Prevalence and Pattern of Helminthic Infection among Children in a Primary School of Rural Tamil Nadu

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Abstract

Introduction: Helminthic infection is common among rural school children and is one of the major causes of iron deficiency anaemia. The recurrence rate after deworming is high, causing considerable morbidity in age group of 5 - 20 years. There is paucity of data regarding prevalence and pattern of helminthic infections in rural Tamil Nadu.

Objectives: To study the overall prevalence and pattern of helminthic infection and among primary school children in the Panchayat Union Primary School of Melmaruvathur Village.

Study design: Descriptive study

Methods: Stools samples were collected and examined for the presence of ova and cysts of helminths. Type of infection was also studied.

Results: 80% of children had ova of helminths in their stool sample. Giardia lamblia contributed to 40%, Ankylostoma duodenale to 18%, Ascaris lumbricoides 16%, Entamoeba histolytica 16% and Trichuris trichura 4% of the samples.

Conclusions: Prevalence of helminthic infection among primary school children in the rural area is very high and the commonest helminth found was Giardia lamblia.

Keywords: Helminthic Infection in Children, Faecal Sampling, Helminths, Melmaruvathur, Stool Sedimentation


Introduction

Helminthic infection is a leading cause of nutritional and cognition deficiency in the school-going children. Anaemia is one among the common manifestations of these infections. Paediatric populations were taken in consideration because they are highly prone to acquire these infections and they are likely to spread the infections due to close contact in schools and in home.

Objectives

To study the overall prevalence and pattern of helminthic infection and among primary school children in the Panchayat Union Primary School of Melmaruvathur Village.

Materials and Methods

Study Design: Descriptive study.

Study Population: Primary school children in the age group of 5-10yrs

Study Sample: 25 children were selected from the school for the study.

Study Setting: The panchayath Union Primary School of Melmaruvathur was chosen for the study.

Methods: Stools samples were collected and examined for the presence of ova and cysts of helminths. Type of infection was also studied. The procedure of stool sample collection from the children to examine for helminthic infections was explained to the teachers and other staffs of the school.

The materials used for stool collection include:

- Stool collection container
- Clean paper to collect the specimen in order to prevent contamination of the specimen
- Sticks to collect the specimen in the container

Parents of children were invited to school and were briefed about the study. Informed consent was obtained from those who were willing to participate in the study. The procedure of sample collection was explained to those who consented and the materials needed for sample collection were handed over to them.

They were instructed to bring the sample collected in the container to the school on the next day.

*See End Note for complete author details
Essentials to be fulfilled while collecting included:

- The stool collected should be fresh
- Receptacle must be clean and dry
- No antiseptics should be used to wash it.
- Urine should not be allowed to mix with the stool.
- Any oily substance should not be taken by the children before stool collection.

These samples were taken to the microbiology laboratory of Adhiparasakthi Institute of medical Science and Research, Melmaruvathur, for processing and examination for any helminthic eggs, trophozoites or body segments and to describe the type of infection.

Materials used for stool examination included Clean glass slides, Saline and iodine preparation, Cover slips, Compound microscope and Centrifuge.

Methods of concentrating Stool sample

Eggs, cysts and trophozoites often in low numbers in faecal material make it difficult to detect in direct smear or mount. Therefore concentration procedures such as Saturation Salt Floatation Technique and Zinc Sulphate Centrifugal Floatation Technique were adopted to separate protozoan and helminthic egg from faecal debris.

Flotation methods involve suspending the specimen in a medium of greater density than that of helminthic egg and protozoan cyst. Eggs and cysts float at the top and they are collected by placing a glass slide on the surface of the meniscus at the top of the tube.

Saturation Salt Floatation Technique: 1 gram of faeces and few drops of saturated salt solution are stirred with glass rod to make an even emulsion. More salt is added so that container is nearly full, stirring the solution throughout. Any coarse mater, which float up is removed. After that glass slide is placed over the top of the container so that the center is in contact with fluid. The preparation is allowed to stand for 20-30 minutes after which the glass slide is quickly lifted, turned over smoothly so as to avoid spilling of liquid and examine under the microscope. All the helminthic eggs float up in saturated salt solution except unfertilised egg of A. lumbricoides, egg of T. solium, T.saginata, all intestinal flukes and strongyloides stercoralis which do not float.

Zinc Sulphate Centrifugal Floatation Technique: 1 gram of faeces with 10 ml of luke warm distilled water is used. Coarse particles are removed by straining through a gauze filter. Filtrate is poured into a 15 ml conical centrifuge tube and centrifuged at 2500 rpm for 1 min. Supernatant fluid is poured off. Distilled water is added to the sediment, shaken well and again centrifuged. This process is repeated 2 to 3 times till the supernatant fluid is clear. The clear supernatant fluid is poured off and 3-4 ml of 33% zinc sulphate is added and centrifuged again at 2500 rpm for 1 min. With the help of platinum wire loop, sample is taken from the surface of the tube and placed it on the clean glass slide and examine under microscope. Cysts of protozoa and eggs of nematodes and small tapeworms are concentrated by this method. This method is unsuitable for unfertilised eggs of Ascaris lumbricoides and eggs of most trematodes and large tapeworms.

Sedimentation Method: Eggs and Cysts of parasites settle to the bottom of the tube because they have greater density than the suspension medium.

Microscopic Examination

Saline Mount: 2 mg of faecal sample mixed with drop of saline placed on glass slide. This method is used for the detection of live motile trophozoites eg. Entamoeba histolytica, G. lamblia and B. coli.

Iodine Mount: Stool is emulsified with Lugol's iodine on clean glass slide, covered with cover slip and examined under microscope. It helps to study the nuclear character of cyst and trophozoite for identification of species. Helminthic egg and larvae are also identified by this method. The larvae are immobilized and killed so that they differentially. But in iodine mount trophozoite motility cannot be made out.

Ethical Considerations

The consent and co-operation was obtained from the Head Mistress of Panchayath Union Primary School of Melmaruvathur and parents of children.

Results

All study participants were in the age group 5-10 years. 13(52%) were males. 20 (80%) had at least one helminthic ova in their stool sample. Age-wise distribution of parasitism is shown in Table 1.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No. of Affected Children (%)</th>
<th>No. of Normal Children (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 - 7 yrs</td>
<td>11 (44%)</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>8 - 10 yrs</td>
<td>9 (36%)</td>
<td>4 (16%)</td>
</tr>
<tr>
<td>Total</td>
<td>20 (80%)</td>
<td>5 (20%)</td>
</tr>
</tbody>
</table>

It can be seen that Proportion of helminthic infection is more among the younger age group.

Figure 1 shows isolation pattern of egg/cyst in the stool sample. 5 stool samples were found to be negative for parasitic infection out of 25 stool samples obtained from children in the age group 5-10 years.

1. Ascaris infection was observed in 20%
2. Ankylostomiasis in 10%
3. Giardiasis in 45%
4. E.histolytica infection in 20%.
Conclusion

Overall prevalence of helminthic infection among primary school children is 80% and Giardiasis is the commonest type.

Recommendations

Intense health education may be given to parents and teachers regarding helminthic infections, adverse health effects, methods of prevention and importance of personal hygiene and appropriate treatment. Children may be advised to avoid contact with contaminated food and water. Autoinfection (finger-mouth) may be prevented by hand washing. Regular deworming may be done through schools.

End Note

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References