PREVALENCE OF INTESTINAL PARASITIC INFECTIONS AND ASSOCIATED FACTORS AMONG STREET CHILDREN IN JIMMA TOWN IN 2019: A CROSS SECTIONAL STUDY

BY SABIT ZENU (BSc.)

A RESEARCH THESIS SUBMITTED TO JIMMA UNIVERSITY, INSTITUTE OF HEALTH, FACULTY OF PUBLIC HEALTH, DEPARTMENT OF EPIDEMIOLOGY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE MASTERS OF PUBLIC HEALTH IN EPIDEMIOLOGY.

JUNE, 2019

JIMMA, ETHIOPIA

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Abstract

Background

Street children are defined as any girl or boy whose age is less than 18 years for whom the street has become his or her habitual abode and/or source of livelihood, and who is inadequately protected, supervised or directed by responsible adults. They are a group of population who are underserved and exposed to numerous social, psychological and physical problems. In Ethiopia the issue of street children and especially their health problems are given poor attention in research. This problem is pronounced when it comes to the issue of intestinal parasitic infections that add misery to the already underprivileged street children by impacting their current and future abilities to lead a decent life.

Objective: The aim of this study was to assess the prevalence of intestinal parasitic infections and associated factors among street children in Jimma town in the year 2019.

Methods and Materials: Community based cross sectional study was used. Complete enumeration was employed and 312 study subjects were included after preparing list of the street children in urban Kebeles of the town. Pretested tool was used to collect the data. Collected data was entered to Epidata version 3.1 and exported to SPSS version 20 for analysis. Stool samples were examined by using wet mount and formalin ether concentration for the existence of parasitic agents. Appropriate descriptive analysis was conducted for the data. Bivariable and multivariable logistic regression was used to identify factors associated with intestinal parasitic infection. Variables with the level of significance ≤ 0.25 on the bi variable analysis were candidates for the multivariable analysis. Significance of association was decided by using the 95% confidence interval of AOR and P-value of ≤ 0.05 in the multivariable model.

Result: A total of 312 children of the street who fulfilled the inclusion criteria were involved in the study making the response rate 96.2%. The prevalence of intestinal parasitic infection was 66.7%. *Ascaris Lumbricoides, Trichuris Trichuria and Schistosoma mansoni* were predominant species. Untrimmed finger nails AOR=2.03;95%CI (1.02-4.06), eating street food AOR=2.24;95% CI (1.04-5.02), practice of swimming in unprotected water bodies AOR=2.5; 95% CI (1.24-5.04), not wearing shoes at the time of data collection AOR= 3.8;95% CI (1.8-8.2) and lacking knowledge of way of transmission of intestinal parasites AOR= 2.5; 95% CI (1.25- 5.0) were significantly associated with intestinal parasitic infections.

Conclusion and Recommendations: The prevalence of intestinal parasitic infections and magnitude of multiple infections among street children in the study area was high and require integrated interventions to avert the problem. Several factors such as status of finger nails, swimming habit, eating street foods, shoe wearing and lacking knowledge of ways of transmission of intestinal parasitic infections are also associated with infection status. Measures has to be taken to curb the problem by taking integrated interventions like including them in mass drug administration and targeted health education towards identified factors.

Key words: Street children, Intestinal parasites, Jimma town

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Acronyms and Abbreviations

BSc	Bachelor of Science
CI	Confidence Interval
ETB	Ethiopian Birr
FIDO	Faya Integrated Development Organization
HIV	Human Immune Virus
IPI	Intestinal Parasitic Infections
IQR	Inter Quartile Range
Km	Kilometers
MDA	Mass Drug Administration
PSAC	Preschool Age Children
SAC	School Age Children
SDG	Sustainable Development Goals
SEA	South East Asia
STH	Soil Transmitted Helminths
SPSS	Statistical Package for Social Sciences
SSA	Sub Saharan Africa
UN	United Nations
UNICEF	United Nations International Children's Fund
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

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CHAPTER 1: INTRODUCTION

1.1 Background

Intestinal parasitic infections (IPI) are one of the most common diseases and resulted in widespread morbidity starting from early times of human history. The eggs of certain intestinal worms were recovered from mummified feces of humans dating back thousands of years(1). These days intestinal parasites, mostly of soil transmitted helminthiasis, affect nearly a third of global population and it severely affects underprivileged populations of developing countries where poverty, undernutrition, inadequate sanitation and lack of clean drinking water prevails(2,3). In 2010, an estimated 438.9 million people were infected with hookworm, 819.0 million with *A. lumbricoides*, 464.6 million with *Trichuris Trichuria* and these parasites inflicted nearly 5 million years lived with disability in the world(4).

World Health Organization(WHO) strives to eliminate the soil transmitted helminths and schistosomiasis as public health problems by providing chemotherapeutic treatments to Pre-school age children(PSAC), school age children(SAC), women of reproductive age and adults with increased risk of developing morbidity through annual and bi annual distribution of chemotherapeutic agents. The frequency of Mass drug administration(MDA) depends on the initial prevalence of the disease. Areas with initial prevalence of less than 20% are considered low and recommended to be covered by case based treatments. In areas where the initial prevalence falls between 20-50%, the magnitude is considered moderate and MDA will be distributed once per year. Twice yearly distribution is needed in areas where the prevalence is found to be greater than 50% among populations at risk; rendering the magnitude as hgh(2).

According to WHO, three quarters of children with intestinal worms requiring chemotherapy are in South East Asia and African regions and the least prevalence of the problem is found to be in the European region. In Africa only, nearly three hundred million preschool age and school age children require preventive chemotherapy; this figure accounts for 30% of the global chemotherapy requirement(2).

In the year 2009, only 32% of children requiring treatment for intestinal worms had access to the very needed service in Africa and this figure was at a staggering five percent coverage in three

countries of the region among which is our country, Ethiopia. The organization stated the under coverage of children that are not enrolled to schools as a major challenge to the achievement of global target of covering 75% PSAC and SAC with preventive chemotherapy to eliminate morbidity that results from this diseases by 2020(2).

In Ethiopia the prevalence of intestinal worms among school aged children ranged from 20% to 100% with the highest percentage in wet and humid central areas while the prevalence is found to be limited in arid and dry areas of the country. In Ethiopia intestinal parasites are endemic in 329 districts with about 6,545 Kebeles and 11,410 schools(5).

Street children are defined by the United Nations as "boys and girls for whom 'the street' (including unoccupied dwellings, wasteland, etc.) has become their home and/or source of livelihood, and who are inadequately protected or supervised by responsible adults." Additionally, the organization categorizes "street children" as either children on the street, who worked on the street and went home to their families at night and children of the street, who lived on the street, were functionally without family support who lived completely on their own(6).

There are wide controversies concerning the reliable estimate of the number of the street children around the world. The widely contested claim of the United Nations International Children's Fund (UNICEF) stating the figure at 100 million is now rendered baseless and currently the estimate is stated in the area of tens of millions with rapidly increasing pattern due to a rapidly urbanizing and growing global population. Together with increasing inequalities and migration, studies suggest that numbers are generally increasing, including in richer regions. Studies suggest factors like war, HIV/AIDS, economic and social disintegration, family separation and abuse for increasing pattern of the number of the street childen(6,7).

The precise estimate of number of street children in Ethiopia is also controversial. In 2007 the ministry of Labor and Social Affairs conducted a study that is supported by the UNICEF and estimated the overall number of children on or off the street at around 150,000 with about 60,000 living in the capital. The recent estimates of the number of street children as 500,000-700,000 is roughly five times higher than the report in 2007 and approaches two to three times the population of Jimma town(8). The Forum on Street Children in Ethiopia conducted a study on the situation of street children in eight towns of the country. The study revealed that poverty, family disintegration,

neglect and violence at home, lack of educational opportunities, the death of parents and sexual abuse were among the factors that pushed vulnerable children onto the street(9).

1.2. Statement of the problem

Intestinal parasitosis refers to a group of diseases caused by one or more species of protozoa, cestodes, trematodes and nematodes. These parasites are responsible for the major share of morbidity and mortality in those communities where there is over-crowding, poor environmental sanitation and personal hygienic practices, which make them a great concern for the developing countries. Factors ranging from water, sanitation and hygiene to weak health service delivery to populations at risk of infections were major reasons for persistence of these diseases in the community(10).

Intestinal parasites i.e. soil transmitted helminthiasis, schistosomiasis and certain protozoans affect over two billion peoples around the globe and the greatest share of this morbidity is inflicted on the residents of the developing countries in which adequate sanitation and safe drinking water is scarce. Apart from this, this group of disease disproportionately affects children aged 2-14. The effect of this group of disease is mainly manifested as a chronic and insidious effect on health and quality of life, while intense infection can result in developmental faltering, poor growth and poor school performance(2).

Studies indicate that children with heavy intestinal parasitic infection have lower body mass index, lower hemoglobin levels and are often stunted(11).Some studies also revealed that children with heavy parasitic infection to have poor anthropometric indices, growth retardation, poor cognitive development, chronic inflammatory diseases and life threatening surgical conditions. Furthermore, the chemotherapeutic treatment of the intestinal parasites resulted in improved physical, motor and language development(12–14).

The effect of intestinal parasitic infection on health of infected children is found to depend on the status of the children. Children with underlying nutritional problems and other health conditions are more likely to suffer from the brunt of the diseases and develop morbidities(15).

World Health Organization recommends preventive chemotherapeutic treatment of preschool and school age children with school based mass drug administration in areas where the prevalence of the intestinal parasites is found to be greater than 20%(2).The government of Ethiopia also started implementation of this program by establishing a school based distribution of drugs for children(5). Unfortunately, street children are most likely to drop out of primary education and

miss this deworming opportunity. Furthermore, health education programs and campaigns that could have helped in prevention of these diseases are often unreachable by street children(16).

Several studies also indicated that street children are disproportionately affected with range of diseases and health problems including parasitic infections, infestations, other infectious diseases, unintentional injuries, violence, abuse by older adults and police officers, substance abuse, malnutrition, sexually transmitted diseases, other reproductive and mental health problems. In all categories of infection fulltime street residents are far greatly affected than those on the street children(16–19).

Despite the wide-ranging health problems of the street children, only few studies are conducted to quantify the situation in Ethiopia on this segment of population and especially limited when it comes to the issue of intestinal parasitic infections. Most studies conducted to assess the prevalence of intestinal parasites in Ethiopia are conducted in institutions like schools. Some studies that are conducted to assess the prevalence of these diseases in Ethiopia are also carried out among the overall street residents and some on street beggars and not specifically on street children. This shows the paucity of information on the prevalence and factors associated with intestinal parasitic infections on street children, a group of children that are most likely to suffer from these conditions than adults and even than supervised children.

Accordingly, this study was intended to assess the prevalence and factors associated with intestinal parasitic infections among street children to bridge the knowledge gap and provide the rationale to reconsider the ongoing intervention modalities in the way that this segment of population will also be included.

CHAPTER 2: LITERATURE REVIEW

2.1. Magnitude of the intestinal parasitic infection

Efforts to capture precise estimate of global distribution and disease burden of intestinal parasitic infections largely remained unsuccessful mainly for two reasons. These are the scarcity of decentralized prevalence data and difficulty of measuring exact effect of intestinal parasites on morbidity and mortality(4,20). Despite these difficulties, global estimations show that roughly around two billion peoples are infected with these pathogens and majority of them are estimated to be in south east Asian and sub-Saharan African countries (4).

The estimation of the prevalence of intestinal parasite among street children is also further difficult due to their underrepresentation in global research(16,21). In spite of such difficulties, some community based cross sectional studies were conducted to capture the prevalence of these diseases among street children in Latin American and African countries. A study conducted in Peru indicated the prevalence of pathogenic intestinal parasites to be 30.6%, and the commonest parasites are found to be Entameoba coli, Giardia lamblia and intestinal helminths (22). In contrary to relatively low prevalence recorded in Peru, a study conducted in neighboring Sudan revealed 71.7% prevalence of intestinal parasites among street children and the commonest were Giardia lamblia, Entameoba histolytica and Hymenolepis nana (23).

Apart from the street children, bulk of studies are conducted on preschool and school aged children in various parts of our world. Most of these studies are conducted to assess the status of soil transmitted helminthiasis in their locality while some others assessed the more general prevalence of intestinal parasitic infections.

Community based cross sectional studies conducted in different areas of Brazil among preschool and school aged indicated relatively lower prevalence of these parasites; figures range from 20% to 30%. The commonest parasites were Trichuris trichuria, Ascaris lumbricoides, Entameoba coli and Giardia duodinalis(24–26).In reverse, studies conducted in Cuba and Peru revealed high prevalence ranging from 70% to 74%. While a study from Honduras showed relatively moderate prevalence of intestinal parasites with toll standing at 43.5%(27). The commonest parasites recovered in above three studies were Ascaris lumbricoides, Trichuris trichuria, Giardia lamblia and hookworm(28,29).

Studies conducted among School age children in some Middle and South East Asian countries showed relatively moderate prevalence of intestinal parasites. The lowest prevalence was recorded in Nepal where only around 16.7% of school aged children are affected(30). Studies conducted in Malaysia, Iran and Vietnam showed relatively similar burden of infection with the figure ranging from 30% to 33%. In these areas, the commonest parasites are found to be Ascaris lumbricoides, Hookworm, trichuris trichuria, Entameoba coli, Entameoba histolytica giardia lamblia and Blastocysts hominis(31–34).

Several studies conducted in different part of Sub Saharan Africa revealed varying level of prevalence with most of them showing the burden to affect more than half of studied children. Among studies conducted in the west Africa, the prevalence in Accra, Ghana is found to be the lowest,15%(35). While the prevalence was found to be near half in Angola, the highest is in Nigeria with the magnitude ranging from 54.2% to 86.2% among school aged children.(36–38). In all West African countries, the commonest parasites are found to be Ascaris lumbricoides, hookworm, Schistosoma mansoni, Hymenolepis nana among helminths while Giardia lamblia, Entameoba histolytica, Giardia duodinalis and Blastocysts species among protozoans. In the Eastern Africa, the magnitude ranged from 40% in school aged children of Nairobi, Kenya to 65% among Sudanese school aged children. The figure in Tanzania stood just near half at 48.7%(39,40).

In Ethiopia, studies regarding intestinal parasites among children have disproportionately focused on school children and highly difficult to encounter such studies conducted on street children. Two studies were conducted in Ethiopia to assess the prevalence of intestinal parasites among street dwelling population and neither of them are specifically focused on street children. A cross sectional study conducted on 355 street residents in capital Addis Ababa revealed the prevalence of intestinal parasites to be 71.8%. Nine species of parasites were recovered from their stool and the commonest was Ascaris lumbricoides with the prevalence of 34.9%, followed by Trichuris trichuria, Giardia lamblia and Entameoba histolytica with prevalence of 22.8%, 9.6% and 8.2% respectively. Similar study was also conducted on 116 street beggars in Jimma town indicating the prevalence to be as high as 89.7% with the commonest parasite recovered being Ascaris lumbricoides with the magnitude of 65.5% among respondents. Parasites like trichuris trichuria, Schistosoma mansoni and hookworm were also recovered with prevalence of 44.8%,12.1% and 9.5% respectively(32,41).

Other community and school based studies conducted on school aged children in different parts of the country revealed varying levels of prevalence. A regional community based survey conducted on school aged children in Amhara Region revealed the overall regional prevalence of soil transmitted helminthiasis to be 36.4% and 6.9% for Schistosoma mansoni. The survey estimated the prevalence among zones to be in the interval of 12.1% to 58.3% for STH and 0.5% to 40.1% for Schistosoma mansoni(42). School based studies in Northern Ethiopia also showed the prevalence ranging from 25.8% in Dembiya to 84.3% in Debre Elias primary school.(43–45). This figure stands at 65.5%for the primary school students in Dona Berber primary school near Bahir Dar town(46). In western Ethiopia the prevalence among school children ranged from as low as 12.6% in Ambo town to 54.9% in Durbete town(47–50). Many cross sectional studies are also conducted in Southern Ethiopia to reveal the magnitude of this diseases among school aged children. The results of these studies showed the prevalence ranging from 22.3% in Butajira to 81.0% in Chencha town (51–55).The toll is also found to be very high in Mizan town and Wolaita Zone with the magnitude of these conditions among school children being 76.7% and 72.2% respectively(56,57). Lastly, the prevalence among school aged children in Jimma town showed near the half and showed marked difference between the private and government schools(49).

2.2. Factors associated with intestinal parasitic infection

2.2.1. Socio demographic factors

Intestinal parasitic infections among children is found to be associated with some demographic factors; among these are age and sex of children. Studies conducted in Malaysia, Western Nigeria and Sudan showed significant association between IPIs and age of children.(38,40,58). In addition, a study conducted in Bahirdar revealed higher odds of IPIs among older children aged nine years and above when compared to younger children with age five up to nine years while another study conducted in Butajira reported the reverse with higher odds being among younger children(51,59). Regarding sex of children, studies conducted in Poland and Iran showed higher odds of infection among males(33,60). In Ethiopia similar finding was reported from a study conducted in Bahirdar town(59). Conversely, reports from cross sectional studies among school aged children in Ambo and Jimma towns revealed higher odds of infection among females(47,49). Additional findings from studies conducted in Poland and Nigeria outside Ethiopia; and Bahirdar and Durbete towns in Ethiopia also showed significant effect of birth place and place of residence on the infection

status. This studies showed higher odds of IPIs infection among rural children when compared to urban ones(48,60,61).

Several factors that reveal socioeconomic status of children were also identified as determinants of infection status. Educational achievement of children was found to be associated with the infection status. A finding from study carried out in Malaysia showed income as a determinant; while others in East Gojjam zone and Gondar town depicted higher odds of infection among children of lower grades and lower incomes(44,45,58).

2.2.2. Water, sanitation and hygiene (WASH) Factors

Many factors that could be summarized as water, sanitation and hygiene were found to be significant factors associated with IPIs among children. Source of water for both drinking and bathing is a well-established determinant of infection. According to cross sectional studies conducted in Western Brazil and Nigeria, children who used untreated water for drinking and bathing had higher odds of developing infections(26,37).In Ethiopia, studies conducted in Dembiya,Bahirdar,Yirgachefe, Mizan and Haike towns showed up to five fold increase in odds of developing infection among children who used untreated water for drinking (43,46,54,57,62).

Another important determinant of IPI status is the habit of hand washing before meals. Reports from cross sectional studies in Peru(29) and western Brazil (26)outside Ethiopia; and Dembiya, Butajira, Mizan and lake Hawassa area showed up to eight-fold increase in odds of developing infections among children with habit of irregular hand washing before meals(43,51,52,57).

Cleanliness and trimming of finger nails are also found to affect the likelihood of developing infections. According to cross sectional studies conducted on school age children in Butajira, Ambo and Jimma towns, children who had not had their finger nails cut short are up to three times more likely to develop IPIs(32,47,51). Cleanliness of finger nails was also found to predispose children to IPIs. A study conducted in Bahirdar town among school age children revealed up to fivefold increase in the odds of developing infections in children with unclean finger nails when compared to their counter parts(63).

A study conducted in Yirgachefe also underlined the importance of sucking fingers as a determinant of infection status(54). Cross sectional studies conducted in Bahirdar, Chencha,

Jimma and other several areas in Ethiopia showed significant association between shoe wearing habit and IPIs(32,44,46,55,59,64).

2.2.3. Health system related factors.

Intestinal parasitic infections among children are also affected by the performance and coverage of comprehensive health services. Studies conducted in Peru, Vietnam, Cameroon, and Kenya showed that poor access to deworming service as a significant determinant to the IPI status (22,34,39,65). In addition poor access to health education concerning the prevention strategies of IPIs is also reported as a factor associated with infection in south Eastern Ethiopia(64).

2.2.4. Feeding practices

Feeding practices of children was also identified as an important factor that predisposes children to the infection. A cross sectional study conducted among street residents showed that consumption of leftover foods to increase the likelihood of acquiring infections(41).In addition, habit of not washing fruits and vegetables before eating is also found to affect infection status in Western Brazil and Arbaminch(26,53,59). Furthermore, studies carried out in Malaysia and Amhara regional state of Ethiopia also indicated habit of eating raw vegetables to increase the risk of acquiring infections(27,58).

2.2.5. Leisure activities

Some leisure activities in which children involve poses them at an increased risk of diseases and specifically intestinal parasites. Studies conducted in different parts of Ethiopia revealed up to threefold increase in odds of developing IPIs among children swimming in unprotected water bodies(27,52,53,56,62).

2.2.6. HIV/AIDS infection

HIV/AIDS reduces the capacity of individuals to protect themselves from diseases that healthy individuals do. A study conducted in Gondor among street dwellers revealed high prevalence of HIV /AIDS and Intestinal parasitic co-infections among street dwellers(66).

2.2.7. Conceptual framework

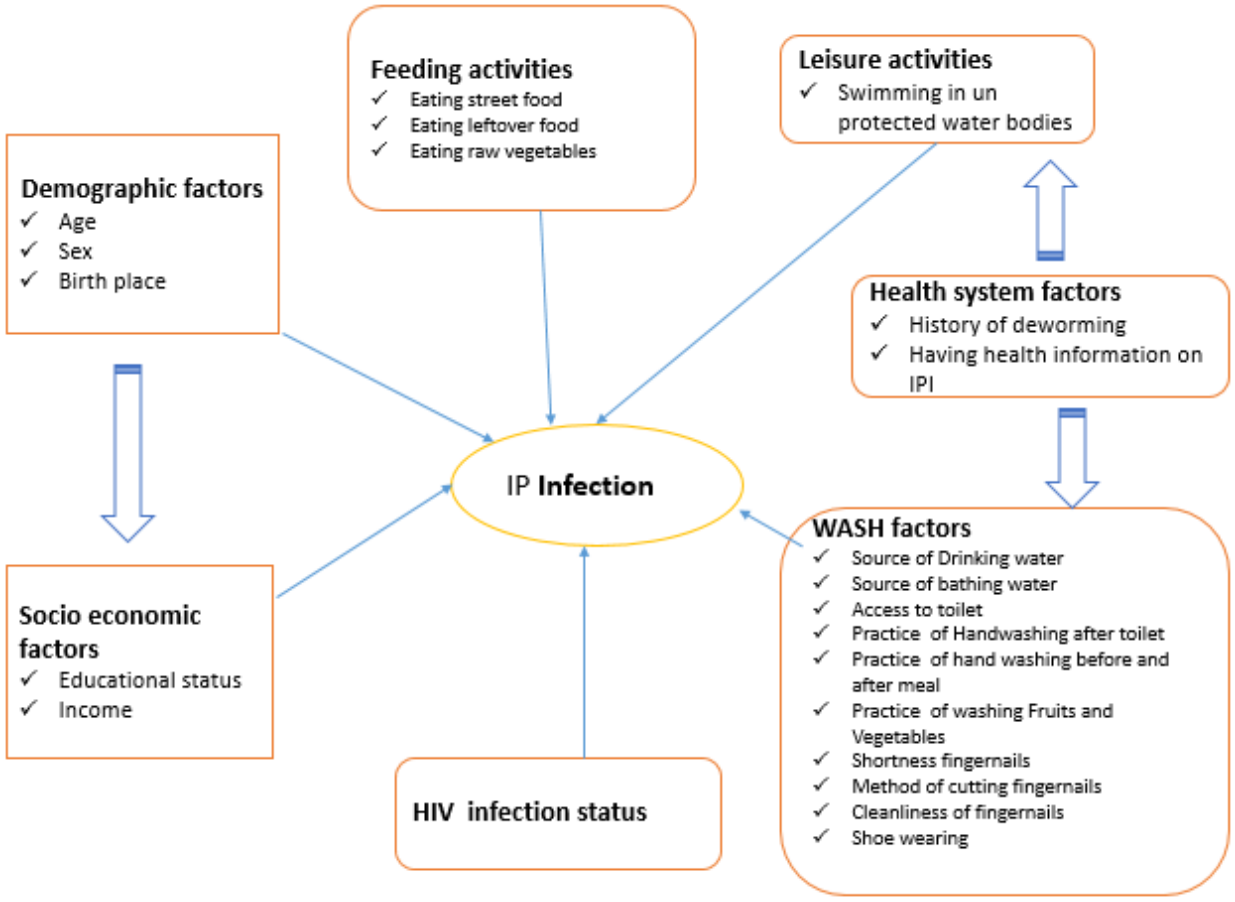

Figure 1: Conceptual framework for factors associated with IPIs developed after reviewing relevant literatures((27,40,41,43,45,47,51,52,55,57,59))

2.3. Significance of the study

The health and health related problems of street children are given minimal attention in public health research. This made the magnitude and factors associated with their health problems mainly unexplored through valid epidemiologic study designs. Revealing the health problems of this segment of population helps to design effective intervention modalities that suit their condition. This study helps to gear towards accomplishment of national and global targets concerning IPIs by providing decentralized and timely information on this segment of population. Decentralized information is very crucial for disease control and elimination activities and more important on underserved populations. Ignoring these segment of children in researches concerning the prevalence of intestinal parasitic infections and associated factors will result in failure of elimination activities as they remain source of infection for the wider community. In addition, this study helps to carry out targeted interventions by considering identified associated factors to prevent intestinal parasitic infections and consequent morbidities. Furthermore, the methods and findings of this study could be used as a reference and a baseline data for upcoming studies. Finally, this research is of great importance to reconsider the national intervention programs against IPIs to be more inclusive of this group of children.

CHAPTER 3: OBJECTIVES

3.1. General Objective

To assess the prevalence of intestinal parasitic infections and associated factors among street children in Jimma town in 2019.

3.2. Specific Objectives

- ✓ To determine the prevalence of intestinal parasitic infections among street children in Jimma town in the year 2019.
- ✓ To identify factors associated with intestinal parasitic infections among street children in Jimma town in 2019.

CHAPTER 4: METHODS AND MATERIALS

4.1. Study area and period

The study was conducted in Jimma town from March 1 – 31/ 2019. Jimma town, capital of Jimma zone is located at 356 Km to South West of the national capital, Addis Ababa. Its astronomical location is 7º 4' North Latitude and 36º 5' East Longitude. In the year 2018, the total population of Jimma town is projected to be 205,384. From these 104,745 are females while 100,639 are males. Regarding the health service organizations, there are ten government health facilities in the town among them are two hospitals, four health centers and four health posts. Private health facilities in the town include a primary hospital, 27 medium clinics, 7 dental clinics, 7 small clinics, higher level diagnostics laboratory 3, 19 pharmacies and 33 drug stores.

Few organizations work to provide essential services to the street children in Jimma town. The biggest and most organized one is Faya Integrated Development Organization(FIDO) which provides comprehensive services ranging from legal aid to medical treatment. The organization has decentralized establishment including thirteen community social workers each at every urban Kebeles and registered community volunteers ranging 20-30 on each Kebeles. These community volunteers work under close supervision from community social workers and have direct contact with the street children.

4.2. Study design

Community based cross sectional study design was employed.

4.3. Populations

4.3.1. Source population

The source populations were all children of the street aged 12-18 years living in Jimma town during the study period.

4.3.2. Study population

Study populations were all children of the street living in Jimma town during the study period, aged 12-18 years and fulfilled the inclusion criteria.

4.3.3. Study unit

Study units are individual children of the street.

4.4. Sample size

Sample size was calculated for the two objectives separately and the higher sample size was used. Sample size for the first objective was calculated by using single population proportion formula by using 95% confidence interval, 5% margin of error and the prevalence of intestinal parasitic infections among street residents in Addis Ababa as 71.8%(41).

Accordingly, = $\boldsymbol{z(\alpha/2)^2 * P(1-P)/ D^2 = (1.96)^2 * 0.718(1-0.718)/0.05^2}$=311

Sample size for the second objective was calculated by using STATCALC of Epi info 7 for different variables as shown in the following table. Since the first one is higher, 311 was chosen as the sample size for this study (table 1).

Table 1: Sample size calculation for the second objective using different variables

S.no	Author	Study area	Variable	OR	% of outcome in unexposed	E/UE	Power	CI	Sample size
1	Banchiamlak M.(41)	Addis Ababa	Consumption of left over foods	2.9	74%	1	80	95%	228
2	Hailu et al.(59)	Rural Bahir Dar	Age	2.3	22.2%	1	80	95%	222
3	Hailu et al.(59)	Rural Bahir Dar	Sex (male)	1.9	40.4%	1	80	95%	310
4	Workneh T.(44)	East Gojjam	Source of drinking water(unprotected)	4.38	65.4	1	80	95%	112
5	Hailegebriel (63)	Bahir Dar	Cleanliness of finger nails(unclean)	3.68	54.3	1	80	95%	106
6	Alemu etal.(67)	Arbaminch	Washing of fruits and vegs(do not wash)	2.16	55.8	1	80	95%	260
7	Jejaw etal(57)	Mizan town	Consumption of street foods(yes)	2.3	69%	1	80	95%	290
8	Jejaw etal(57)	Mizan town	Eating raw vegetables(yes)	2.7	68%	1	80	95%	212

Since the source population is 365 from the preliminary survey which is less than 10,000, correction formula was used to adjust the sample size. The final sample size was calculated as follows

$$n = \frac{n}{1+n/N} = n = \frac{311}{1+311/365} = 167$$

Adding 10% for non-response rate, the final sample size was **185**.

4.5. Sampling technique

Complete enumeration was used after developing list of children of the street and included all 312 children who fulfilled the inclusion criteria. Thirteen urban Kebeles of Jimma town were included in the preliminary survey. By using Community social workers and volunteers at every Kebele, list of street children was developed for every Kebele. Demographic information, time since started living on the street, area of usual residence, means of communication, language, visible deformities, nick name and whether they go to home at the night or not was recorded on the format. Demographic information was also written on respondent card, provided to the respondent and told to come with for data collection. The list of street children developed with their characteristics and inclusion procedures are portrayed on the following diagram.

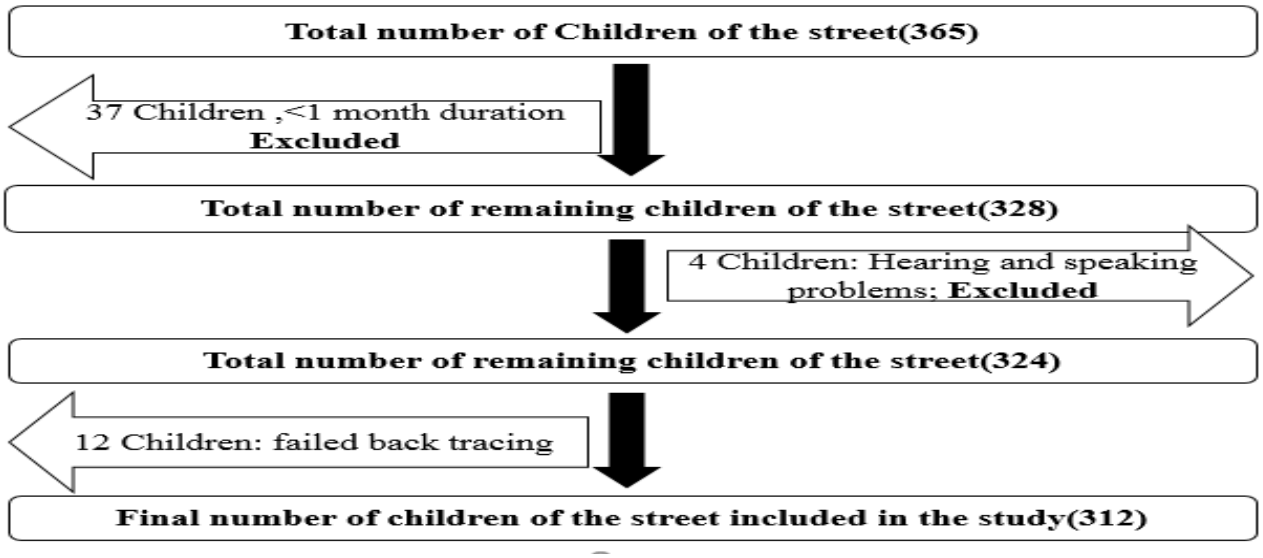

Figure 2: Registration and selection of street children to the study in Jimma town, 2019

4.6. Inclusion and exclusion criteria

4.6.1. Inclusion criteria

All children of the street who live on the street without adult supervision, residing on the street during the time of the study and aged 12-18 years were included in the study.

4.6.2. Exclusion criteria

Children who stayed on the street for less than one month were excluded to account for incubation period of most intestinal parasitic infections. In addition, children with difficulties in hearing and speaking were excluded after failure of repeated attempts to hire data collectors who are suitable for their conditions.

4.7. Data collection procedures

Demographic and other personal data were collected by interviewer administered questions using a structured questionnaire that was developed after reviewing relevant literatures. Selected children were brought to the public health centers of the city by community volunteers. Questionnaire based questions were asked and recorded in shady and calm areas of the health centers. Fresh stool sample was collected from every selected street child by laboratory technologists at health centers up on arrival. Small portion of the fresh stool sample was examined by using wet mount and the rest was fixed and examined by using formalin ether concentration method to determine the presence of parasitic eggs, trophozoites or cysts or relevant developmental stages of intestinal parasites. HIV testing of individual participants was carried out at the health centers by laboratory technologists using the national HIV testing algorithm.

Four licensed clinical nurses were employed to collect interview- based information from selected study participants and a BSc health officer supervised their activities. Laboratory examination was conducted by two licensed laboratory technologist in each four Health Centers in Jimma town.

4.8. Study variables

4.8.1. Dependent variable

Intestinal Parasitic infection status

4.8.2. Independent variables

Demographic factors

- ✓ Age
- ✓ Sex
- ✓ Birth place

Socio economic factors

- ✓ Educational status
- ✓ Income

Leisure activities

- ✓ Practice of swimming in unprotected water bodies

Feeding activities

- ✓ Eating street food
- ✓ Eating leftover food
- ✓ Eating raw vegetables

WASH Factors

- ✓ Source of drinking water
- ✓ Source of bathing water
- ✓ Usage of toilet
- ✓ Practice of Hand washing after toilet
- ✓ Shoe wearing
- ✓ Practice of hand washing before and after meals
- ✓ Practice of washing fruits and Vegetables before eating
- ✓ Status of fingernails
- ✓ Method of cutting finger nails
- ✓ Cleanliness of fingernails

Health system factors

- ✓ Deworming status
- ✓ Health information (Knowledge of ways of transmission)

4.9. Operational definitions

Street children: In this research street children were children of the street who work, live and sleep on the street, who are not supervised with any adult guardian and aged 12-18 years.

Intestinal parasitic infection: Presence of one or more species of pathogenic intestinal parasites or their different developmental stages on microscopy after wet mount and Formalin Ether concentration is conducted.

Street food: Street food are those foods that are either prepared and/ or sold at road sides like 'dinich be doko','godere', 'road side biscuits', 'sambusa' etc

Knowledge of ways of transmission if intestinal parasitic infections: Providing a 'yes' response to at least one question among the questions that assess the knowledge of ways of transmission of IPIs.

Hand washing practice: The practice of washing hands after key times like after toilet, before and after eating meals and after contact with any contaminant with soap and water or water and ashes.

Swimming in unprotected water bodies: The practice of swimming at least once a week in the month preceding the data collection in unprotected rivers, lakes or ponds.

Cleanliness of fingernails: Short finger nails with no visible dirt underneath after visual observation of each fingernail.

4.10. Data analysis procedures

Data was entered in to Epidata version 3.1 and exported to the SPSS version 20 for analysis. Data exploration was conducted to assess the completeness and descriptive statistics were used to describe the data depending on its nature. The data were displayed by using tables and graphs. Inferential statistical analysis was conducted by using the bi variable and multivariable logistic regression. Variables with the level of significance ≤ 0.25 on the bi variable analysis were candidates for the multivariable analysis. Significance of the association was decided by using the P-value of ≤ 0.05 at the 95% confidence interval for the multivariable model. Hosmer and Lemeshow test was conducted to assess the fitness of the model.

4.11. Data quality management

Licensed clinical nurses were selected for the collection of the interview-based data. The questionnaire prepared in English was translated into Amharic and translated back to English to assess consistency. The Amharic version was used while carrying out the interview. Intensive training was provided for the data collectors concerning the objectives of the study and the nature of study participants for two days. On site supervision of the data collectors and data collection process was carried out on daily basis. Pretesting of the data collection instrument was done on 30 children in Agaro town and amendment of the questionnaire was done based on the findings of the pretest. Data were checked for completeness and consistency, edited and coded on daily basis. Finally, it was cleaned after entry into computer and exportation to SPSS version 20 for analysis.

Stool samples were collected by laboratory technologists, coded and examined without any delay. Quality control of laboratory examinations was carried out by involving two laboratory technologists at each health centers. Concordant findings are taken as final measure and discordant findings were re-examined by a senior laboratory technologist and finally his conclusion was used as a final decision on the specimen. Questionnaires and stool specimens were coded and later re-merged with laboratory findings.

4.12. Ethical consideration

Ethical clearance was sought from institutional review board of Jimma University; Institute of Health. Letter of cooperation was written to administration of the town. Permission was secured from the town's Police department, and Office of Women, Children and Youth affairs to study street children. Assent was obtained from children aged 12-18 years; informed consent was sought for those aged 18 years after providing comprehensive information about the nature, objectives, risks and benefits of the study. Standard treatment was provided for children in which the intestinal parasites are diagnosed in addition to the provision of deworming for entire participants. Children with positive status as per the national HIV testing guideline were linked to the town health office and FIDO. Health information was disseminated to participants after the completion of the data collection.

4.13. Dissemination plan

Final result was submitted to Jimma University, Institute of Health, Faculty of Public Health, Department of Epidemiology. The copy of the result will also be kept at the postgraduate library and office of the Community Based Education. In addition, Jimma town health office, Municipality office, women, children and youth's affairs office will be provided with the final result of this study. Finally, efforts will be made to publish the findings on peer reviewed journal.

CHAPTER 5: RESULT

5.1. Sociodemographic and other characteristics of street children

A total of 324 children of the street fulfilled the inclusion criteria. Out of these, 12 were lost from back tracing and the study included 312 children of the street making the response rate 96.2%. Most of the studied children were male with a total of 284(91%). The median age of participants was 14 years with interquartile range (IQR) of 2 years (13-15 years). Most of children were ethnic Oromo 242(77.6%) and Muslims in religion 240(76.9%). Median duration of time since joining the street life was 12 months with (IQR) of 17.75 months (6.25-24 months). More than a two third of the children came from rural areas.

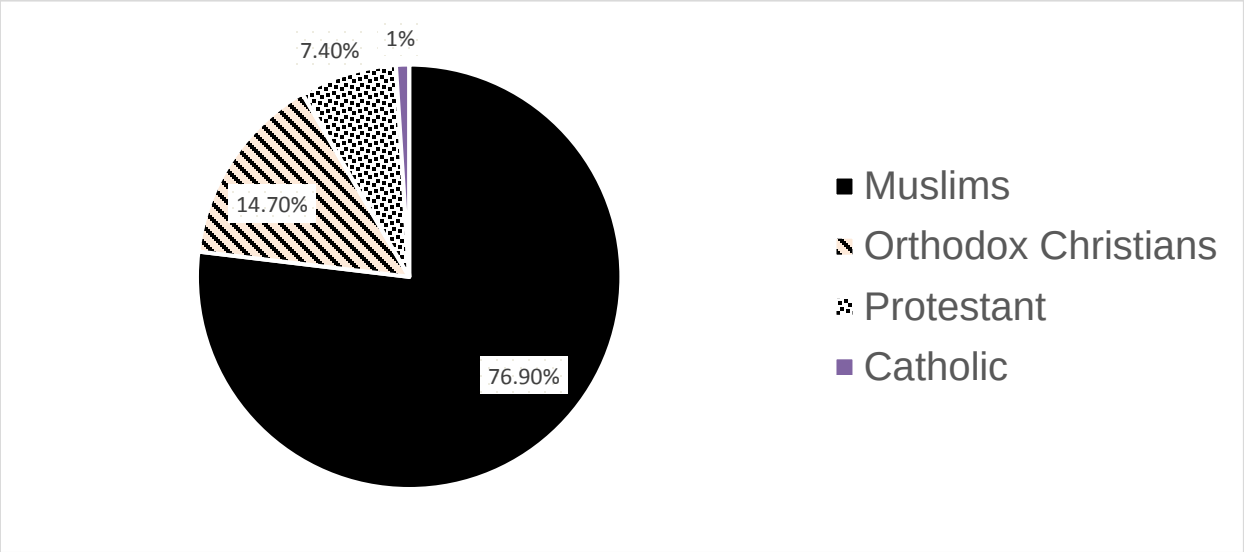

Figure 3: Religion of street children included in the study in Jimma town, 2019

More than a two third of the children had once been in school and nearly half of all the children were in the first cycle of primary education. Currently only 19(6.1%) are following their formal education. Search of job 148(47.4%), peer pressure 90(28.8%) and death of parents 76(24.4%) were the commonest factors that caused the children to join street life. Almost all studied street children are involved in at least one income generating activity on the street 309(99%). Among these activities are carrying goods 226(72.4%), street vending 84(27.2%) and car washing and protection 85(27.3%). The median income of the children was 35 ETB with IQR of 20 ETB(30-50ETB) (Table 2).

Table 2: Socio demographic characteristics of street children included in the study in Jimma town, 2019

Characteristics	Categories		Frequencies (n=312)	Percentages	Remark
Ethnicity	Oromo		242	77.6%	
	Amhara		17	5.4%	
	Dawro		30	9.6%	
	Keficho		18	5.8%	
	Guraghe		4	1.6%	
	Tigre		1	0.3%	
	Total		312	100%	
Birth area	Urban		83	26.6%	
	Rural		229	73.4%	
	Total		312	100%	
Educational status	Never joined		79	25.3%	
	Able to read and write		23	7.4%	
	Grade 1-4		155	49.7%	
	Grade 5-8		55	17.6%	
	Total		312	100%	
Current school attendance	Yes		19	6.1%	
	No		293	93.9	
	Total		312	100%	
Working on the street	Yes		309	99%	
	No		3	1%	
	Total		312	100%	
Type of income generating works	Carrying goods	Yes	226	72.4%	
		No	83	26.6%	
		Total	309	100%	
	Begging	Yes	36	11.6%	
		No	273	88.4%	
		Total	309	100%	
	Street trade	Yes	84	27.2%	
		No	225	72.8%	
		Total	309	100%	
	Car washing and protection	Yes	85	27.3%	
		No	224	72.7%	
		Total	309	100%	
Income	≤ 30 ETB		142	45.5%	
	31-50 ETB		122	39.1%	
	≥51 ETB		48	15.4%	
	Total		312	100%	
Reasons to live on the street	Search of job	Yes	148	47.4%	
		No	164	52.6%	
		Total	312	100%	
	Peer pressure	Yes	90	28.8%	
		No	222	71.2%	
		Total	312	100%	
	Death of parents	Yes	76	24.4%	
		No	236	75.6%	
		Total	312	100%	
	Home violence	Yes	72	23.1%	
		No	240	76.9%	
		Total	312	100%	

Open space veranda 157(50.3%), Small selen bet(madeira) 136(43.6%) and old and unused buildings 111(35.6%) were the commonest sleeping sites utilized by these children.

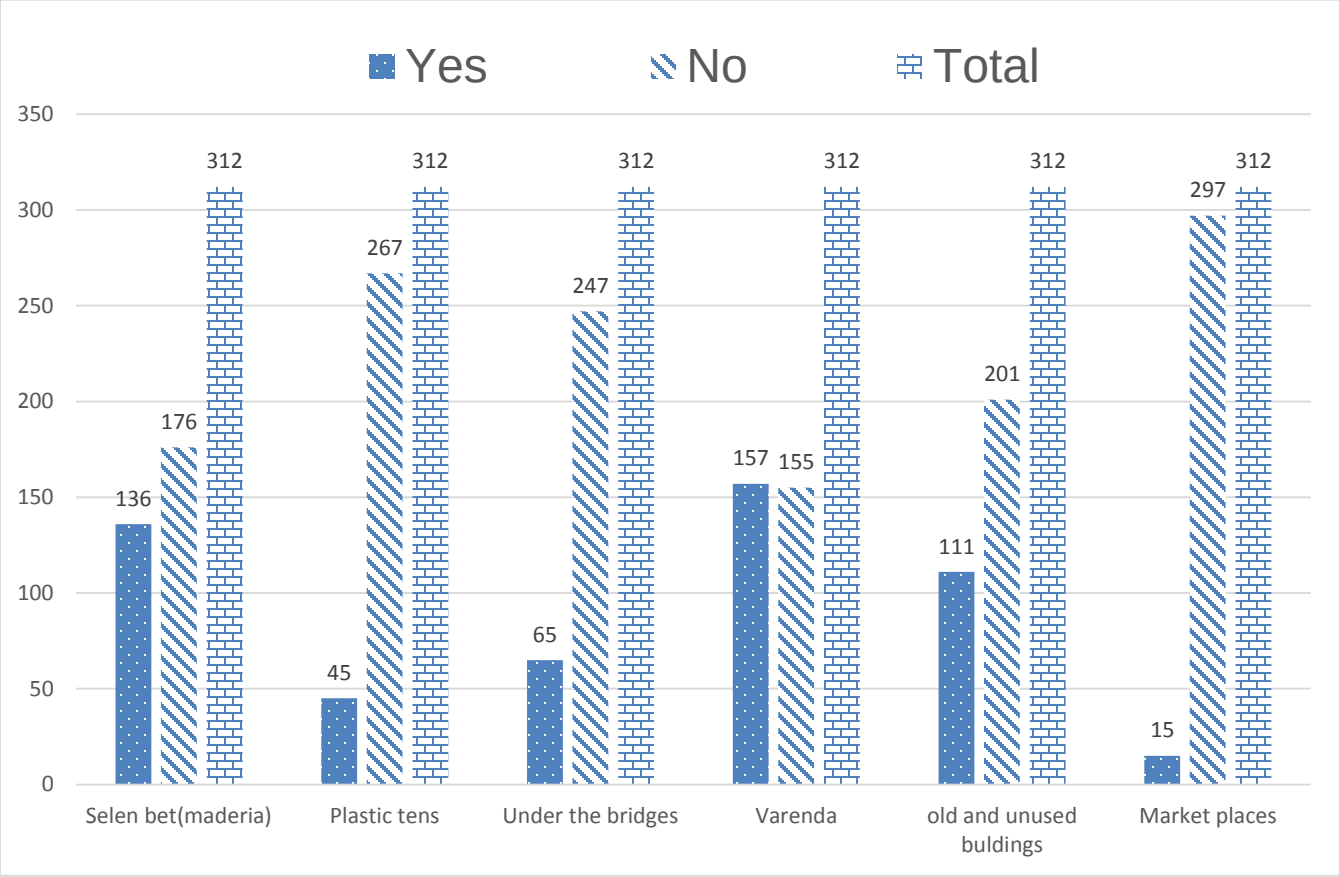

Figure 5: Place of sleeping of studied street children in Jimma town,2019.

Half of studied children had lost one or both or don't know whereabouts of their biological parents. Among those whom their biological parents died, 34(26.0%)lost both their father and mother. In addition, far more than half respondents198(63.5%) had history of recent illness with the commonest being in the last two weeks 95(30.4%). Fever, abdominal pain and vomiting were the most common symptoms of their recent illness (Graph-2). Almost half of all study participants 149(47.8%) sustained varying levels of injury in one month preceding the study. The commonest source of injuries was fighting, falling, car accident and being beaten by police. Only half of the children who has been ill or injured received treatment121(51.5%). Shortage of money to pay for treatment was the reason for more than half not to seek treatment 61(53.5%).

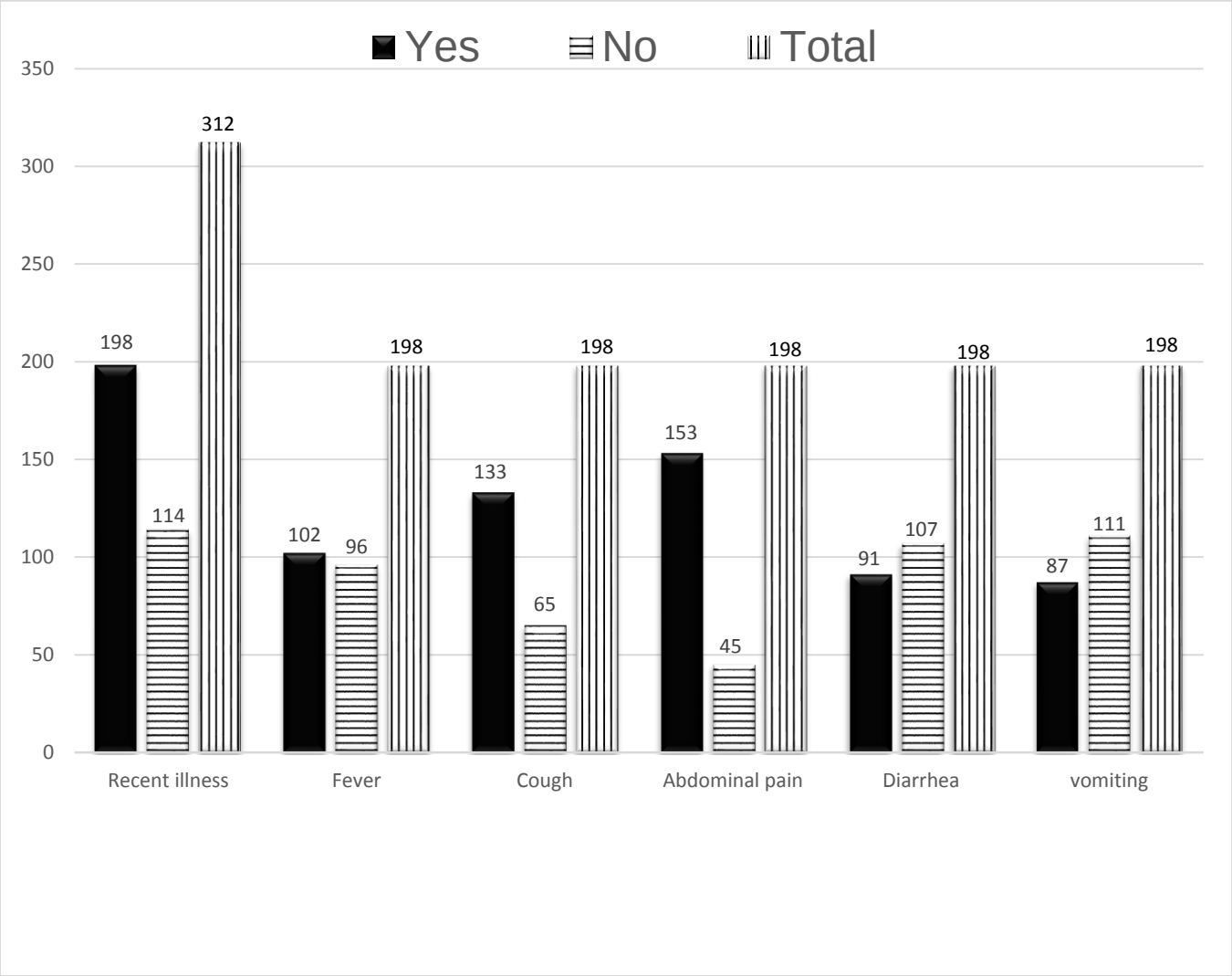

Figure 6: Common symptoms of illnesses for studied street children in Jimma town,2019

More than half of the children ate only two meals a day in the last week prior to the study 178(57.1%). The means of obtaining meals were eating leftovers 235(75.3%), buying 203(65.1%) and individual aid 91(29.2%) (Table 3).

Table 3: Parental characteristics and feeding practices of studied street children in Jimma town, 2019

CHARACTERISTICS	RESPONSE CATEGORIES		FREQUENCIES (N=312)	PERCENTAGES	REMARK
STATUS OF BIOLOGICAL PARENTS	Alive		156	50%	
	Dead		131	42%	
	I don't know		25	8%	
	Total		312	100%	
DEAD PARENTS	Father		51	38.9%	
	Mother		46	35.1%	
	Both		34	26.0%	
	Total		131	100%	
HOW MANY MEALS DO YOU EAT IN A DAY	1 meal a day		45	14.4%	
	2 meals a day		178	57.1%	
	3 meals a day		89	28.5%	
	Total		312	100%	
FROM WHERE DO YOU GET YOUR MEALS	By buying	Yes	203	65.1%	
		No	109	34.9%	
		Total	312	100%	
	Left-over foods	Yes	235	75.3%	
		No	77	24.7%	
		Total	312	100%	
	From individual assistance	Yes	91	29.2%	
		No	221	70.8%	
		Total	312	100%	
	From drop-in centers	Yes	2	0.6%	
		No	310	99.4%	
		Total	312	100%	

5.2. Prevalence of intestinal parasitic infections

Pathogenic intestinal parasites are recovered from almost two third of the stools of study participants 208(66.7%);95% CI (61.2-72.1). Polyparasitism (recovery of two or more parasitic species from stool specimen) was observed in 33(15.9%) participants with positive stool samples and all were dual polyparatism. A total of nine parasitic species were recovered from stool specimens. The parasites fall under categories of helminths, Schistosoma mansoni, cestodes and protozoans. The category of STH and Schistosoma mansoni contributed to 95.2% of recovered parasitic species; the left proportion is shared by protozoans and cestodes. The commonest recovered species was *Ascaris lumbricoides* 121(58.2%) and the rarest was pathogenic amoebic species (*Entameoba histolytica*) 7(3.4%).

Table 4: Intestinal parasitic species recovered from stools of studied children of the street in Jimma town, 2019

Species of parasites	Frequencies	Percentages	Remark
Ascaris lumbricoides	121	58.2%	
Trichuris Trichuria	28	13.5%	
Schistosoma mansoni	24	11.5%	
Taenea species	11	5.3%	
Hook worm species	16	7.7%	
Hymenolepis nana species	9	4.3%	
Strongloides stercolaris	2	1%	
Giardia lamblia	22	10.6%	
Entameoba histolytica	7	3.4%	

Vast majority of parasitic infections were identified among males 187(89.9%). Greater preponderance of polyparasitism was also identified among males 29(87.9%). Age distribution of parasitic infections also showed higher preference towards younger children aged 12-14. This age group shared 142(68%) of the parasitic infections. Concerning educational status, 98(47.1%) of parasitic infections were among children who were in grade 1-4. Higher proportion of children who do not wash their hand after toilet acquired parasitic infections 124(59.1%). In addition,156(75%) of parasitic infections occurred among children who do not wash fruits and vegetables before eating; while133(63.9%) occurred among children who do not know at least one way of transmission of intestinal parasites. HIV AIDS infection was diagnosed by using national HIV testing algorithms in 2.9% (9/312) children of the street and five of them had intestinal parasitic infections.

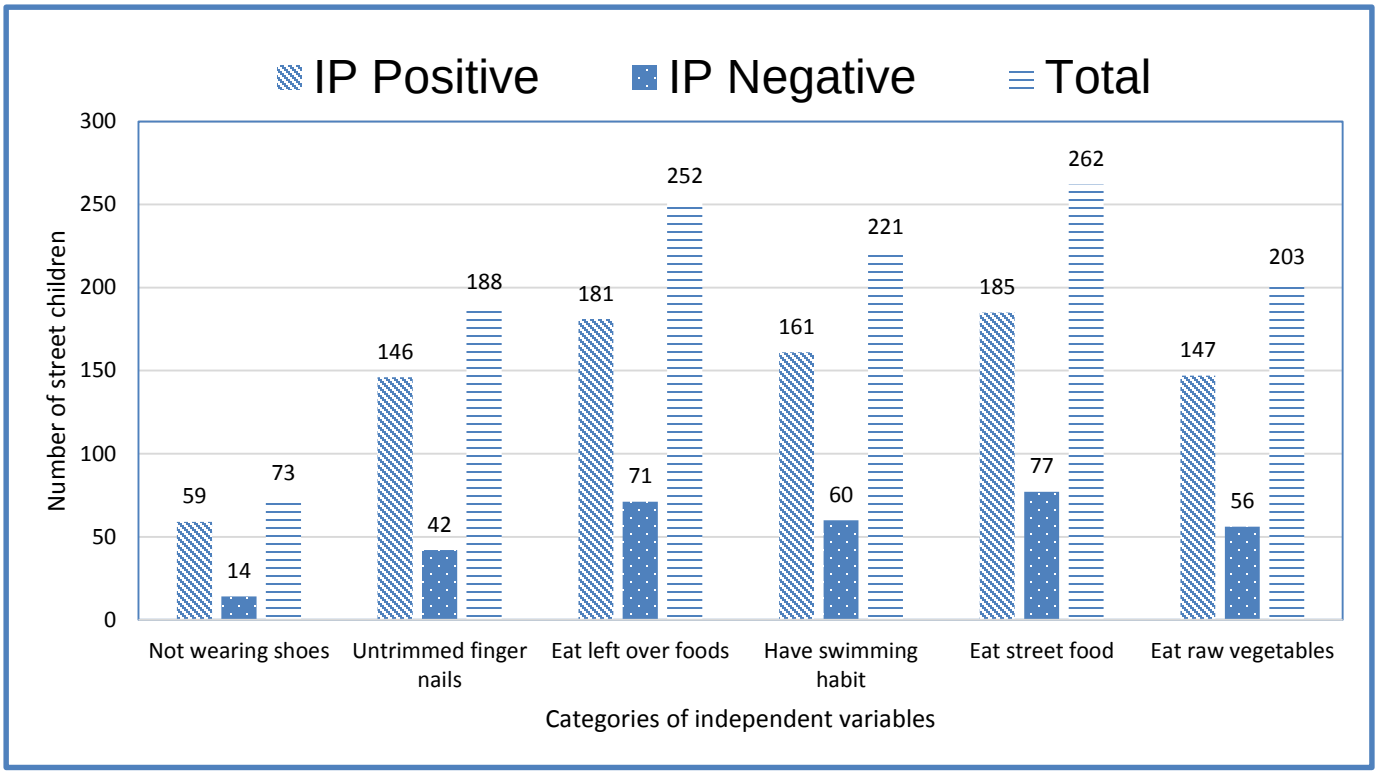

Figure 7: Distribution of parasitic infections among different independent variable categories among children of the street in Jimma Town, 2019.

5.3. Factors associated with intestinal parasitic infections among street children

Bivariable and multivariable logistic regression was used to assess factors associated with IPI among street children in Jimma town. Majority of independent variables showed significant association on the Bivariable model. After taking the independent variables to the multivariable model, IPI status was found to be significantly associated with status of fingernails at the time of data collection, shoe wearing at the time of data collection, swimming habit, habit of eating street food and knowledge of at least on transmission method of IPIs.

Status of finger nail at the time of data collection was found to be an independently associated factor with IPI status; AOR: 2.03, 95% CI (1.02-4.06). According to this finding, Street children whose finger nails are not trimmed were twice more likely to acquire IPIs when compared with children who had their finger nails trimmed. Shoe wearing at the time of data collection was also one of significantly associated variables with IPIs; AOR = 3.8, 95% CI (1.8-8.2).

The finding indicated that, children who were bare footed at the time of data collection are roughly four times more likely to acquire infections when compared children who put on their shoes.

Children who swim in unprotected water bodies are more than twice likely to acquire IPIs when compared with those who do not swim at all; AOR=2.5, 95% CI (1.24-5.04). In addition, eating street food was also found to rise the likelihood of acquiring these infections and children who ate street food had more than twice odds of being infected when compared with those who don't eat street food; AOR=2.24 95% CI (1.004-5.02). Lastly, knowledge about the ways of transmission of transmission of these diseases was found to be significantly associated with the infection status AOR 2.5, 95% CI (1.25-5.0). Accordingly, children who don't know at least one method of transmission of IPI were more than twice more likely to be infected when compared with those who know at least one method of transmission.

Table 5: Bivariable and multivariable logistic regression results of factors associated with intestinal parasitic infections among children of the street in Jimma town,2019.

Independent variable categories		IPI status		COR (95%CI for COR)	P-Value	AOR (95%CI for AOR)	P-Value*
		Positive	Negative				
Age	12-14	142	47	2.6 (1.6 - 4.23)	<0.001		
	15-18	66	57	1			
Income	<35ETB	118	46	1.65(1.02 - 2.65)	0.038		
	>=35ETB	90	58	1			
Educational status	Never joined	78	24	2.33(1.15 - 4.7)	0.018		
	Grade 1-4	98	57	1.23(0.66 - 2.3)	0.50		
	Grade 5-8	32	23	1			
Toilet use	Yes	97	71	1			
	No	111	33	2.46 (1.5 - 4.04)	<0.001		
Hand washing after toilet	Yes	84	68	1			
	No	124	36	2.8 (1.7 - 4.5)	<0.001		
Washing fruits and vegs. before eating	Yes	52	47	1			
	No	156	57	2.5 (1.5 – 4.07)	<0.001		
Cleanliness of fingernails	Clean	55	54	1			
	Not clean	153	50	3.0 (1.8 - 4.9)	<0.001		
Status of finger nails	Trimmed	62	62	1			
	Not trimmed	146	42	3.5 (2.1 - 5.7)	<0.001	2.03(1.02-4.06)*	0.045*
Nail trimming method	Tooth	125	37	2.72 (1.7 - 4.4)	<0.001		
	Blade/others	83	67	1			
Hand washing before and after meals	Yes	96	76	1			
	No	112	28	3.2 (1.9 - 5.3)	<0.001		
Having shoes	Yes	122	82	1			
	No	86	22	2.6 (1.5 - 4.5)	0.001		
Shoe wearing frequency	Regularly	64	64	1			
	Irregularly	58	18	3.2 (1.7 - 6.0)	<0.001		
Current shoe wearing	Yes	63	68	1			
	No	59	14	4.5 (2.3 - 8.9)	<0.001	3.8(1.78-8.16)*	0.001*
Habit of Swimming	Yes	161	60	2.5 (1.5 - 4.2)	<0.001	2.5(1.24-5.04)*	0.011*
	No	47	44	1			
Eating street foods	Yes	185	77	2.8 (1.52 - 5.2)	0.01	2.24(1.04-5.02)*	0.049*
	No	23	27	1			
Eating leftover foods	Yes	181	71	3.1 (1.74 - 5.5)	<0.001		
	No	27	33	1			
Eating raw vegetables	Yes	147	56	2.0 (1.3 - 3.4)	0.004		
	No	61	48	1			
Source of drinking water	Protected	138	85	1			
	Unprotected	70	16	2.7(1.28 - 4.03)	0.005		
Knowledge of ways of transmission of IPs	Yes	75	71	1			
	No	133	33	3.8((2.3-6.3)	<0.001	2.5(1.25-5.0)*	0.01*

CHAPTER 6: DISCUSSION

In this study, the prevalence of intestinal parasitic infections among street children was found to be 66.7% ;95% CI (61.2-72.1) and concurrent infection with two or more parasites was 15.9%. The predominant parasitic species were Ascaris Lumbricoides, Trichuris Trichuria, Schistosoma mansoni and hook worm. Giardia lamblia was the commonest of protozoan species. The current prevalence of IPIs in the town among this segment of population is categorized as high rate of infection demanding bi annual MDA administration according to the WHO. Several factors such as status of fingernails, practice of swimming in unprotected water bodies, shoe wearing, eating street food and knowledge of ways of transmission of IPI were found to be associated with intestinal parasitic infections among street children. This indicates that street children are still at risk of developing morbidities from these diseases. Furthermore, these children may serve as a source of infection for the wider community and need to be considered in ongoing interventions by giving special emphasis on identified factors to meet the global and national targets of eliminating these diseases as a public health problem.

This finding is in line with a report from a study conducted on street dwellers in Addis Ababa which put the magnitude as 71.8%(41). Similar finding was also reported from Sudan that stated the prevalence of IPIs among street children in Khartoum as 71.7%(23). In addition, the finding from this study is comparable with a finding from Philippines among street children that put the magnitude of IPI as 62% (68). The composition of the species of parasites were also similar in that Ascaris lumbricoides, trichuris trichuria and hookworm were the predominant parasites.

The current finding is lower than a report from a study conducted on street beggars in Jimma town which stated the figure as 89.7%(69). The variation may be due to the difference in timing of the studies and the sample size. The study in Jimma among street beggars was conducted in 2010. In the year, MDA was not intensified since the national master plan on STH control was launched in 2013 by the Federal Ministry of Health ealth in Ethiopia. As a result, the transmission of IPIs was thought to be extensive. Furthermore, the study used only wet mount method to assess the status of infection and this method is less sensitive supporting the above statement that the prevalence at the time could be even more than the stated. In addition, the study only involved 115 participants and may also be far from estimating the true population level prevalence among street dwellers.

In contrary, the current finding is much higher than a report from a study conducted in Peru among street and institutionalized children which put the magnitude of pathogenic IPIs as 30.6%(22). This difference may be due the difference in the population from which sample is taken. The study in Peru included both institutionalized and street children in the study; this can lower the prevalence of IPI as those institutionalized children are more likely to have more access to medical checkups and treatments when compared to this study that included only street children which do not have access to medical care even when they are ill. In this study, 48.5% of children who were ill in the month preceding the study didn't get any form of treatment. Similarly, the finding from the current study is much higher than a report from rural Poland that is conducted on orphanages and street connected children putting the figure at 46.3%(60). This variation may be due to geographic and socioeconomic difference between the two countries.

This study revealed that several factors like hygienic factors, feeding practices, leisure activities and knowledge of ways of transmission were associated with IPIs status. Status of finger nails was found to be significantly associated with IPIs AOR=2.03 95% CI (1.02-4.06). This finding is supported by the data from this study. In this study, intestinal parasites were recovered from 146(77.7%) of children with untrimmed finger nails. This finding is also supported by studies conducted on school aged children in Ambo and Butajira towns(47,51). The explanation would be possible harboring of untrimmed finger nails for disease causing parasites with dirt(70) especially when children are in contact with soil as a result of their daily working conditions. The ovum can be ingested orally through food to cause IPIs as most of children do not have practice of hand washing before and after meals. In the current study near a half, 140/312(44.8%) of the street children do not wash their hands before and after meals. Finally, a cluster randomized trial conducted in northern Ethiopia showed marked decrease in rate and likelihood of re infection among study group who washed their hands during key times and trimmed their fingernails on weekly basis(71).

Eating street food is also associated with IPI status among street children AOR=2.2; 95%(CI 1.004-5.02). The current data indicated that more than eight in ten of the children consume street foods 262(84%) and IPs were identified from stools of 70% of children who consume street foods. This finding is supported by studies conducted on street residents in Addis Ababa and school aged children in Mizan towns(41,57). This might be due to unhygienic preparation, storage and vending

of street foods that makes them contaminated with disease causing pathogens including intestinal parasites and bacteria. Utensils used on street food vending were also found to be contaminated by disease causing agents(72). In addition unhygienic transfer of currencies during street food vending could also result in transfer of disease causing parasitic agents with subsequent infections (73–75).

Shoe wearing status was another significantly associated variable with IPIs; AOR=3.8 ;95% CI (1.8-8.2). In this study, barefooted children were found to be nearly four times more likely to acquire infections. The current study found that 204(65.4%) of studied children had shoes and only 131(64.2%) of those who have shoes had put their shoes on during data collection. Majority of children who were barefooted at the time of data collection were found to be infected with IPIs 59(80.8%). Studies from different parts of Ethiopia supported this finding. These studies found that children who were bare footed at the time of data collection had increased likelihood of acquiring IPIs(59). In contrary, shoe wearing children had lowered odds of acquiring infections(42,44,46,62,64). This may be due to increased susceptibility of bare footed children to skin penetrating intestinal parasites like hookworm and protective effects of shoe wearing on IPIs.

Habit of swimming was one of the significantly associated variables with parasitic infection; AOR=2.5;95% CI (1.24-5.04). This finding is strengthened by reports from several studies conducted in South Ethiopia like Arbaminch zuria woreda and lake Hawassa area; Northern and Central Ethiopia like Amhara regional state, Haike and some in South Eastern Ethiopia(52,53,59,62,64). This can be explained by the established fact that frequent contact with unprotected waterbodies could result in an infection by skin penetrating infections like Schistosomiasis and swallowing unclean water could result in infection by certain disease causing pathogens including protozoans.

Knowledge of ways of disease transmission helps peoples to take precautionary measures to prevent infection and consequent suffering. This truth is revealed in this study in that, children who do not know any method of transmission of IPI are more two times likely to acquire infections when compared with those who know at least one; AOR= 2.5;95% CI 1.25-5.0). More than half of studied street children 166(53.2%) in the current study do not know at least one method of transmission of IPIs and 133(80.1%) of these children were infected with IPs. This finding is

supported by a report from a study conducted in Addis Ababa among street residents(41). In addition, community trials revealed that health education on core aspects of intestinal parasites including ways of transmission significantly reduced magnitude of parasitic infections(76,77).

In this study, variables like educational status, age, sex and other WASH related characteristics were not independently associated with intestinal parasitic infections unlike studies conducted among non-street dwelling school age children in different part of Ethiopia. This may be due to the variation these between populations and little variation among the street children when it comes to these variables as they are more concentrated towards one of the other categories.

Limitations of the study

The limitation of this study was that the IPI statuses of the children was ascertained by a single stool specimen which could underestimate the prevalence of the measure. In addition, the study didn't include intensity of infections for STH and Schistosoma mansoni infections.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

7.1. Conclusions

This study has found high prevalence of intestinal parasitic infections among street children in the study area. In addition, considerable proportion of the children had harbored multiple parasites. The parasites included soil transmitted helminths, Schistosoma mansoni and protozoa species. Several factors were found to be associated with infection status. These factors include shoe wearing, swimming habit, habit of eating street food, nail trimming status and knowledge of ways of transmission of intestinal parasites.

7.2. Recommendations

The findings from this study warrant the need to focus on underserved populations like street children to be included in the MDA. Neglecting this segment of children will result in disruption of the wider control and elimination activities of these group of diseases as these children remain sources of infection for the overall community. Accordingly, integrated control activities need to be initiated by making collaborations with all stake holders. Depending on findings from the study, the following recommendations are directed towards these entities.

Recommendations to the Federal Ministry of Health

The prevalence of IPIs among street children in Jimma town is high and requires bi annual MDA as per the WHO guideline. It would be better if the FMOH could carry out localized studies among these segment of populations in different cities to device a way to include them into an ongoing MDA program for the good the health system, community and to fulfill the right of these children to enjoy a healthy life as enshrined in international conventions of child rights which our country has also adopted.

Recommendations to Jimma town health office

The health office should provide comprehensive education targeting these children on IPI risk factors like personal hygiene, wearing protective shoes, swimming in unprotected water bodies, consumption of street food, and ways of transmission of the diseases. In addition, the health office

should cover these children with deworming campaigns pending the official inclusion by the FMOH benefit both the children and the community.

Recommendations to Jimma town administration, Office of Women, Children and Youths affairs, NGOs and local volunteers

These organizations should join hands with the town health office and town administration to design interventions that boost access to water, sanitation and hygiene to these group of children.

For researchers

Further study has to be conducted by using constellation of laboratory methods including egg counts to assess intensity of infections among these children.

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Annex 1: Consent form

JIMMA UNIVERSITY

INSTITUTE OF HEALTH

FACULTY OF PUBLIC HEALTH

DEPARTMENT OF EPIDEMIOLOGY

DATA COLLECTION TOOL FOR ASSESSMENT OF THE PREVALENCE OF INTESTINAL PARASITIC INFCTION AND ASSOCIATED RISK FACTORS AMONG STREET CHILDREN IN JIMMA TOWN, MARCH 2019

My name is_____. I am working as a data collector for a study that is being conducted in Jimma town to assess the prevalence of intestinal parasitic infections and associated factors among street children. The principal investigator is Mr. Sabit Zenu, a student at Jimma University, institute of health, faculty of public health, department of Epidemiology. He is doing this study as a fulfillment of partial requirements of Masters of Public Health(MPH) in Epidemiology.

Objective and significance of the study: The objective of this study is to determine the prevalence of intestinal parasitic infections and associated factors among street children in Jimma town. This study helps to document the magnitude of intestinal parasitic infections and factors associated with infection so that the town health office, and other responsible bodies take actions to curb the problem. Furthermore, the aim of this study is to write final thesis as a fulfillment of partial requirements of the postgraduate study in the field of Epidemiology for the principal investigator.

Risks and Benefits: This study entails no risk except the time you give for the information you provide. This study will benefit You by providing you a free stool examination that help you know your infection status. In addition, you will be provided with a free medical treatment if you are found positive for the parasites. Lastly, you will be compensated for the time you give to provide your information with 20 ETB.

Rights: You will be included in this study only if you are voluntary to do so. You have the right to decline to participate in this study from the start or withdraw at any time during the study. In addition, you have the right to refuse to answer questions you think unfavorable.

Confidentiality: I assure you that the information you provide and your laboratory result will not be accessed by a third party and your name or anything that may identify you will not be included in the reports.

Do you agree to participate? Yes ☐ No ☐

Dear data collector, if the individual says No to the above question stop there: if he/ she says Yes thank him/ her and proceed.

Annex 2: English version of the Questionnaire

	ID Number of the respondent	----------	
S/No	**Questions**	**Responses**	**Remark**
Part 1	**Socio demographic and other characteristics of the respondent**		
101	Sex of the child	1=Male 2= Female	
102	How old are you?	----------years	
103	Where was your birth place?	1=Rural 2= Urban	
104	What religion do you follow?	1=Orthodox 2=Muslim 3=Protestant 4=Catholic 5= Others	
105	To which ethnic group do you belong?	1=Oromo 2=Amhara 3=Guraghe 4=Dawro 5= Others	
106	What highest level of education did you attain?	1=Never went to school 2=Can read and write 2=Grade 1-4 3=Grade 5-8	
107	How long have you been on the street?(in months)	----------	
108	Why did you choose to live on the street?	1= Death of family 2= To help my family 3= Peer pressure 4=Search of job 5= Fled home violence	

		6=Seeking freedom	
109	Do your biological parents alive?	1=Yes 2=No 3=I don't know	**If No, Jump to 111**
110	Which of your biological parent/s is/are not alive	1=father 2=Mother 3= Both	
111	Do you visit your family?	1=Yes 2=No	**If No, jump to Q 112**
110	If Q 111is Yes, how often do you visit them?	1= Daily 2= Weekly 3= Monthly 4= Yearly 5=Others	
112	Where do you usually sleep?	A=Small rent houses B=On the veranda C= Under the bridges D=In old and unused buildings E=Market places F= Plastic tents	**More than one answer is possible**
113	Do you work to earn income on the street	1=Yes 2=No	**If No, jump to 115**
114	What is your work on the street?	A= Carrying small goods B=Guarding/washing cars C= Shoe shining D= Stealing E= Begging F= Street trade G=Escorting disabled peoples	**More than one answer is possible**

		H= Messaging	
115	What is your average daily income in ETB?	---------- in ETB	
116	How many meals do you eat in a day?	----------	
117	How do you obtain food usually?	A=Buying B= Eating leftovers C= Begging D= From drop-in centers E=From individual assistance	**More than one answer is possible**
119	Have you ever been sick in the last 1 month?	1=Yes 2= No	**If No, Jump to 201**
120	If Q no 119is yes what was/ were your sickness?	A= Fever B= Diarrhea C= Abdominal pain D= Vomiting E=Headache F= Others	**More than one answer is possible**
121	Did you get treatment for the sickness/es?	1=Yes 2= No	**If No, Q 123**
122	If Yes for Q 120, from where?	1= Gov't HI 2= Private HI 3= Traditional/spiritual 4=Pharmacies 5= Self-medication 6= Others	
123	If No, For Q 120, what was the reason for not seeking treatment?	1=Lack money 2= No time 3=Unsupportive care givers	

		4= Others	
Part 2	**Water, sanitation and hygiene(WASH) practices**		
201	What is the source of your drinking water?	1= Tap(pipe) water 2= Spring water 3= River water 4= Others	
202	Do you take bathing?	1=Yes 2= No	
203	How often do you take bathing?	1= Twice in a week 2= < Once in a week 3= Rarely	
204	What is your source of water for bathing?	1= Tap water 2= River water 3= Lake 4= Others	
205	Do you use toilets for defecation/excretion?	1= Yes 2= No	**If No -207**
206	If his/her response to **Q 205** is Yes, where do you usually do so?	1=Individual pit 2=Communal latrine 3=VIP 4=Others	
207	If his/her response for **Q 205** is No, how do you usually defecate/excrete?	1= Open field 2= Plastic bags 3= Others	
208	Do you wash your hands after defecation?	1=Yes 2=No	**If No- go to Question 210**
209	What do you use to wash your hands	1=Water only 2=Soap and water 3=Ashes and water	

210	Do you wash fruits and vegetables before eating?	1=Yes 2=No	
211	How often do you cut your fingernails?	1= Usually 2= Some times 3= Rarely	
212	Do you cut your fingers?	1= I cut regularly 2= Some times 3= Rarely	
213	What do you use to cut your finger nails short?	1= My tooth 2= Blades 3= Others	
214	Does his/her nail shortened?	1= Yes 2= No	**Observe**
214	What is the status of his/her fingernails?	1=Clean 2=Unclean	**Observe**
215	Do you wash your hand before and after meal	1=Yes 2=No	
216	Do you have shoes	1=Yes 2=No	**If no, Jump to 218**
217	How often do you wear shoes	1= Usually 2 =Some times 3= Rarely 4= Never wear	
218	Does the respondent currently wearing shoes	1=Yes 2=No	
219	Do you swim?	1=Yes 2=No	
220	Where do you swim?	1=River 2=Lakes 3=Swimming pools	

		4= Ponds and Others	
Part 3	**Feeding and leisure practices of the street children**		
301	Do you consume street foods?	1=Yes 2=No	**If No, go to Question 303**
302	If his/her r4sponse to **Q 301** is Yes, how often?	1= Usually 2= Sometimes 3= Rarely	
303	Do you consume leftover foods?	1= Yes 2= No	**If No, go to 305**
304	If his/her response to **Q 303** is Yes, how often?	1= Usually 2=Sometimes 3=Rarely	
305	Do you eat raw vegetables?	1=Yes 2=No	**If no, go to 307**
306	If his/her response to **Q 305** is Yes, how often?	1=Usually 2=Sometimes 3=Rarely	
307	Do you eat raw meat	1= Yes 2= No	
Part 4: Health service and knowledge related factors			
401	Have you received medications on the street from health workers in the last six month?	1=Yes 2= No	**If no go to 403**
402	If Q 309 is Yes, what did they say it helps for?	1= Kill worms 2=Kill lice 3=Others 4=They didn't tell advantage	
403	Have you ever heard of intestinal worms?	1=Yes 2= No	**If No, go to 405**

404	If Q 310 is Yes, from where did you hear about them?	1=from my family 2=from health workers 3=from Radio 4= from TV 5=others	
405	Do you know ways of transmission of intestinal parasites?	1=Yes 2=No	**If no, finish**
405i	Intestinal parasites can be transmitted by not keeping personal hygiene	1=Yes 2=No	
405ii	Intestinal parasites can be transmitted by eating contaminated food	1=Yes 2=No	
405iii	Intestinal parasites can be transmitted by drinking contaminated water	1=Yes 2=No	
405iv	Intestinal parasites can be transmitted by swimming in unprotected water bodies	1=Yes 2=No	
405iv	Intestinal parasites can be transmitted by not wearing protective shoes	1=Yes 2=No	
Part 5: HIV testing and Laboratory results of stool examinations for intestinal parasites			
501	HIV infection status	1= Positive 2= Negative	
502	Parasitic infection status	1= Positive 2= Negative	
503	Is there polyparasitism?	1= Yes 2= No	
504	What parasites are recovered from the stool?	List 1---------- 2---------- 3---------- 4---------- 5----------	

Annex 3: Amharic consent form

ጅማ ዩኒቨርሲቲ

በጤና እንስትቲዩት

የህብረተሰብ ጤና አጠባበቅ ፋካሊቲ

ኤፒዲሚዮሎጂ ትምህርት ክፍል

ስሜ _____: በጎዳና ህፃናት በአንጀት ጥገኛ ተህዋሲያንተ ላላፊበሽታዎች እና ተዛማጅነት ያላቸውን ተፅዕኖዎች ለመገምገም በጅማ ከተማ እየተካሄደ ላለው ጥናት እንደ መረጃ ሰብሳቢ እየሰራሁ ነዉ:: ዋናውመርማሪ፡ተማሪ ሳቢት ዘይኑ የጅማ ዩኒቨርሲቲ ኤፒዲሚዮሎጂ ትምህርት ክፍል ተማሪ ሲሆን በትምህርት ክፍሉ የሁለተኛ ዲግሪ ትምህርት ከፊል መስፈርቶችን ለማሞላት ይህንጥናት ያካሂዳል::

የጥናቱ ዓላማ እና ጠቀሜታ: የዚህ ጥናት ዋና ዓላማ በጅማ ከተማ በሚገኙ የጎዳና ላይ ህፃናት ላይ የሚከሰተውን አንጀት ጥገኛ ተህዋሲያን ተላላፊ በሽታዎች እና ተዛማጅነት ያላቸውን ተፅዕኖዎች ለመገምገምነው፡፡ይህ ጥናት አነኝህን ችግሮች በመለየት የበሽታዎቹን መጠን እና ተዛማጅነት ያላቸውን ሁኔታዎች ለመመዝገብ እገዛ በማድረግ የከተማ ጤናቢሮ እና ሌሎች ኃላፊነት ያላቸው አካላት ችግሩን ለመግታት እርምጃዎችን ይውሰዱ ዘንድ ይጠቅማ:: በተጨማሪም, የዚህ ጥናት ዓላማው ለዋናው መርማሪ በኤፒዲሚዮሎጂ መስክ የድህረምረቃ ጥናት የመደምደሚያ ከፊል መስፈርቶች ፅሁፎችን ለመፃፍ ይረዳል፡፡

አደገኛ ሁኔታዎች እና ጥቅሞች :ይህ ጥናት እርስዎ ለሚያቀርቡት መረጃ ከ ሚሰጡት ጊዜ በስተቀር ምንም አደጋን አያደርስቦትም:: በዚህ ጥናት የኢንፌክሽንዎን ሁኔታ ለማወቅ የሚረዳዎ ሲሆን፡ተጠቂ ሁነዉ ከተገኙ ነፃ ህክምና እንዲያገኙ ይረዳዎታል፡፡. በተጨማሪም, መረጃዎ በሚሰጡበት ወቅት ከመረጃ ሰብሳቢ ጋረ ለሚያሳልፉት ግዜ 20ብር ይከፈልዎታል፡፡

መብቶች፡ በዚህ ጥናት ውስጥ እርስዎ በፍቃደኝነት ከፈቀዱ ብቻ ይካተታለ:; በጥናቱ ወቅት በዚህ ጥናት መሳተፍ አልፈልግም የማለት መብት አለዎት::በተጨማሪም, አግባብ አየደለም ብለው የሚያስቡትን ጥያቄዎች አለመመለስ መብት አለዎት፡፡

ሚስጢራዊነት :እርስዎ የሰጡት መረጃ እና የእርስዎ የላቦራቶሪ ውጤት በሦስተኛ ወገን ሊደረሱ እንደማይችሉ ላረጋግጥሎት እወዳለሁ፡፡እንዲሁም ስምዎ ወይም ማንኛውም እርስዎን ለይቶ ሊያውቁት የሚችል ማንኛውም ነገር በሪፖርቶች ውስጥ አይካተቱም

ለመሳተፍ ተስማምተዋል?

አዎ ☐ አይ ☐

ውድ መረጃ ሰብሳቢ ግለሰቡ ከላይ በተጠቀሰው ጥያቄ ላይ**"አይ"**የሚል ከሆነ እዚያያቁሙ:: እሱ ወይም እሷ ያለችው **አዎ** ከሆነ በማመስገን ወደ ጥያቄዎቹ ይሂዱ::

Annex 4: Amharic Version of questionnaire

አባሪ 2: መጠይቅ

	የመላሹየመታወቂያቁጥር	**----------**	
ተ/ቁ	**ጥያቄዎች**	**ምላሾች**	**ማስታወሻ**
ክፍል 1 የ ሶሾ ዲሞግራፊየዊ እናተዛማጅ ጠባዮች			
101	የልጁ /ዋ ጾታ	1 = ወንድ 2 = ሴት 3=አልመለሰም/ችም	
102	እድሜህ/ሽ ስነት ነዉ ?	----------ዓመታት	
103	የትውልድ ቦታዎ የት ነበር?	1 = ገጠር 2 = ከተማ 3 = ኣላዉቅም	
104	ሃይማኖትዎ ምንድንነው ?	1 = ኦርቶዶክስ 2 = ሙስሊም **3 =** ፕሮቴስታንት 4 = ካቶሊክ 5 = ሌሎች 6= አላውቅም	
105	የእርስዎ ጎሳ/ ብሄር ምንድነው?	1 = ኦሮሞ 2 = አማራ 3 = ጉራጌ 4 = ዳዉሮ 5 = ትግሬ 6= ሌሎች 7=ኣላውቅም	
106	የትምህርት ደረጃህ/ሽ ምንያህል ነው?	1 = ትምህርት ቤት አልሄድኩም 2 = ማንበብ እና መጻፍ ብቻ	

		3 = 1-4ኛ ክፍል 4 = 5-8ኛ ክፍል	
107	በመንገድ ላይ ለምን ያህል ጊዜ ኖረዋል?	----------ወራት	
108	በመንገድ ላይ ለመኖር የጀመርከው/ሽዉ ለምንድነው ?	1 = የቤተሰብ ሞት 2 = ቤተሰቤን ለመርዳት 3 = የእኩዮች ተጽዕኖ 4= የቤት ዉስጥ ብዝበዛ ሸሽት 5 = ነጻነት ፍለጋ 6= ስራ ፍለጋ 7 = ሌሎች, ይግለጹ	
109	ወላጅ ብተሰቦችህ በይወት አሉ?	1 = አዎ 2 = አይ 3= ኣላዉቅም	
110	ከ ወላጆችህ በ ህወት የሌለዉ ማን ነዉ;	1= አባት 2=እናት 3= ሁለቱም	
111	ቤተሰቦችህ/ሽን ትጎበኛለህ/ሽ?	1 = አዎ 2 = አይ	**መልስ አይ ከሆነ, ወደ ጥያቄ 113 ዝለል**
112	ለጥያቄ ቁጥር 111 መልዎ አዎ ከሆነ ቤተሰቦችህን/ሽን በየ ስንት ጊዜ ደጋግመህ/ሽ ትጠይቃለህ/ሽ?	1 = በየቀኑ 2 = በየሣምንቱ 3 = በወር አንዴ 4 = በየዓመቱ 5 = ሌላ	
113	አብዛኛውን ጊዜ የት ነው የምትተኛው/ኚዉ?	ሀ = በ ሰሌን ቤት/ማደርያ ለ = ከድልድዮች ስር ሐ = በአሮጌ ሕንፃዎች ውስጥ መ= ቨረነዳ ላይ ረ = የገበያ ቦታዎች ሰ= በ ፕላስቲክ መጠልያዎች ሸ = ሌላ, ይግለጹ	**ከ አንድ በላይ መልስ መመለስ የቻላል**
114	መንገድ ላይ ስራ ትሰራለህ?	1 = አዎ	

		2 = አይ	
115	የኑሮ መተዳደሪያህ/ሽ ምንድነው?	ሀ = ጫማ ማጽዳት ለ= በመለመን ሐ=አነስተኛ እቃዎችን ማንሳት መ=ተሸከርካሪ መጠበቅ ወይም ማጠብ ረ= ቆሻሻመሰብሰብ ሰ= ጎዳና ላይ ንግድ ሸ= አካል ጉዳተኞችን ማዘዋወር ቀ= መልዕክት መላላክ በ= ሌላም	**ከ አንድ በላይ መልስ መመለስ የቻላል**
116	የእርስዎ ዕለታዊ ገቢ ምን ያክልነው?	----------ብር	
117	በቀን ምን ያህል ምግቦችን ትበላለህ/ሽ?		
118	ምግብ የምታገኘዉ/ኚዉ እንዴት ነው?	1 =በመግዛት 2 = የተረፈ ምግብ መብላት 3 = መማፀን 4 = ከ መርጃ ማእከላት 5 = ሌሎች ይዘርዝሩ	
119	ባለፈው አንድ ወር አሞህ/ሽ ያዉቃል?	1 = አዎን 2 = አይ	**መልስዎ 'አይ' ከሆነ, ወደጥያቄ 201 ይዝለሉ**
120	ለ ጥያቄ 119 መልስዎ **አዎን** ከሆነ ህመምህ/ሽ ምን ምልክት ነበረዉ?	ሀ = ትኩሳት ለ = ተቅማጥ ሐ = የሆድህመም መ = ራስምታት ረ = ጉዳት ሰ = ሌሎች	**ከአንድበላይመልስይሰጣል**
121	ለህመምህ/ሽ ህክምና ማግኘት ችለሃል/ሻል?	1 = አዎን 2 = አይ	**መልስዎ 'አይ' ከሆነ, ወደጥያቄ123 ይዝለሉ**
122	ለ ጥያቄ 120 መልስዎ **አዎን** ከሆነ የት ነዉ የታከምከዉ/ሽዉ?	1 = የመንግሥት የጤና ተቋማት 2 = የግልጤና ተቋማት	

		3 = ባህላዊ / መንፈሳዊ ህክምና 4 = መድሃኒት ቤቶች 5 = በራሴ 6 = ሌሎች	
123	ለጥያቄ ቁጥር 120 መልስዎ **አይደለም** ከሆነ ህክምና ላለማግኘት ምክንያት የሆነህ/ሽ ምንድን ነው?	1 = የገንዘብማጣት 2 = ጊዜየለም 3=የሃኪሞች አመለካከት ጥሩ አይደለም 4 = ሌሎች	
ክፍል 2 : የውሃ, ሥነንጽህና እና ጤና አጠባበቅ (WASH) ጥያቄዎች			
IP201	የ እርስዎ የመጠጥ ውሃ ምንጭ ምንድንነው?	1 = የቧንቧውሃ 2 =የምንጭ ውሃ 3 = ወንዝውሃ 4 = ሌሎች	
IP202	ገላህን ትታጠባለህ/ሽ?	1 = አዎን 2 = አይ	**መልሱ 'አይ' ከሆነ, ወደጥያቄ205 ይዝለሉ**
IP203	ምን ያህል ጊዜ ገላዎን ይታጠባሉ?	1. በሳምንት አንድ ጊዜ 2. በሳምንት ሁለት ጊዜ 3. በወር አንድ ጊዜ 4=ያልተደጋገመ	
IP204	ለ ገላ መታጠቢያ የሚሆን ውኃ የእርስዎ ምንጭ ምንድንነው?	1 = የቧንቧውሃ 2 = ወንዝውሃ 3 = ሐይቅ 4= ሌሎች	
IP205	መፀዳጃ ቤት ትጠቀማለህ/ሽ?	1 = አዎን 2 = አይ	**(መልስ'አይ' ከሆነ, ወደጥያቄ 207 ይዝለሉ)**
IP206	ለ ጥያቄ 205 መልስዎ **አዎ** ከሆነ, አብዛኛውን ጊዜ የት ነዉ የሚፀዳዱት?	1 = የግል ጉድጓድ 2 = የጋራ መፀዳጃ ቤት 3 =የተሻሻለ ጉድጓድ(ቪ ኣይ ፒ) 4 = ሌሎች	
IP207	ጥያቄ ቁጥር 205'**አይ**' ከሆነ እንዴት ይጸዳሉ?	1 = ክፍት መስክ 2 = ፕላስቲክ ከረጢቶች ዉስጥ 3 = ሌሎች	

IP208	ከመጸዳጃ በኋላ እጅዎን ይታጠቡታል?	1 = አዎን 2 = አይ	**(መልስ 'አይ' ከሆነ, ወደ ጥያቄ 210 ይዝለሉ)**
IP209	ለ ጥያቄ 208 መልስዎአዎ ከሆነ, እጅዎን በምን ይታጠባሉ?	1 = በዉሃ ብቻ 2 = በ ሳሙና እና በ ዉሃ 3 = በዉሃ እና በ አመድ 4= ሌላ	
IP210	ፍራፍሬዎችን እና አትክልቶችን ከመብላትህ/ሽ በፊት ታጥባለህን/ሽን?	1 = አዎን 2 = አይ	
IP211	ጥፍርህ/ሽን ተቆረጣለህ/ሽ?	1=በየጊዜውእቆረጣለሁ 2 = አንዳንድጊዜ 3 = እምብዛም	
IP212	የጣትህ/ሽን ጥፍርዎች አጭር ለማድረግ በምን ትጠቀማለህ/ሽ?	1=በጥርስ 2=በምላጭ 3 = ሌሎች	
IP213	የእጁን /ዋን የጥፍሮች ሁኔታ?	1=ንጹህ 2 = ንጹህ አይደለም	**ዉድ መረጃ ሰብሳቢ እባክዎ እጁን ይመልከቱ**
IP214	ጥፍሮቹ/ዋ ተቆርጠዋል?	1=አልተቆረጠም 2 ተቆርጠዋል	**ዉድ መረጃ ሰብሳቢ እባክዎ እጁን ይመልከቱ**
IP215	ሁልጊዜ ምግብ ከመብላትዎ በፊትና ከበሉ በኃላ እጅዎን ይታጠባሉ?	1= አዎ 2= አይ	
IP216	ጫማ አለህ/ሽ	1= አዎ 2 = አይ	***(መልሰ አይ ከሆነ ወደ ተራ ቁጥር 3 ይዝለሉ)***
IP217	ለጥያቄ ቁጥር 216 መልስህ/ሽ አዎ ከሆነ ጫማህ/ሽን መቼመቼ ትለብሳለህ/ሽ	1= ሁል ግዜ 2= አልፎ አልፎ 3= እምብዛም 4= በጭራሽ አልለብስም	
IP218	ልጁ/ልጅተዋ መረጃ በሚሰበሰብበት ወቅት ጫማ ለብሳለች(እግሩ/ዋን ይመልከቱ)	1= አዎ 2. አይ	
IP219	ዋና ትዋኛለህ/ሽ?	1 = አዎን 2 = አይ	***(መልሰ 'አይ' ከሆነ, ወደ ጥያቄ 310 ይዝለሉ)***
IP220	ለጥያቄ 307መልስህ/ሽ **አዎ** ከሆነ, አብዛኛውን ጊዜ የሚዋኘ/ኚዉ የትነው?	1 = ወንዝ 2 = ሐይቆች	

		3=መዋኛገንዳዎች 4 = ሌሎች	
ክፍል 3 : የጎዳና ተዳዳሪ ልጆችን አመጋገብ በተመለከተ ያሉ ጥያቄዎች			
IP301	የጎዳናላይ ምግብ ትበላለህ?	1 = አዎን 2 = አይ	(*መልሰ 'አይ' ከሆነ, ወደጥያቄ 303 ይዝለሉ)*
IP302	**ጥያቄ 301 አዎን** ከሆነ በየስንት ጊዜው?	1 = በአብዛኛው 2 = አንዳንድጊዜ 3 = እምብዛም	
IP303	የተረፈ ምግብ ትበላለህ/ሽ?	1 = አዎን 2 = አይ	(*መልሰ'አይ' ከሆነ, ወደጥያቄ 305 ይዝለሉ)*
IP304	ለ ጥያቄ **303** መልስዎ **አዎ** ከሆነ በየስንት ጊዜው?	1=በአብዛኛው 2=አንዳንድጊዜ 3 = እምብዛም	
IP305	ጥሬ አትክልቶችን ትመገባለህ/ሽ ወይ?	1 = አዎን 2 = አይ	(*መልሰ'አይ' ከሆነ, ወደጥያቄ 307 ይዝለሉ)*
IP306	ጥያቄ 305 አዎ ከሆነ በየስንት ጊዜው?	1 = በአብዛኛው 2 = አንዳንድጊዜ 3 = እምብዛም	
IP307	ጥሬ ስጋ ትበላለህ/ሽ	1 = አዎን 2 = አይ	
ክፍል 4፣ የ ጤና አገልግሎት፤ እዉቀትና እና ተያያዥ ጉዳዮች			
IP401	ባለፉት ስድስት ወራት ከጤና ሰራተኞች በመንገድ ላይ መድሃኒት አግኝተዋል?	1 = አዎን 2 = አይ	*መልሰ 'አይ' ከሆነ, ወደ ጥያቄ 403 ይዝለሉ*
IP402	ለጥያቄ 401 መልስዎ **አዎ** ከሆነ, ለምን ይጠቅማል ብለዉ ነበር?	1 = ትልችን ይገድላል 2 = ቅማል ለመግደል 3 = ሌሎች 4= ጥቅሙን አልገለጡም	
IP403	ስለ ሆድ ጥገኛ ተህዋሲያን ሰምተህ ታውቃለህ/ሽ?	1 = አዎን 2 = አይ	*መልሰ 'አይ' ከሆነ, ወደጥያቄ 405 ይዝለሉ*
IP404	**ለጥያቄ 310** መልስዎ **አዎ** ከሆነ, ከየት ነዉ የሰማህዉ/ሽዉ?	1 = ከቤተሰቦቼ 2 = ከጤናሰራተኞች	

		3 = ከሬዲዮ 4 = ከቴሌቪዥን 5 = ሌሎች	
IP405	የ አንጀት ጥገኛ ተህዋስያንን መተላለፍያ መንገዶች ታዉቃለህ/ሽ	1 = አዎን 2 = አይ	***መልሰ 'አይ' ከሆነ, ወደጥያቄ 501 ይዝለሉ***
IP405*ሀ*	የግል ንጽህና አለመጠበቅ የ አንጀት ጥገኛ ተህዋስያንን መተላለፍያ መንገድ ነዉ	1 = አዎን 2 = አይ	
IP405*ለ*	ንጽህናዉ ባልተጠበቀ የዉሃ አካል ዉስጥ መዋኘት የ አንጀት ጥገኛ ተህዋስያን መተላለፍያ መንገድ ነዉ	1 = አዎን 2 = አይ	
IP405 *ሐ*	ንጽህናዉን ያልጠበቀ ምግብ በመመገብ የ አንጀት ጥገኛ ተህዋስያን መተላለፍያ መንገድ ነዉ	1 = አዎን 2 = አይ	
IP405 *መ*	ንጽህናዉን ያልጠበቀ ዉሃ መጠጣት የ አንጀት ጥገኛ ተህዋስያንን መተላለፍያ መንገድነዉ	1 = አዎን 2 = አይ	
IP405 *ረ*	ልሎች የምታዉቃቸዉ መተላለፍያ መንገዶች ካሉ ጥቀስ	----------	
ክፍል 5 የላቦራቶሪ ምርመራ ዉጤቶች			
IP501	ኤች አይ ቪ ምርመራ ዉጤት	1=ፖዘቲቭ 2 = ኔገቲቭ	
IP502	የ አነጀት ጥገኞች ኢንፌክሽን ሁኔታ	1=ፖዘቲቭ 2 = ኔገቲቭ	
IP503	ፖሊ parasitism አለ	1=አዎን 2= አይ	

IP504	**ምንዓይነትጥገኛተህዋስከሰገራ ምረመራ ዉስጥ ይገኛል?**	**ዝርዝር** **1----------** **2----------** **3----------** **4----------** **5---------**

Annex 5: Preliminary assessment format

Name of surveyor_____ Phone N. +251_____

Kebele for survey_____

S. N	Name of the child	Nick name	sex	age	Area of Usual residence	Friends name	Return to home at night	Place to sleep at night	Duration on/off the street	Anatomical deformity	Communication problem
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											

Anatomical deformity=

Communication problem- unable to speak and hear