10–14 years had a 2.9fold risk of stunting (OR 2.9, 95% CI 1.37–6.16, $p = 0.002$) and 1.9 risk of MAM (OR 1.9, 95% CI 1.07–3.44, $p = 0.019$). The study revealed that 26.6%, 46% and 10.3% of incidences of stunting, underweight and MAM respectively were attributable to helminthes infections (34).

A study done in Angolala primary School, Ethiopia: Severely underweight boys were 3.88-times more likely than boys of adequate weight (OR=3.88, 95%CI: 1.12–13.52) to be diagnosed with protozoan infections. Among girls, those who were severely stunted were approximately 12 times (OR=11.84, 95%CI: 1.72–81.62) as likely to be infected with a helminthic parasite, than those who were not. Overall, there was a deficit in normal growth patterns as indicated by lower than average anthropometric measures (2).

A study done in Enemorena District, Gurage Zone, Ethiopia: Intestinal parasitic infections showed a significant association with stunting, (OR 0.41, 95% CI 0.29 - 0.57, $P < 0.001$) and thinness, (OR 0.53, 95% CI 0.38 - 0.73, $P < 0.001$). There was no significant association between wasting and IPI (35).

A study done in Birbire primary schools in the Delo-Mena district, Bale Zone, Ethiopia indicates stunted students were found to be almost five times (AOR=4.91, 95%CI=1.87-

12.88) more likely to be infected with IPIs. Similarly, underweight students were found to be two times (AOR=1.81, 95%CI=1.02-3.22) more likely to be infected with IPIs. *S. mansoni*($P=0.008$), *A. lumbricoides*($P=0.015$) and *G. lambilia*($P=0.006$) were significantly associated with malnutrition status of the children. Similarly, those children who were infected with mono-parasitism ($P=0.030$) and poly-parasitism ($P=0.002$) were more likely to be malnourished compared to children who were non-infected with intestinal parasites. However, Hookworms and other identified parasites were not significantly associated with malnutrition status (31).

A study done in Dona Berber primary school, Bahir Dar: Among the different variables assessed in the study, family size of 6 (AOR = 4.90; 95% CI, 2.03–11.83), irregularly shoe wearing habit (AOR = 2.85; 95% CI, 1.53–5.32) and unclean finger nail (AOR = 3.68; 95% CI, 1.87–7.26) were independently predict intestinal parasitic infections. Student drinking well water (AOR = 2.51; 95% CI, 2.30–4.86) and unclean fingernail (AOR = 4.42; 95% CI, 2.55–7.65) were strongly associated with *E. histolytica*/dispar infection. Likewise, irregular shoe wearing habit (AOR = 14.13; 95% CI, 7.06–28.29) was strongly associated with hookworm infections (36).

A study conducted in Adigrat, Ethiopia: Children who not trim their finger nails were more infected than those who trim their finger nails (AOR 0.339; 95% CI 0.046-2.481, $P = 0.043$) (38).

2.3 Conceptual frame work

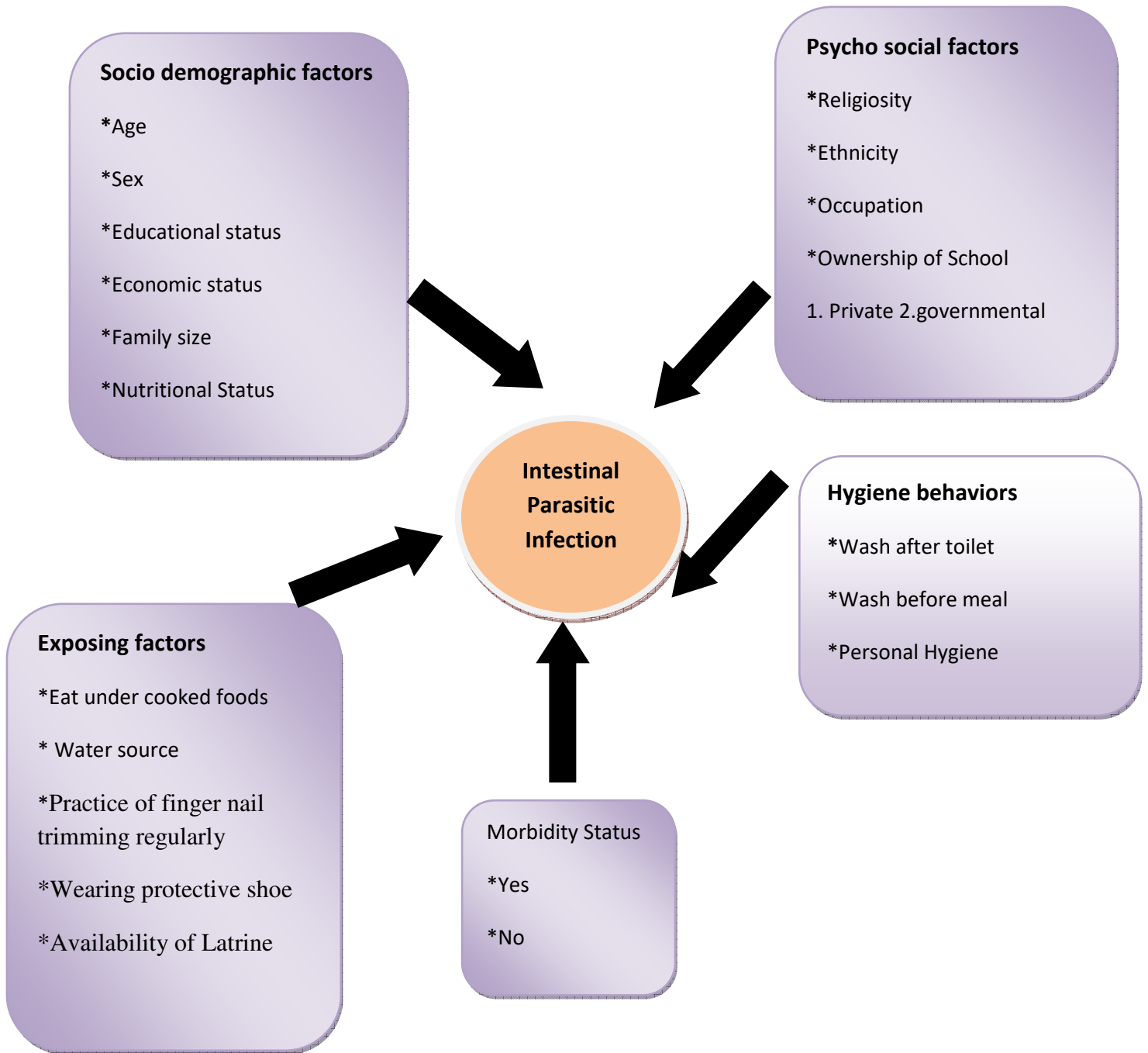


Figure1: Conceptual framework for the study of Magnitude of Intestinal Parasitic Infection and Their Associated factors in Pre and Primary school children in A.A, 2018 adopted from (33, 34, and 35).

3. OBJECTIVE

3.1 General objective

- To assess the magnitude of Intestinal Parasitic Infection and their Associated factors with in preschool and primary School student in Addis Ababa Region, Ethiopia, 2018

3.2 Specific objectives

- To determine the magnitude of Intestinal Parasitic Infection among preschool and primary School student in A.A, 2018
- To assess associated factors of Intestinal Parasitic Infections among preschool and primary School student in A.A, 2018

4. MATERIAL AND METHODS

4.1 Study area

The study was conducted in Kolfefe, Kirkose and Nefase silk, Addis Ababa Region. Addis Ababa (A.A) is the capital city of the Federal Democratic Republic of Ethiopia. Addis Ababa is one of the two cities Administration of Ethiopia. It covers an area of 51948.85 hectares, Located between $8^{\circ}49'55.929''$ and $9^{\circ}5'53.853''$ North latitude and between $38^{\circ}38'16.555''$ and $38^{\circ}54'19.547''$ East longitudes. It is situated in the Central Part of Ethiopia, bounded from South West by Sebeta from West by Road to Ambo, from East by Dukem and from North by Sululta and North East by Sendafa. Its' altitude ranged from 2500 to 2522 meters above sea level. The highly elevated land exists in the north while relatively lower elevation exists in South. The highest peak of Addis Ababa at Semen Mazgaja at the indicated high altitude value of 2522 meters .The city divided by 10 Sub cities, 116 weredas.

According to Addis Ababa city Education bureau Annual Statistics Abstract 2015/2016: There are (1172) Preprimary school, (65) O class and (810) Primary School. There were 168,348 of Preschool students and 509,900 of Primary school student; According to the 2015 projection, the total population within Addis Ababa city is 2,738,248. From the total population 1,304,518(48%) are male while 1,433,730(52%) are female. Kolfe,Yeka, Nifas silk and Bole Lots of people live. Thus, females comprise 52 % and males 48% of the total population. Result from Addis Ababa Food, Medicine, Health care administration, control and Authority, 2016 /17. There are 3Primary hospital, 29 Governmental hospital, 100Gov. Health center, 326 specialty clinic, 414 medium clinic, 118 primary clinic, 8 basic. Lab, 6 advanced laboratory are in A/A.

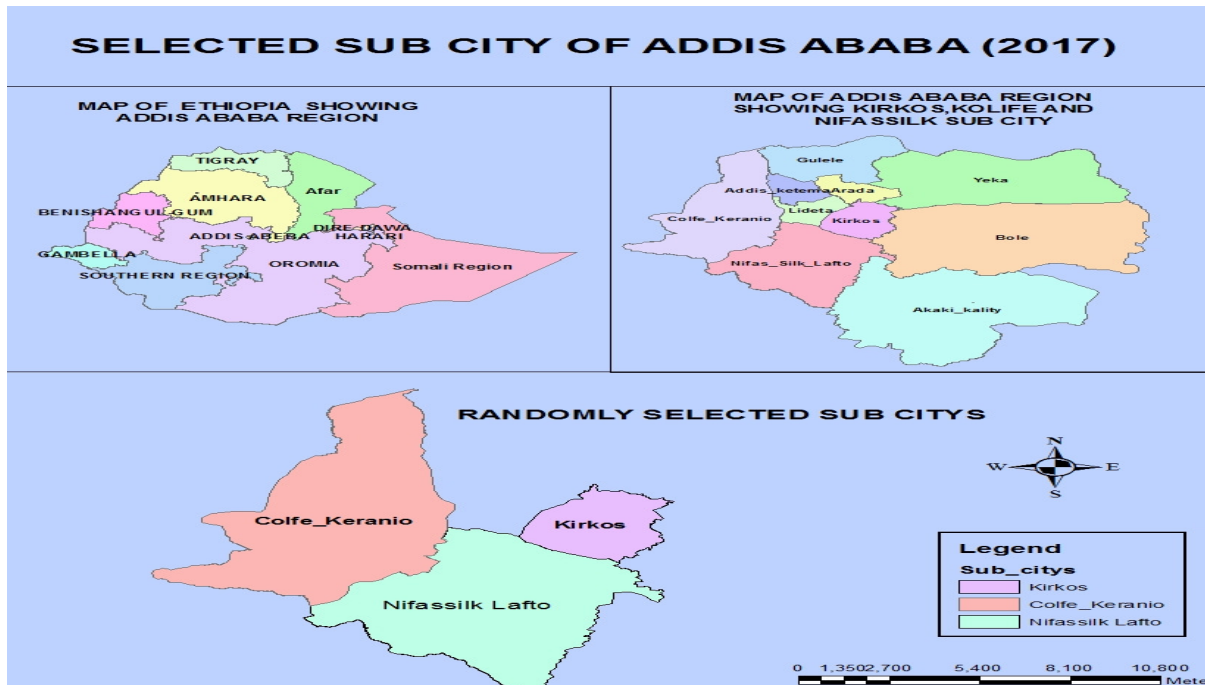


Figure2: Map Showing Kirkose ,Kolfe , and N.Silk Sub City of Addis Ababa, Ethiopia, 2017

4.2. Study Period

The study was conducted from October 22 to December 8, 2017

4.3. Study design

Institutional based analytic cross-sectional study was conducted.

4.4. Source Population

All students of Pre School and Primary School of Addis Ababa.

4.5. Study population

All Pre and Primary School student, selected from Kirkose, Kolefe and Nifase Selke Sub city who fulfilled the inclusion criteria

Inclusion criteria: Regular students of Pre and Primary School Student, age of 3-12, of Addis Ababa.

Exclusion criteria: Students who were critically ill such as with mentally delayed students, Down syndrome, unable to stand and oedematous were excluded during data collection.

4.6. Sample size determination

The sample size of this study was determined using a single proportion formula
$$= (z_{\alpha/2})^2 \frac{p(1-p)}{d^2}$$
 where $z_{\alpha/2}$ = 95% level of confidence (1.96),

p= proportion of magnitude of Intestinal Parasitic infection with assumptions of: expected prevalence 26.6% of IPI among Birbire primary schools in the Delo-Mena district, Bale Zone(33). Total number of target population 248277, confidence level of 95%, degree of precision 5%, design effect 1.5%.The actual number of subjects enrolled in the sample were 480 with 10% non-response rate, Stratified random sampling method was used to draw study subjects. Total students (248,277) were grouped into nine strata: Kindergarten, Grade 1, Grade 2, Grade 3, Grade 4, Grade 5 and Grade 6 then sample was taken based on sample proportional to size.

Therefore, the minimum sample size of students required undertaking the study were 480 by considering a non-response rate of 10%.

4.6.1 Sampling procedure

Addis Ababa has ten Sub city and 30% of them were selected by Lottery. Addis Ababa Regions has 1172 pre and 810 Primary schools. The sample size calculated was 480 and a multistage sampling was used to select the sample.

The first stage was Simple random sampling of 30% of Addis Ababa sub city (Kirkos, N.Silk, Kolfe); 33349(13.43%) , 116013(46.72%) and 98915(39.84%) were targeted student from Kirkos, N.Silk and Kolfe, respectively.

The second stage: from each selected sub city; 20% of woreda selected by simple random sampling (2 out of 11 woreda, from Kirkose), (3 out of 13 woredas, from N.silk) and (3 out of 15 woredas, from Kolfe) by. (Woreda 5 and Woreda 8, from Kirkose) ;(Woreda 1, Woreda 9 and Woreda 12 from N.Silk); and (Woreda 1 , Woreda 3, and Woreda 7 from Kolfe).

3rd stage: From each selected woreda; selection of one governmental and one non-governmental schools by simple random sampling.

Sixteen Pre and primary school involved: From Kirkose: W5(Ewket mich, 33; Seny said, 18) and W8(Yeleba fana , 5; Brass youth, 9).

From N.Silk: W1(Hana, 61; Kalema, 14), W9(Addis Amba, 86; Falcon, 22), and W12(Megabit 28, 30; Future II, 11) and

From Kolfe W1(A.Basilos,53;Tigat,22),W3(Kara Kora,29;Bright hope9) and W7 (Keraniyo ,70 ;Periskal ,8).

The numbers of students on each of the schools were selected using sample proportion to size of students accordingly. Students are stratified by grades. Class of students were selected by lottery if there were more than one class of the same grade. The students were selected systematically from class after receiving their number of size from the records of Pre and Primary School of Sub city of Addis Ababa.

Table 1: Sampling procedure for studying the Prevalence of Intestinal Parasitic Infection and their associated factors among Pre and Primary School student in Addis Ababa City, Ethiopia, 2018

Randomly selected 30% of sub city from A.A city	Randomly selected 20% of woredas from each selected sub city	Selected school with sample size from each selected woreda		Total student
		Governmental	Nongovernmental	
Kirkose Sub city	Woreda-5	Ewket mich,33	Seny said,18	51
	Woreda-8	Yeleba fana ,5	Brass youth,9	14
N/Silk Sub city	Woreda-1	Hana,61	Kalema,14	75
	Woreda-9	Addis Amba,86	Falcon,22	108
	Woreda-12	Megabit 28,30	Future II,11	41
Kolfe Keranyo	Woreda-1	A.Basilos,53	Tigat,22),	75
	Woreda-3	Kara Kora,29	Bright hope,9	38
	Woreda-7	Keraniyo ,70	Periskal ,8	78
Total sample of student				480

4.7. Data collection tool and procedures

The data from participants were collected using standardized self-administered questionnaire which was developed in English language. The questionnaire was translated to Amharic language and was used to collect data. Official letters written by IRB of the College were given to Addis Ababa Health Bureau, Education Bureau and Sub City so that permission were secured at all levels. The objective of the study were also explained to school communities, woreda leaders and parents; and 4 data collectors who have Clinical nurse (2) and Senior Laboratory professional (2) were used as data collectors.

4.7.1 Anthropometric measurement

Height was measured, using a tape meter fixed on a wood board (15 cm × 3cm × 175cm) Posted vertically on the wall, by appropriately trained research nurses who were unaware of the student's infection status. Each student was instructed to stand barefoot, 0.1cm, with head in standard anatomical position, or Frankfurt plane (where the margins of the orbital and the upper margin of each ear canal was most nearly parallel to the ground), and were measured to the closest centimeter (cm). Weight was measured using a calibrated Soehnle model 61319 scale (Soehnle Waagen GmbH & Co., Germany) to the closest kilogram (kg), with the student barefoot and wearing light clothing, 0.1kg. Raw anthropometric data (height, weight and age) of schoolchildren were converted to nutritional indicators (WAZ, BAZ and HAZ) using WHO standards 2006 and WHO Anthroplus. These anthropometric measurements were determined according to the World Health Organization (WHO) guidelines (2).

A reference population of well-nourished children (WHO Multicenter Growth Reference Study Group 2006). The three indices (height-for-age, weight-for-height, and weight-for-age) were expressed as standard deviation units from the median for the reference group. Children who fall below minus two standard deviations (-2 SD) from the median of the reference population are regarded as moderately malnourished, while those who fall below minus three standard deviations (-3 SD) from the reference population median are considered severely malnourished (30). At the time of the measurement inspected whether the finger nails of the students trimmed, general hygienic situation, dirty materials in their hand, and their footwear.

4.7.2 Parasitological examinations

A total of 416 fresh stool samples were collected in plastic cups and were labeled with the students unique study code. Labeled cups were given to the students by trained laboratory

technicians with directions on stool (2gm) sample collection. Following stool collection, the samples were seen by direct Microscopes with 30 minutes and 1gm stool sample preserved in a tube containing 7% formalin, 3% Diethyl ether, were taken to Ethiopian Public Health Institute (EPHI) from the site, for processing. Sedimentation technique was used for fecal examination to diagnose infections with intestinal cyst and ova of worms and protozoa. Following WHO standard operating procedures for the parasitological examination. .

4.8. Data quality management

To ensure the quality of the data first training of the data collectors and their supervisors were carried out for two days by the principal investigator on the objectives, relevance of the study, methods interviewing, confidentiality of information and informed consent. Data Pre-test was conducted on 24 of study participant, in Lemate Minche Preschool and Primary school in Lideta Sub City before the actual data collection to see the accuracy of responses, unseen problem and to estimate time needed for data collection and the questionnaire were adjusted accordingly. Evaluated accuracy, 5% of the fecal samples were randomly reprocessed by a separate senior laboratory expert from EPHI and the results were compared with the results made by the first lab technician

4.9. Measurement variables

Dependent Variables

Intestinal Parasitic Infection status

Independent variables

- Socio demographic characteristics
 - Age in completed years,
 - Date of birth
 - Sex
 - Source of water
 - Ethnicity of Student
 - Religion of Student
 - Year of schools (KG,1,2,3...8)
 - Nutritional Status
 - Educational status of Parents

- Occupation
- Ownership of school
- Household income
- Sanitary facility of Home

4.10. Data processing and analysis

After the data collection was completed; the data were checked for completeness and consistencies, then entered and cleaned using EPI Info version 7 statistical software and exported to SPSS 21 for analysis. Raw anthropometric data (height, weight and age) of schoolchildren were converted to nutritional indicators (WAZ, BAZ and HAZ) using WHO standards 2006 and WHO Anthropus. These anthropometric measurements were determined according to the World Health Organization (WHO) guidelines (2). Data were presented using frequency tables. Bivariate analyses was used to examine the association between IPIs and associated risk factors while multivariate logistic regression analyses were employed to identify independent predictors of IPIs and to control for all possible confounders using binary logistic regression. Odds ratio with 95% confidence interval and p-value <0.05 were estimated to measure the strength of the association.

4.11. Operational definitions/Standards

Oclasses: those are 3-5age that does not have access for formal preschool program (AAEB, 2015/2016).

Preschool Age: Those who are in the age group 3-5 years (AAEB, 2015/2016).

Primary School Age: Those who are in the age group 6-12 years (AAEB, 2015/2016).

Intestinal Parasitic Infection: experience at least one of the IP.

Anthropometry: Human body measurements

Underweight: Weight-for-age below -2 SD (<-2SD of weight-for-age Z score) from WHO Multicenter Growth Reference Study Group 2006

Wasting: Weight-for-height below -2 SD (< -2SD of BMI-for-age Z score) from WHO Multicenter Growth Reference Study Group 2006

Stunting: Height-for-age below -2 SD(< -2SD of height-for-age Z score) from WHO Multicenter Growth Reference Study Group 2006

Overweight :> + 1SD BMI-for-age Z score,

Obesity: ($> +2SD$ BMI-for-age Z score) defined according to the WHO Multicenter Growth Reference Study Group 2006

4.12. Ethical Consideration

Ethical approval for the research were obtained from Department of Public Health of St. Paul's Hospital Millennium Medical College and Addis Ababa Health Bureau Ethical Review Board. Written consent were obtained from every participant's parent or guardians of the selected children before conducting the survey and the children were asked their assent before collecting the samples .We protected the confidentiality of participants through use of codes and omitting names of Students. The ethical considerations were addressed by treating positive children using standard drugs under the supervision of a local BSc. Nurse.

4.13. Dissemination of Results

Final result of this paper were given to Department of Public health of SPHMM, EPHI, Addis Ababa Health and Education Bureau and City government, Sub City Health Office and were also given for others governmental and non-governmental organization responding in Intestinal Parasitic Infection and Nutrition and Control and Prevention. Publication in a reputable journal and presenting it in conferences were considered

5. RESULT

5.1 Descriptive study

5.1.1 Socio-demographic characteristics of study subjects

A total of 480 pre and primary school students were enrolled after fulfilling the inclusion criteria, out of which 43 students refused to participate and 21 students didn't fill the questionnaires fully which makes the non-response rate 13%. The most common reason for non-participation was time due to exams. Complete data were obtained from 416 (86.67%) students. Of the total participants 215 (51.7 %) were males, and 201 (48.3 %) were females. Two hundred six (49.51 %) of the study subjects were in the age group between 6 and 9 years, with a mean and standard deviation of age of 8 ± 2.502 years. Three hundred forty four (82.7 %) and seventy two (17.3%) of the study subjects were from governmental and private school respectively. A large proportion 154 (37 %) of the study subject were from study grade 1-3, one hundred forty five (34.9%), and one hundred sixty (27.9%) were from KG and 4-6 respectively (Table 2).

Table 2. Socio-demographic characteristics of parents and Pre and Primary school children of Addis Ababa, 2018

Descriptive Variables	No(n=416)	%
Age groups		
3-5	92	22.11
6-9	206	49.51
10-12	118	28.36
Total	416	100.00
Sex		
Male	215	51.7
Female	201	48.3
Total	416	100.00
Parent Religion		
Orthodox	137	32.93
Protestant	83	19.95
Catholic	61	14.66
Muslim	92	22.11
Others	43	10.33
Total	416	100.00
Parent Ethnicity		
Amahara	111	26.68
Oromiya	146	35
Tigeray	98	23.55
Guragay	17	4
Seleta	19	5
Others	25	6
Total	416	100.00
Parent Occupation		
Governmental	186	44.71

NGO	43	10.33
Merchant	64	15.38
Private	86	20.67
Others	37	8.89
Total	416	100.00
Household income		
<1500	135	32.45
= >1500	281	67.54
Total	416	100.00
Grades level		
KG	144	34.6
1-3	156	37.5
4-6	116	27.9
Total	416	100.00
School type		
Governmental	344	82.7
Private	72	17.3
Total	416	100.00
Father education		
Illiterate	149	35.82
1-8	81	19.47
9-12	101	24.27
College and above	85	20.43
Total	416	100.00
Mother Education		
Illiterate	169	40.6
1-8	95	22.83
9-12	82	19.71
College and above	70	16.82
Total	416	100.00
Family size		
< = 3	148	35.6
> 3	268	64.4
Total	416	100.00

5.1.2 Prevalence of IPIs

Based on microscopic stool sample examination, five species of intestinal parasites were identified with an overall prevalence of 16.34%. Double infection was observed in 3 (0.72%) of the students. Infection with any protozoan (*Giardia lamblia* and *Entamoeba histolytica*) was identified in 10.34% (7.2% boys and 3.1% girls) of the study population. Infection with any helminth (*A. lumbricoides*, *Hymenolopis nana*, *Taeniaspp*) was also identified in 6.0% (3.6% boys and 2.4% girls) of the study population (Figure 3).

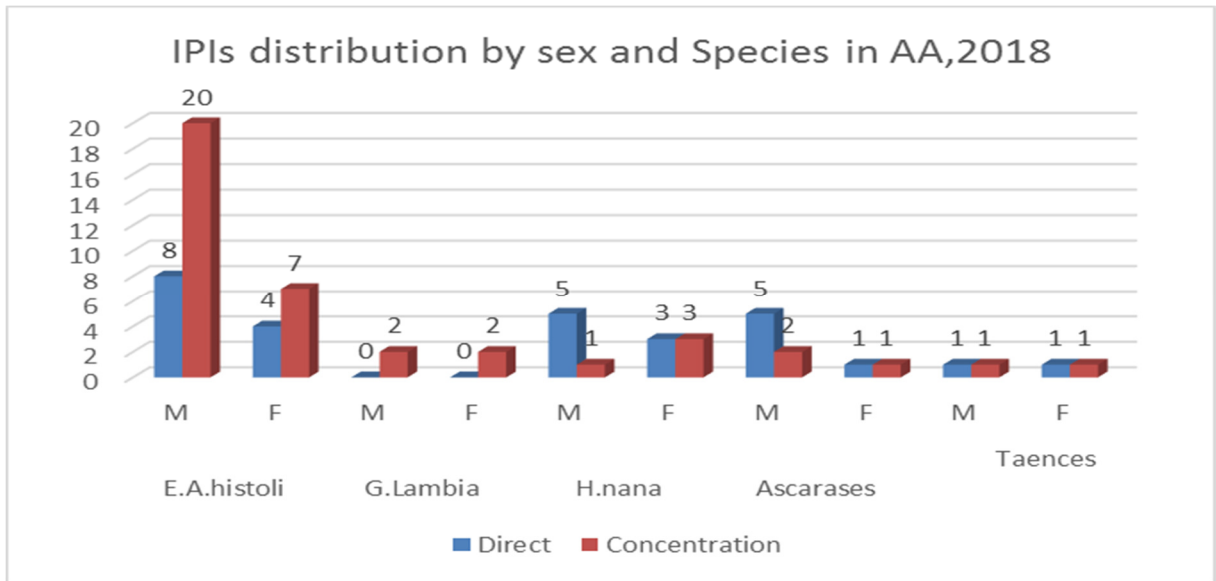


Figure 3. Intestinal Parasitic Infections (IPIs) status of Preschool and Primary school students of Addis Ababa, 2018

5.1.3. Children's nutritional status

Mean and SD of WHZ, HAZ and WAZ of the study population were, -0.12 ± 0.76 , -0.98 ± 1.39 , and -0.67 ± 0.96 for under five study population, respectively. The overall malnutrition was reported among 127 (30.5%) of the children. Stunting was found among 9.4% of the boys and 8.2% of the girls, while wasting was found in 3.6% of boys and 1.6% of girls. Finally, underweight was found in 3.6% of the boys and 4.1% of the girls (Table 3).

Table 3: Nutritional status versus Sex status of Pre and Primary School student of Addis Ababa City, Ethiopia, 2018

Nutritional indicators	Sex status		Total
	Male	Female	
Stunted (< -2 SD HAZ) of 416	39	34	73
Thinness (< -2 SD BAZ) of 416	15	7	22
Underweight (< -2 SD WAZ) of 416	15	17	32
Total	69	58	127

5.1.4 Knowledge about IPIs

Of 416 respondents, 223 (53.61%) of the study subjects cut nail periodically, 258 (62%) of the study subjects knew about IPIs. The most mentioned way of prevention of IPI transmission was Personal hygiene by students of 106 (25.48%). Students who replied food safety for prevention of IPIs were 81 (19.47%), Water safety 35 (8.41%) and Environmental sanitation 36, (8.65%) (Table4).

Table.4 showing ways of prevention of IPIs by the parent of student, A.A, 2018

	Know Prevention of IPIs, No(n=416)	%
Personal hygiene	106	25.48
Water safety	35	8.41
Food safety	81	19.47
Environmental Sanitation	36	8.65
Do not Know	158	37.98

5.2. Analytical Study

5.2.1 Associated Risky factors on the burden of IPIs on students of Pre and Primary school students of Addis Ababa, 2018

According to the bivariate analysis indicated the factors associated with IPIs were frequently Eating under cooked foods (OR: 4.190; 95%CI: 2.41-7.274; $P < 0.001$), House hold income < 1500 (OR: 3.685; 95%CI(2.135-6.362); $P < 0.001$), Being male (OR: 1.879; 95%CI(1.084-3.256); $p = 0.025$); Number of family > 3 (OR: 1.846; 95%CI(1.009-3.378); $p < 0.047$); Mother education [OR: 0.456; 95%CI(0.267-0.780); $p < 0.004$]; Knowledge about IPIs (OR: 0.398; 95%CI (0.232-0.682); $P < 0.001$), Hand nail Hygiene by looking (OR: 0.117; 95%CI (0.061-0.225); $P < 0.001$) and Nail cut periodically (OR: 0.483; 95% CI [0.281-0.831]); $P = 0.009$) (Table 5).

However, on multivariate analysis (adjusted OR), the factor remained statistically significantly associated with IPIs were Hand nail hygiene (AOR: 0.016; 95%CI (0.005-0.050); $P < 0.001$), cut Nail periodically (AOR: 0.076; 95%CI (0.027-0.213), Household income < 1500 (AOR: 11.31; 95%CI (4.322-29.624), adequate knowledge about IP (AOR: 0.028; 95%CI (0.009-0.086) and Mother Education (AOR: 0.146; 95%CI (0.067-0.317), (Table 6).

Table 5. Bivariate analysis of associated factors on burden of Intestinal Parasitic infection in the last 12 months on pre and primary school students of Addis Ababa, 2018

S/r	Variable		Intestinal Parasitic Infection		Crude OR [95%CI]	P-value
			Yes	No		
1	Sex of student	M	42(10.1%)	173(41.6%)	1.879[1.08 4-3.256]	0.025
		F	23(5.5%)	178(42.8%)		
		No	31(7.5)	200(48.1)		
2	Number of family >3	Yes	49(11.8%)	219(52.61%)	1.846[1.00 9-3.378]	0.047
		No	16(3.81)	132(31.7)		
3	Eat undercooked foods	Yes	40(9.6%)	97(23.3%)	4.190(2.41- 7.274)	0.000
		No	25(6%)	254(61.1)		
4	Clean Hand finger nail	Yes	40(9.6%)	327(78.6%)	0.117(0.06 1,0.225)	0.000
		No	25(6%)	24(5.8%)		
5	Nail cut periodically	Yes	25(6%)	198(47.6%)	0.483[0.28 1-0.831]	0.009
		No	40(9.6%)	153(36.8%)		
6	House hold income ,<1500	Yes	38(9.1%)	97(23.3%)	3.685[2.13 5-6.362]	.000
		No	27(6.5%)	254(61.1%)		
7	Father education	Yes	42(10.09%)	225(54.08%)	1.023[0.58 8-1.778]	0.937
		No	23(5.52%)	126(30.28%)		
8	Mother education	Yes	28(6.7%)	219(52.6%)	0.456[0.26 7-0.780]	.004
		No	37(8.9%)	132(31.7%)		
9	Adequate Knowledge about IPIs	Yes	28(6.7%)	230(55.3%)	0.398[0.23 2-0.682]	0.001
		No	37(8.9%)	121 (29.1%)		
10	Stunting	Yes	14(3.4%)	59(14.2%)	1.359[0.70 6-2.613]	0.359
		No	51(12.3%)	292(70.2%)		
11	Wasting	Yes	5(1.2%)	17(4.1%)	1.637[0.58 2-4.606]	0.350
		No	60(14.4%)	334(80.3%)		
12	Underweight	Yes	3(0.7%)	29(6.9%)	0.537[0.15	0.318

					9-1.819]	
		No	62(14.9%)	322(77.4%)		

The Multivariable analysis indicated that those student whose Hands visibly clean were protected from being infected by IPIs than visibly soiled (AOR: 0.016; 95%CI (0.005-0.050); P<0.001),

Those students without IPIs were 92% more likely cut their Nail frequently than those with IPIs (AOR: 0.076; 95%CI (0.027-0.213). Those student without IPIs were 85% more likely there mother were Educated than those with IPIs (AOR: 0.146; 95%CI (0.067-0.317).The students whose parents House hold income<1500 were eleven time at risk of experiencing IPIs than those house hold income >1500 [AOR=11.31; 95%CI; 4.322-29.624, P<0.001]. Those student without IPIs were 97% more likely with adequate knowledge about IPIs than those with IPIs (AOR: 0.028; 95%CI (0.009-0.086)).

Table 6. Multivariable analysis of associated factors on burden of Intestinal Parasitic infection in the last 12 months on pre and primary school students of Addis Ababa, 2018.

S/r	Variable		Intestinal Parasitic Infection		Crude OR[95%CI]	Adjusted OR[95%CI]
			Yes	No		
1	Sex of student	M	42(10.1%)	173(41.6%)	1.879[1.084-3.256]	1.349[0.660-2.758]
		F	23(5.5%)	178(42.8%)		
2	Number of family >3	Yes	49(11.8%)	219(52.61%)	1.846[1.009-3.378]	1.981[0.832-4.718]
		No	16(3.81)	132(31.7)		
3	Eat undercooked foods	Yes	40(9.6%)	97(23.3%)	4.190(2.41-7.274)	1.863[0.651-5.327]
		No	25(6%)	254(61.1)		
4	Clean Hand finger nail	Yes	40(9.6%)	327(78.6%)	0.117(0.061,0.225)	0.016[0.005-0.050]*
		No	25(6%)	24(5.8%)		
5	Nail cut frequently	Yes	25(6%)	198(47.6%)	0.483[0.281-0.831]	0.076[0.027-0.213]*
		No	40(9.6%)	153(36.8%)		
6	House hold income ,<1500	Yes	38(9.1%)	97(23.3%)	3.685[2.135-6.362]	11.316[4.322-29.624]*
		No	27(6.5%)	254(61.1%)		
7	Mother education	Yes	28(6.7%)	219(52.6%)	0.456[0.267-0.780]	0.146[0.067-0.317]*
		No	37(8.9%)	132(31.7%)		
8	adequate Knowledge about IPIs	Yes	28(6.7%)	230(55.3%)	0.398[0.232-0.682]	0.028[0.009-0.086]*
		No	37(8.9%)	121 (29.1%)		

*Significant p<0.05

6. DISCUSSION

This study investigated the burden of Intestinal Parasitic Infection (IPIs) and associated factors in pre and primary school children in age 3-12 year, A.A.

Study on the prevalence of intestinal parasites in school age children is detrimental, since they are the high-risk groups for intestinal parasitic infections. Even though, the continuous efforts made to control intestinal parasitic infections during the past decade, infections remained high in Ethiopia. This could be due to low socioeconomic status, poor hygienic conditions, impure drinking water, and low literacy rate of parents, large size of the family and poor health status of the child and Nutritional status of the students (35).

The findings of the present study showed that 16 % (65/ 416) of the participating children were positive for at least one parasite species with E.A. Histolytic infection being the leading IPI 39(9.3%) in these children, followed by H. Nana 12(2.9%) and *Ascaris lumbricoides* 9 (2.2%).

In this study, the observed overall prevalence rate of IPI was found to be relatively lower than studies done :90% in Central Sudan (26), 50% in Rwanda (27), 48.7%in Tanzania (28) and 84.7% in Burkina Faso (29).In Ethiopia: (35.44%) in Homesha District school children, Northwest Ethiopia (37). (50.81%) in Adigerat (38). 26.6 % in Bale Zone(31), 37.2% in Angolala (2), 40.2% in Guraga Zone (35), 49.6% in Behar dire (35), and 86.2% in Jimma (6). Double infection was observed in 3(0.72%) which was lower than in Yemen 10 %(32), six time lower than in Bale Zone (4.7%) (31), as well as lower than in Bahir Dar (16.2%) (36).

This study indicated E.A. Histolytic had a prevalence rate of 9.3%. This was higher than the findings of Begna .T and Yohannes .Z (7.7%) (31), 30 (7.59%) Northwest Ethiopia (37) and in Adigerat (4.5%) (38). But lower than among schoolchildren in Gurage Zone (12%) (35) And in Bahir Dar in North Ethiopia (24.5%) (36).

H. nana had a prevalence rate of 12(3%). This was higher than the findings in Yemen 2(0.9%) (34), but lower than among schoolchildren in Bale Zone (5.3%) (31).

The differences in findings among the studies may be explained by variations standard of study participant, in geography, socio-economic conditions like study age groups (6-19 in Angulalay primary school, grade 1 – 4, 7 to 14 years from Enemorena-Ener District, Ethiopia), educational status, living standard and cultural practices of the population under

consideration and the methods employed for stool examination like Kato-Katz which was not done in our study.

In the present study, a total of 416 children enrolled in Kirkose ,Kolefe and N/Silek Sub city of Addis Ababa Region Elementary Schools were examined and 127(30.53%) were malnutrition among this 73(17.6) were stunted, 22 (5.3%) thinness and 32(7.6%) underweight.

This study indicated higher underweight than study done in Wakeso, Central Uganda (5.3%) (34), Addis Ababa (5%) (30), higher Stunting than Bale Zone (4.5%) (31) and 11% of stunted in Angolala primary School (2).

In contrast was lower than a study done; in Wakeso, Central Uganda; stunting (22.5 %,) and Wasting (18.5%) (34). These values are low as compared to a previous study carried out in under five children of Ethiopia, based on the Central Statistical Agency (CSA), 2016: underweight (31%), wasting (13%), and stunting (56%) (30).(46%) stunting in Amhara ,23% wasting in Somali, 18% wasting and 36% underweight in Afare region, 34% underweight in Benishagul Gumeze region , (3.5%) wasting, and (14.6%) stunting in Addis Ababa (30), Thinness/wasting (17.1%) and (13.6 %,) underweight Bale Zone (31). 19.6% wasted, and 20.8% underweight ,Angolala primary School (2) , 262 (40.9%) thinness (<-2 SD of BAZ) and 250 (39%) stunted (<-2 SD of HAZ) and 71/148 (48%) underweighted ($<- 2$ SD of WAZ) in Gurage Zone (35).

The variation in the reported prevalence of nutrition across studies may be explained by the difference in study setting, socio-demographic, living standard and cultural differences. In developing countries like Ethiopia, under nutrition is one of the major causes for children's morbidity and mortality. This problem is directly related to the poor economic development of the nation and accompanied by serious long-term consequences for the child.

This study indicated that: Stunting and wasting of the boys were higher than girls. Underweight of the boys smaller than the girls. In agreement with other study done in Bale: Stunting, and thinness/wasting were found to be higher in boys than girls (33). A study done in Wakeso, Central Uganda: Males had a threefold risk of being underweight (OR 3.2,) and 2 fold risk of suffering from MAM (OR 2.1,) (34).

This study indicated Mother educated were 247(59.4%) among them 28(11.33%) were positive for IPIs. Which is higher than a study in Bale: 215(43.7%) among them 78(59.5%) were positive for IPIs (33).This might be due to the difference in study setting and living standard.

This study indicated: Number of rooms < 3 in the study participant were 139(33.4%) among this 29(20.86%) were positive for IPIs. Lower than as compared to the study participant of 409(83.1%) among this 115(87.8%) positive for IPIs (33).This might be socioeconomic and study setting difference.

In this study: those who cut nail periodically 223(53.6%) among this 25(11.2) were with IPI. which is lower than who cut nail periodically 331(67.3%) among this 57(57.3) with IPI (33).

A study done in Enemorena Ener District, Gurage Zone: IPIs showed a significant association with stunting, (OR 0.41) and thinness, (OR 0.53,).In contrast in this study; there was no significant association between IPIs and Stunting, Wasting and Underweight. This could be due to the effect of deworming, difference in study setting and living standard difference.

In this study indicated that, Hands nail visibly clean were protected from being infected by IPIs than visibly soiled .This finding is similar with the result of (36). This is probably due to low knowledge of children about the feco- oral transmission of intestinal parasite through their soiled finger nails.

Those students without IPIs were more likely cut their Nail periodically than those with IPIs. This finding is similar with the result of (31) and (38). This is probably due to low knowledge of children about the feco- oral transmission of intestinal parasite through their untrimmed finger nails. Those student without IPIs were more likely with adequate knowledge about IPIs than those with IPIs. Those student without IPIs were 85% more likely there mother were Educated than those with IPIs. The students whose parents House hold income<1500 were eleven time at risk of experiencing IPIs than those house hold income

>1500. Family level of education, house hold income and adequate knowledge about IPIs were strongly associated with infections. This is more likely that parents of children at high level of education provide better sanitation condition for their children than low educational level parents, due to low knowledge of children about the feco-oral transmission of intestinal parasite through their uncleansed finger nail.

7. STRENGTH AND LIMITATION OF THE STUDY

Strength of the study

1. The facilitators were qualified and well experienced with data collection related to IPI and Anthropometrics measurement cases.
2. All preschool and primary school students were included with appropriate sample size procedure and analysis methods.

Limitation of the study

1. The cross-sectional design of the study precludes causal inference
2. Students absent due to illness or other circumstances were not included
3. Its self-administered questionnaire so the students' parents/guardians may not feel free and were not answer accordingly with minimal denial response because some of their parents illiterates.

8. CONCLUSION

The following conclusions can be made by taking the limitations of this study in to account:

Intestinal parasitic infections and Malnutrition were prevalent and important health problem among Preschool and primary school children of Addis Ababa region. E.A. Histolytic and H. Nana were the most frequently Encountered parasites. There is no association between IPIs and Nutritional status of preschool and primary school children of Addis Ababa. In this study, practice of fingernail trim periodically, adequate knowledge about IPIs, House hold income < 1500, Mother Education, and clean hand finger nail were associated factors of IPIs.

9. RECOMMENDATION

1. Efforts should be made to strengthen effective practices to control the spread of Intestinal parasitic diseases by AAEB and AAHB. Because there are IPIs in Pre and primary school children of A.A
2. Initiatives aimed at improving the nutritional status of school children are also needed by AAEB. Because there are student with Malnutrition in pre and primary school of A.A
3. Encourage Mother education, House hold income generation activity. Because student with Malnutrition were from mother of not educated as well as parent of lower household income.
4. Initiatives aimed at improving personal hygiene of student by providing WASH facilities and to keep short their nail. Visibly soiled hand nails and not cutting nail periodically were associated with IPIs
5. The students should have better access to health education on IPIs issues which result student of pre and primary school children in adequate knowledge about IPIs which result in prevention of IPIs.

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11. ANNEX



ANNEX.11.1 Direct Microscopic procedure for studying the Prevalence of Intestinal Parasitic Infection and their Association with Nutritional status of Pre and Primary School student in Addis Ababa City, Ethiopia, 2017



ANNEX.11.2 Concentration procedure for studying the Prevalence of Intestinal Parasitic Infection and their Association with Nutritional status of Pre and Primary School student in Addis Ababa City, Ethiopia, 2017



ANNEX.11.3 Anthropometric measurement for studying the Prevalence of Intestinal Parasitic Infection and their Association with Nutritional status of Pre and Primary School student in Addis Ababa City, Ethiopia, 2017

ANNEX11.4

Information sheet

Introduction: Dear respondent, my name is working as data collector in this study to assess prevalence of Intestinal Parasitic Infection and Their association with Nutritional Status in Pre and Primary School children in Addis Ababa, 2017.

Title: prevalence of Intestinal Parasitic Infection and Their association with Nutritional Status in Pre and Primary School children in Addis Ababa, 2017

Purpose of the study: Dear respondents here are lists of questioners with different sections, which are designed for research work to be conducted in partial fulfillment in master Degree in Field Epidemiology by Getahun Hailu from SPHMMC public Health department

Procedures: I am going to ask you some very personal questions that some people find it difficult to answer. About your demographic background characteristics, as well as other topic related to Intestinal Parasitic Infection and Dietary. The Questionnaire will take approximately 30 minutes to complete. There is no right or wrong answers.

Confidentiality: Your responses are completely confidential. Your name will not be written on this questioner, and will never be used in connection with any of the information you provide.

Risks and Benefits of the Study: By participating in this study, you will not receive any direct benefit. However, you will help to increase our understanding towards Prevalence of Intestinal Parasitic Infection (IPI) among Pre and Primary school students and their association with Nutritional Status and the result of the study would hopefully serve as an important input to intervention programs that aim at reduce the consequences of IPIs. Your participation in this study will have no risk.

Rights: Your participation in this study is voluntary and you have the right to end to participate in the study any time you want. Or to skip any questions that you don't want to answer. Your honest & genuine response to each question will play a major role in the attainment of the objective of the study. Therefore we thank you in advance and greatly appreciate your help. Do you understand all that has been said so far? If you have questions regarding this study or would like to be informed of the results after its completion, please do not hesitate to contact; Contact Address of the Investigator: Address: Getahun

Hailu:Cell phone: +251 (0) 924705336or +251 (0)913186322; E-mail:
getanesh2@gmail.com

Identification and Consent

Questionnaire ID (Interviewer-School-Child Code) [][]-[][]-[][]

Woreda name: _____

Child full name: _____

School name: _____

Grade /class level §ion: _____ ;

Name & signature of interviewer: _____

Date of interview: [][] [][] [][] | E.C

DD |MM |YYYY

Child assent

Simple Oral explanation about the study and signed parent/guidance permit ion form

Consent form

I the selected participant heard the information in the study information sheet & understood the purpose, benefit and what is required from me if I take part in the study. I understood that all the information regarding me like name and all answers given by me must not be transferred to a third party. I also understand that I can decide whether or not to take part in the study or even withdraw from the study at any time. So I am willing to participate in the study.

Participant signature_____

Date_____

Parent /guardiansconsent

I the selected participant parent/ guardian heard the information in the study information sheet & understood the purpose, benefit and what is required from my child if he/she take part in the study. I understood that all the information regarding him/her like name and all answers given by him/her must not be transferred to a third party. I also understand that

he/she can decide whether or not to take part in the study or even withdraw from the study at any time. So I am willing, my child to participate in the study.

Parent/guardian signature_____

Date_____

School director consent

I the selected School director heard the information in the study information sheet & understood the purpose, benefit and what is required from student if they take part in the study. I understood that all the information regarding them like name and all answers given by them must not be transferred to a third party. I also understand that they can decide whether or not to take part in the study or even withdraw from the study at any time. So I am willing our students to participate in the study.

School director signature_____

Date_____

Data collector's name_____

Data collector's Signature_____

Date_____

May I continue the Data collection?

Yes_____

No _____

Questionnaire

completed_____

Partially completed_____

Participant refused_____

Other (Specify)_____

Checked by Supervisor

Supervisor name_____

Supervisor Signature_____

Date_____

English questionnaire form

Questioners prepared to study prevalence of Intestinal Parasitic Infection and their association with Nutritional Status in Pre and Primary School student in Addis Ababa, 2017.

Encircle your appropriate answer

Section 1Socio demographic data

No	Questions	Coding category	
101	What is your full name	_____	
102	Child Age	Age_____ in Months/Years	
103	Sex	1. Male 2. Female	
104	Family Size	_____	
105	Study Grade	_____	
106	What is the monthly income of your household?	1. _____birr 2. I don't know	
107	Household owning	1.Owning telephone 2.Owening TV 3.Radio .	
108	Number of rooms	_____	

109	Home town residence	1. Urban 2. Rural	
110	Current accommodation	1. Live with family 2. Live with parents	
111	Mother Education	1.No Education 2.Primary Education 3.Secondary Education 4.More than Secondary	
112	Father Education	1.No Education 2.Primary Education 3.Secondary Education 4.More than Secondary	

Section 2.Feeding practise

113	Meal Frequency per day	1.1-2 2.3-4 3.5-6	
114	Dietary Habit	1.Injera with shero 2.Injera with meat 3.Spagaty 4. Breads 5.beyayent 6.Others	
115	Eat different Dietary foods	1.Yes 2.No	

Section 3.Psycosocial factor

116	Religiosity	1.Orthodox 2.Catholic 3.Muslim 4.Protestant 5.Others	
117	Ethnicity	1.Amahara 3.SNNPR 2.Oromoya 4.Tigray	

118	Heard about Intestinal Parasites	1.Yes 2.No	
119	Methods of transmission	1.Direct contact 2.Fecal contamination	
120	Do they have treatment	1.Yes 2.No	
121	Intestinal Parasitic Infection is preventable	1.Yes 2.No	
122	Mode of Prevention	1.Personal Hygiene 2.Food Hygiene 3.Enviromental Hygiene 4.Medication	
123	Working status of Mother	1. House wife 2. Employed	
124	Occupation of your father?	1. Private, 2.Marechant, 3.Goverement 4. NGO 5. Others	
125	Ownership of school	1.Private 2.Public	

Section 4Hygiene Behaviour

126	Personal Hygiene?	1. Clothes net 2. Clothes not net	
127	Frequency of Bathing	1.Every three days 2.Every Week 3.Every 2-3 week 4.Every other days	

128	Nail Hygiene	1.Nailes short and clean 2.Nailes not cleaned	
129	Practice of finger nail trimming regularly	1.Yes 2.No	
130	How frequent you wear shoes	1.always 2.somtimes 3.none	
131	Do you have latrine	1.Yes 2.No	

132	Kind of latrine	1.Common latrine 2.Private latrine	
133	Source of water	1.Pipe water 2.Well water 3.River water 4.Stream water	

Section 5 Morbidity status

134	Disease Status	1.Yes 2.No	
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Anthrop measurement:

Height in cm:

Weight in kg:

Laboratory:

S/E_____

የጥናቱ መግለጫ

የመጠይቅ መለያ ቁጥር-----ጤና ይስጥልኝስሜ-----

ይባላል በጥናቱ ውስጥ በመረጃ ሰብሳቢነት ነው የምሠራው።

የጥናቱ ርዕስ፡-

የአንጀት-ትላትል እና ከምግብ እጥርት ያላቸው ግንኙነት በአዲስ አበባ ቅድመ መደበኛ እና የጀመሪ ያደርጃት ምህርት ቤቶች

ጥናቱ የሚጠናው በአቶ ጌታ ሁንጋይሉ ሲሆን በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም ሜዲካል ኮሌጅ የህ/ሰብጤና ክፍል የድህረ ምረቃ ንግራም ሚዲያ የሚሆን ነው። ይህ መጠይቅ የተለያዩ ንዑስ ክፍሎች የተካተቱ ሲሆን የጥናቱ ዓላማ በአዲስ አበባ የአንጀት-ትላትል ያለበትን ደርጃ እና የምግብ እጥርት በትምህርት ቤቶች ባሉ ተማሪዎች ላይ ያላቸው ግንኙነት ለማጥናት ነው።

ጥናቱ ንዝስመል ክፍል እና ርዕሰ ዎሪ ሰጡት ማንኛውም መረጃ በሚስጡ ሲሆን የሚጠበቅበት መሆኑን በማንኛውም መንገድ ለሶስተኛ አካል አሳልፎ አይሰጥም ወይም አይጋለጥም።

ማንነት ዎስን ዳይታ ወቅም ስም ዎ በጥያቄው ወረቀት ላይ አይመዘገብም። በጥናቱ ላይ በመሳተፍ ዎ የተለየ ጥቅም አይኖርም ነገር ግን በጥናቱ ላይ በመሳተፍ ዎ ለሚጠየቁት ጥያቄ በዕውቀት ላይ የተመሠረተና ተገቢ የሆነ መረጃ መስጠት ዎ በአንጀት-ትላትል ዘራ እና የምግብ እጥርት ላሉ ችግሮች ተገቢውን መፍትሔ ለመስጠት ከፍተኛ አስተዋፅኦ አይኖረዎል።

በመጨረሻም ለሚሰጡት ምላሽ አመሰግናለሁ።

መጠየቅ (ማነጋገር) የምትፈልጉት ነገር ካለ-ጌታ ሁንጋይሉ (የጥናቱ ባለቤት)

ስልክ ቁጥር- 0913 186322 ወይም 0924705336

Email — getanesh2@gmail.com

ፈቃድ መጠየቂያ እና ኮድ መስጫያ ቅጽ

ኮድ..... ክ/ከተማ..... ወረዳ.....

ስም..... የትምህርት ቤት ስም..... የክፍል ደረጃ.....

የጠያቂው ስም..... ፊርማ..... ቀን.....

የልጅ ፈቃድ መጠየቂያ

ስለ ጥናቱ ለልጅ በአጭሩ በቃል በመንገር የቤተሰብ ወይም የአሳዳጊ ፊርማ ቅፅ

ቤተሰብ/አሳዳጊ ፈቃድ

እኔ ቤተሰብ/አሳዳጊ የሆንኩ ከላይ የተገለጹትን በሙሉ ሰምቼ አለሁ

፤ አላማውንና ጥቅሙንም ተረድቼ አለሁ

፤ ሚስጥር እንደሚጠበቅና ለሶስተኛ አካል እንደማይተላለፍ ተገንዝቤ አለሁ ፤ ስለዚህ በጥናቱ ልጄ እዲህ ተፍፈቃ ደኛኝ፡፡

አዎ ፈቃደኛኝ ፊርማ..... ቀን.....

ፈቃደኛ አይደለሁም ፊርማ..... ቀን.....

መረጃ ስብሰባ ስም----- ፊርማ----- ቀን.....

ክፍል 1. አጠቃላይ መረጃ

የትምህርቱ ተዓይነት 1. የግል 2. የመንግስት

ተ.ቁ	ጥያቄ	አማራጭ
101	ሙሉ ስም	 የሚስጥር ቁጥር
102	1. እድሜ 2. የትውልድ ዘመን	 አመት ቀን ወር አ.ም
103	ጾታ	1. ወንድ 2. ሴት
104	የቤተሰብ ብዛት	
105	የትምህርት ደረጃ	
106	የቤተሰብ ገቢ መጠን	1. ብር 2. አላውቅም
107	በቤታችሁ የትኞቹ ዕቃዎች ሁ? (የሚሰሩ)	1. ቴሌቪዥን 2. ሬዲዮ 3. ስልክ
108	የመኖር ያቤት ክፍል ብዛት	
109	የመኖሪያ ቦታ	1. ከተማ 2. ገጠር
110	ከማንኛውም የምትኖርው?	1. ከእናት እና ከአባት 2. ከእናት 3. ከአባት 4. ከዘመድ
111	እናት ተምራሶች?	1. አልተማረችም 2. አንደኛ ደረጃ 3. ሁለተኛ ደረጃ 4. ከሁለተኛ ደረጃ በላይ
112	አባት ተምሯል?	1. አልተማረም 2. አንደኛ ደረጃ 3. ሁለተኛ ደረጃ 4. ከሁለተኛ ደረጃ በላይ
113	የቤተሰብ ስራ አይነት	1. የግል 2. ነጋዴ 3. የመንግስት 4. መንግስታዊ ያልሆነ ድርጅት 5. ሌላ

ክፍል 2. ስለ አመጋገብ ጥያቄዎች

114	በቀንስንት ጊዜት በላለህ?	1. ከ1-2 ጊዜ 2. ከ3-4 ጊዜ 3. ከ5-6 ጊዜ	
115	አዘውትር የተለያዩ ምግቦችት መገባለህ/ሽ?	1. አዎ 2. አልመገብም	
116	ለጥያቄ 115 ምላሽ ህዝብ አዘውትረህ የምትመገበው ምግብ የትኛው ነው?	1. እንጀራ በሽሮ 2. እንጀራ በስጋ 3. ፓስታ/መኮሮ/ሩዝ 4. ዳቦ 5. በያዳይነት 6. ንፍሮ 7. አትክልት	

ክፍል 3. ስለ ሳይኮሶሻል የቀርቡ ጥያቄዎች

117	ሃይማኖት	1. ኦርቶዶክስ 2. ካቶሊክ 3. ሙስሊም 4. ፕሮቴስታንት 5. ሌላ ግለፅ.....	
118	ብሔር	1. አማራ 2. ኦሮሞ 4. ትግራይ 5. ከምባታ 6. ወላይታ 7. አፋር 8. ሶማሊ 9. ጉራጌ 10. ቤንሻንጉል 11. ሐረሪ 12. ሌላ ግለፅ.....	
119	ስለ የእንጀት ትላትል ሰምተህ ታወቃለህ?	1. አውቃለሁ 2. አላውቅም	
120	መተላለፊያ መንገዱን ታወቃለህ?	1. በንኪኪ 2. በአይነምድር 3. በመበከል 4. አላውቅም	
121	የእንጀት ትላትል ህክምና አለው?	1. አዎ 2. የለውም	
122	የእንጀት ትላትል በሽታ መከላከያ መንገድ አለው?	1. አዎ 2. የለውም	
123	ለመጠይቅ 122 ምላሽ ህዝብ መከላከያ መንገዱ ምንድነው?	1. የግል ንፅህና መጠበቅ 2. የምግብ ንፅህና መጠበቅ 3. የአካባቢ ንፅህና መጠበቅ 4. ሁሉም	

124	የእናትስራ	1. የቤትእመቤት 2. ሰራተኛ
125	የአባትስራ	1. የግል, 2.ነጋዴ, 3.የመንግስት 4. መንግስታዊያልሆነድርጅት 5. ሌላ

ክፍል 4.ስለ ግልንፅህናየቀረቡጥያቂዎች

126	የግልንጽህናሁኔታ	1.ሲታይ ንጹልብስ 2.የቆሸሸ
127	በየስንትጊዜነውሰውነትህንየምትታጠበው?	1.በየ 3 ቀን 2.በየሳምንቱ 3.በየ2-3 ሳምንት 4.በየወሩ
128	የጥፍርንጽህናሁኔታ	1.ንፁህ 2.የቆሸሸ
129	ጥፍርህንበየጊዜውትቆርጣለህ/ለሽ?	1.አዎ 2.አልቆርጥም
130	በየስንትጊዜጫማታደርጋለህ?	1.ሁልጊዜ 2.አንዳንዴ 3.አላደርግም
131	በመኖሪያቤትህ/ሽ ሽንትቤትአለ?	1.አዎ 2.የለም
132	ለመጠይቅ 131 ምላሽህአዎከሆነምንአይነት ?	1.የጋራ 2.የግል
133	የመጠጥውሃከየትነውየምትቀዱት?	1.ከቧንቧ 2.ከምንጭ3.ከወንዝ4.ከጉድጓድ

ክፍል 5 ስለህመምሁኔታጥያቂ

134	የአንጀትትላትልበሽታህመምተኛ?	1.ህመምተኛ 2.አይደለም
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የሰውነትልኬት

የሰውነትቁመት ሴ/ሜ.....የሰውነትክብድት ኪ/ግ..... ሰገራምርመራ.....