

PREVALENCE INTESTINAL PARASITIC INFECTIONS AMONG PRIMARY SCHOOL CHILDREN IN ETHIOPIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Annotation: Background: Parasitic infections are a serious public health problem because they cause anemia, growth retardation, aggression, weight loss, and other physical and mental health problems, especially in children. Numerous studies have been performed on intestinal parasitic infections in Ethiopian school children. However, no study has gathered and analyzed this information systematically. The aim of the present study is to systematically review the prevalence of intestinal parasitic infection among primary school children in Ethiopia through systematically evaluating results of studies conducted in this regard.

Materials and methods: In this systematic review study; the required data was collected using terms intestinal parasite, school children, prevalence, Ethiopia and their Persian equivalents through Google search. Out of 60 articles, 16 articles were finally considered after excluding the remaining articles which were not related to the study objectives and conducted meta-analysis using Comprehensive Meta analysis (CMA) software.

Results: The pooled prevalence of intestinal parasitic infection among school children in Ethiopia was 53.64% (95% CI, p-value = 0.000). The minimal value was observed in Babile town, eastern Ethiopia (13.82%) and the maximum result registered in Chenchu town, Southern Ethiopia (81%) and the relevant data extracted and meta-analysis was conducted (Tables 1 and figure 1) and the Time interval of the evaluated articles varied from 2010 to 2018.

Conclusion: The overall prevalence of intestinal parasitic infection among school children in Ethiopia is more than 50% so that improvement of sanitation, personal hygiene, and increased awareness of people, and health education can be effective in reducing parasitic infections in different communities.

Key word: Intestinal parasites, School, Children, Ethiopia, Systematic review, Meta-analysis

1. Introduction

According to a WHO report, 3.5 billion people are affected, and 450 million are sick because of parasitic infections, of which the majority is children. Of the total annual mortalities in developing countries, parasitic diseases accounts for 16 million deaths.

Approximately 39 million disability-adjusted life years are attributed to IPIs and these infections represent a substantial economic burden. Preschool and

schoolchildren are easily identifiable target groups. IPIs are transmitted directly among children through fecal contamination of soil and water, or indirectly through poor sanitation so intestinal parasites cause considerable morbidity and mortality in the world, especially in developing countries like Ethiopia. Both urban and rural inhabitants are vulnerable to infection with intestinal parasites in developing countries. (WHO, 2007)

Intestinal parasitic infections (IPIs) are a health problem in most countries, especially in developing countries. The infections cause iron deficiency anemia, growth retardation in children, weight loss, abdominal pain, dyspepsia, and other physical and mental health problems (WHO, 2014).

The prevalence of intestinal parasitic infections is very high in the school children. The high prevalence of parasitic infections in these populations of children indicates that the protozoa and helminths concerned are very common in the environment as results of the risk factors like water, hygiene and sanitation facilities are inadequate. Water supplies are not enough to drink and use, and in the absence of environmental sanitation, when the rubbish and other wastes increased, and sewage and waste water are not properly treated (1).

Intestinal parasitic infections were the primary health problems in Ethiopia. The most possible reasons are presence of inadequate and unprotected water, limited health education access, high family illiteracy, and poor shoe wearing practices, poor hand washing habits, open defecation practices, low family income, and poor personal and environmental hygiene (2, 3, and 4).

Intestinal parasitic infections were highly prevalent health problem among school children in Dagi primary school. The risk factor of the prevalence of intestinal parasites was poor hand washing habit before meals and after defecations. In addition to this, prevalence of intestinal parasite infections was also shown a significant association among children having unclean finger nails, and did not wear shoes (2, 5, and 7).

Numerous studies have been performed on IPIs in school children from Ethiopian regions. However, there is no study to gather and systematically analyze the information. The aim of this study was to provide summary estimates for the available data on intestinal parasitic infections in Ethiopian primary school children. This study has been carried out to evaluate the prevalence of parasitic infections.

2. Objective

The aim of this study is to provide the summery prevalence of Intestinal parasitic infection among primary school children in Ethiopia through systematically evaluating results of different studies conducted from 2010–2018.

3. Material and methods

3.1. Search strategy and data extraction

We searched MEDLINE via PubMed, Science Direct, Web of Science (ISI), Google Scholar (as English databases) using the terms: intestinal parasites, school, children, Ethiopia.

To collect precise information, a comprehensive search was carried out on

all Published and unpublished articles including full texts, abstracts, and parasitology Congress summaries.

Data were collected from articles in the English language.

Extracted data from the studies included year of the study, first author, and prevalence of

The study, total sample size, and the number of intestinal positive school children.

3.2. Statistical analysis

In this study, forest plots were used to estimate pool Prevalance and effect of each

Study with their confidence interval (CI) to provide a visual summary of the data.

Random effects model (DerSimonian Laird model) was used to compute overall effect and conducted meta-analysis using Comprehensive Meta Analysis software version 3, And for all statistical results were used.

3.3 Inclusion and exclusion criteria's of articles

3.3.1 Inclusion criteria's of articles

- Should primary study (not review)
- Latest article
- Measurable outcome
- Relation with study objective
- No duplication of articles in the same zone

Out of 60 articles, 16 articles were finally considered.

3.3.2 Exclusion criteria's of articles

Out of 60 articles, 44 articles were excluded due to

- 2 articles due to duplication of articles in the same zone
- 25 articles due to years of study
- 17 articles due to lack of relation with the study objectives.

4. Results

Of the 60 publications that were gathered for this systematic review, 16 were eligible for inclusion under intestinal parasitic infections (Figure 1 and Table 1).

In this study, The results of random-effects meta-analysis showed that the highest prevalence rate of IPIs was reported From Abossie A, S.M(81%), and the lowest was reported from Tefera E, M.J(13.8%) and the pooled prevalence of IPIs among Ethiopian primary school Children was 53.6% (95% CI, p.value<0.05) (Figure 1 and Table 1).

Table 1; the relevant data extraction on the prevalence of intestinal parasite on primary school children in Ethiopia from the year 2010-2018.

S/ NO	Author	Citation	Year	Number of sample taken	Number of postivechil dern
1	Gebretsadik et al	Homesha District (Woreda) in Benishangul-Gumuz	2016	395	140
2	Gashaw et al.	Maksegnit and Enfranz Towns, northwestern Ethiopia,	2015	550	365
3	Gelaw et al.	University of Gondar Community School, Northwest Ethiopia	2013	304	104
4	Amare et al.	Northwest Ethiopia	2013	405	92
5	Haile Admasu	Gurage Zone, South Ethiopia	2017	463	195
6	Abossie and Seid	Chencha town, Southern Ethiopia	2014	400	324
7	TeferaEphrem	Babile town, eastern Ethiopia	2014	644	89
8	AbdiMerem	Zegie Peninsula, north western Ethiopia	2016	408	282
9	AberaAlamneh	Tilili town, northwest Ethiopia	2014	385	170
10	Tulu et al	Yadot South Eastern Ethiopia:	2014	348	89
11	MulusewAndalemAsmahagn,	Motta Town, Western Amhara, Ethiopia	2014	364	245
12	Hailegebriel	Dona Berber, Bahir Dar, Ethiopia	2017	359	235
13	MulatAlamiret al.	Dagi, Amhara, Ethiopia	2013	399	311
14	Berhanu EIfuFeleke	Bahir Dar, Ethiopia	2016	2372	1464
15	Bajiro M, Gedamu S, Hamba N, Alemu Y	Jimma Town, South West Ethiopia	2018	233	118
16	Hailegebriel	Bahir Dar, Ethiopia	2018	382	200

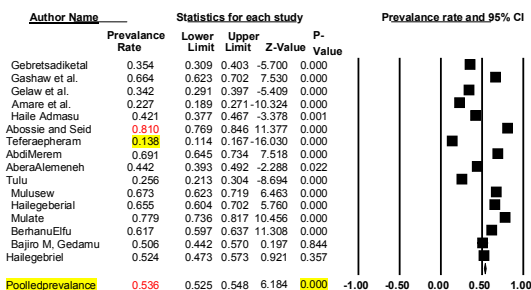


Figure 1; Meta analysis results of the study on the prevalence of Intestinal parasitic infection of primary school children in Ethiopia from the year 2010 to 2018.

4. Discussion

This systematic review and meta-analysis will be beneficial for understanding the situation of IPIs in Ethiopian primary school children. This study estimated the prevalence rate of IPIs in this group, using the documented data from the literature reviews, which have been gathered from different Regions of Ethiopia. According to our results, the prevalence rate of IPIs among Ethiopian primary school children was 53.8% from 2010 to 2018. In meta-analysis has been carried out; the prevalence of IPIs differs in various Regions of Ethiopia.

Chencha town, Southern Ethiopia reported the highest (81%) prevalence rate of IPIs due to unavailability of washing facilities constructed at home had also a contributing effect for the presence of intestinal parasitosis. And Home cleanliness condition also had contribution for the existence of IPIs. The lowest prevalence was observed in Babile town, eastern Ethiopia (13.8%). The low rate of IPIs in this area seems to be because general health information dissemination is suggested to be given to students on how to protect themselves from intestinal helminth infections with special emphasis for children. It is also suggested that the local Education Bureau as well as the local Health Bureau need to provide safe learning environment especially for students of lower grade such as school sanitation.

The prevalence of IPIs is different in other countries. For example, prevalence is 47.6% in Afghanistan (Gabrielli et al., 2005), 42.5% in Syria (Al-kafri and Harba, 2009), 31.8-37.2% in Turkey (Okyay et al., 2004), and 27% in Egypt (El-Soud et al., 2009) and my meta-analysis results varies in Region to Region and the overall prevalence of the country was 53.64%. The reasons for these differences could be socio-economic status, poor hygiene and sanitary facilities, weather, climate and environmental factors, as well as inappropriate drinking water.

There were many studies that presented data and analysis of demographic information and risk-factors such as sex, age, the literacy level of parents, etc. that were not mentioned in their articles because of the limitation of time so. It is recommended that researchers conduct and analyze demographic and risk factor information mentioned in the respective articles.

5. Conclusions

This is the first systematic review and meta-analysis that provides a comprehensive overview of the prevalence of IPIs in Ethiopia primary school children. This study results showed that the prevalence of IPIs more than half percent so improved sanitation, personal hygiene, increased awareness, and health education can be effective in reducing parasitic infections in different communities. Moreover, the establishment of appropriate sanitation facilities and education in hygiene schools will help make a healthy society.

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7. Annex

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