

Intestinal Parasitic Infection Status (IPIS) among Primary School Children in Ethiopia: A Systematic Review and Meta-Analysis

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Abstract

Background: Intestinal parasitic infection is considered to play an important role in the compromised physical and cognitive growth of children in developing countries, primarily affecting children in resource-limited settings. Better understanding of intestinal parasitic infection is needed to identify and apply important intervention strategies. Various studies have been conducted on intestinal parasitic diseases on school children in a few districts of Ethiopia. But, no study has collected and analyzed this information systematically. This review aims to assess the prevalence of Intestinal parasitic diseases along with primary school children in Ethiopia through systematically evaluating the results of studies conducted in this respect.

Methods: In this systematic review study; the required data were collected using combine term prevalence AND Intestinal parasitic Infections OR diseases AND School Children and their Persian equivalents through Google search. Out of 60 articles, 16 articles were at last considered after barring the remaining articles which were not related to the study targets. Finally, conducted a meta-analysis using Review Manager (Rev Man) 5.3 software.

Results: The pooled occurrence of intestinal parasitic diseases within primary 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 Chench town, Southern Ethiopia (81%) and the relevant data extracted and meta-analysis was conducted 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 was more than 50% so that the improvement of sanitation, personal hygiene, and increased awareness of people, and health education can be effective in reducing parasitic infections in different communities.

Keywords: Prevalence; Intestinal parasitic infection; Primary school children; Ethiopia; Systematic review; Meta -analysis

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Introduction

The prevalence of intestinal parasitic infections (IPIs) 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 deficiency of sanitation, rubbish and other wastes increasement, and untreated sewage and wastewater [1].

IPIs were the primary health problems in Ethiopia. The most possible reasons are the 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 [2-4].

IPIs were a highly prevalent health problem among school children in Dagi primary school. The risk factor of the prevalence of intestinal parasites was poor hand washing habits before meals and after defecations. In addition to this, the prevalence of intestinal parasite infections was also shown a significant association between children having unclean fingernails and did not wear shoes [2,5-7].

Assessment of the incidence of IPIs within school children is highly relevant for policy intervention. But, there are no investigations to collect and analyze the information systematically. Therefore, this study aims to provide the summary prevalence of IPIs among primary school children in Ethiopia through systematically evaluating the results of different studies conducted from 2010-2018.

Methods

Study design

We conducted a systematic review and meta-analysis to assess the prevalence of Intestinal parasitic infection among primary school children in Ethiopia.

Data source and Collection

We explore the data via Hinari, Pub MED, Science Direct, Web of Science (ISI), and Google Scholar (as English databases) using the terms: Prevalence, intestinal parasites, primary school, children, Ethiopia. To get full information, a strong search was carried out on all Published and unpublished articles, including full texts, abstracts, and parasitological Congress summaries. Data were collected from articles in the English language. Extracted data from the studies included a year of the study, the first author, and the prevalence of the study, total sample size, and the number of intestinal positive school children.

Data synthesis and analysis

In this Review, Two reviewers independently extracted data by taking the Author, the number of samples each author took, year of study, and Number of intestinal diseases positive children. Conducted meta-analysis using Review Manager (**Rev Man**) 5.3 software to estimate pool prevalence rates and weight of each Study with their confidence interval (CI) and display the result graphically.

Inclusion and exclusion criteria's of articles

Inclusion criteria's of articles:

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

Out of 60 articles, 16 articles were finally considered.

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 a lack of relation to the study objectives.

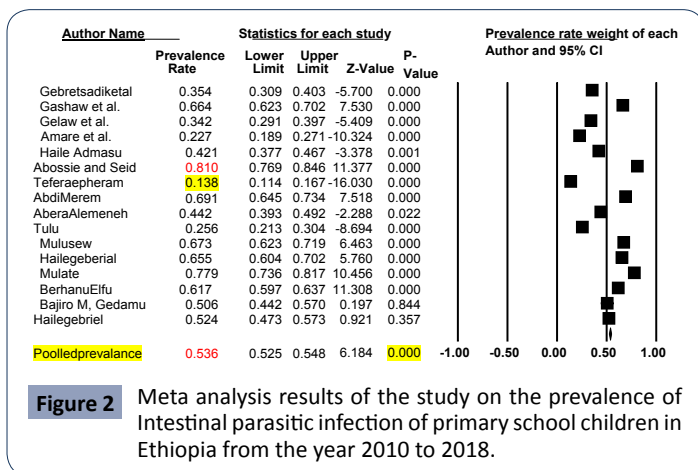
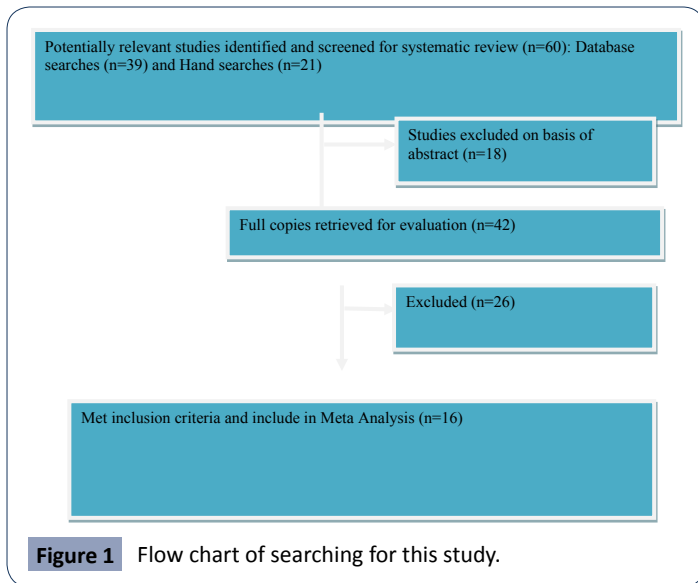
Results

The combined search strategies identified 60 potentially relevant studies of intestinal parasitic infections. The full text of 42 potentially eligible reports was obtained for further assessment after the screening of titles and abstracts. Of the 60 articles that were gathered in this systematic review, 16 were eligible for inclusion under intestinal parasitic infections (**Table 1 and Figure 1**).

In this review, The results of random-effects meta-analysis shows 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 Intestinal Parasitic Infections among Ethiopian primary school Children was 53.6% (95% CI, p.value<0.05) (**Figure 2**).

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

S.No	Author	Citation	Year	Number of samples taken	Number of positive children
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	Tefera Ephrem	Babile town, eastern Ethiopia	2014	644	89
8	Abdi Merem	Zegie Peninsula, northwestern Ethiopia	2016	408	282
9	Abera Alamneh	Tilili town, northwest Ethiopia	2014	385	170
10	Tulu et al.	Yadot South Eastern Ethiopia:	2014	348	89
11	Mulusew Andualem Asemahagn	Motta Town, Western Amhara, Ethiopia	2014	364	245
12	Hailegebriel	Dona Berber, BahirDar, Ethiopia	2017	359	235
13	MulatAlamiret <i>al.</i>	Dagi, Amhara, Ethiopia	2013	399	311
14	BerhanuElfuFeleke	Bahir Dar, Ethiopia	2016	2372	1464
15	<i>Bajiro M, Gedamu S, Hamba N, Alemu Y</i>	<i>Jimma Town, South West Ethiopia</i>	2018	233	118
16	Hailegebriel	Bahir Dar, Ethiopia	2018	382	200



Discussion

Our systematic review and meta-analysis of 16 included articles, among 60 review articles show the situation of IPIs in Ethiopian primary school children. This Review 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 this meta-analysis has been carried out; the prevalence of IPIs differs in various regions of Ethiopia. Chench 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 of the presence of intestinal parasites and the home cleanness condition had contributed to 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 health information given to students on how to protect themselves from intestinal helminthic infections with special emphasis for children. It is also suggested that the local Education

Bureau as well as the local Health Bureau needs to provide a safe learning environment, especially for students in lower grades such as school sanitation.

The prevalence of IPIs among school children in Ethiopia (53.8%) is higher than in other countries. Such as 39.1% in Afghanistan [8], 38% of Iranian children from January 1996 to April 2015 [9], 31.8-37.2% in Turkey [10], and 26.5% in Egypt [11] and in this meta-analysis result variable in Region to Region and the overall prevalence of the country was 53.64%. The differences might be socioeconomic status, poor hygiene and sanitary facilities, weather, climate, and environmental factors, as well as inappropriate drinking water.

Many studies 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 limitations of time. So It is recommended that researchers conduct and analyze demographic and risk factor information mentioned in the respective articles.

Conclusions

This is the first and the most important systematic review and meta-analysis because it provides the prevalence of IPIs in Ethiopia primary school children and background information about Environmental dysfunction. This study results showed that the prevalence of IPI is 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.

Abbreviations:

IPI: Intestinal Parasitic Infection; WHO: World Health Organization; CI: confidence interval; **Rev Man**: Review Manager

Declarations

Ethics Approval and Consent to Participate

Not needed for this particular study.

Consent to Publish

Not applicable.

Availability of Data and Materials

All data generated and analyzed during this study. are included in the manuscript.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contribution

All the authors actively involved during the conception of research issues, development of research proposals, and writing of various parts of the research report. The final manuscript is prepared by

Mr. Chalachew Yenew. All authors read and approved the final manuscript.

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