ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Intestinal Parasitic Infections in Pre-School and School Going Children from Rural Area in Puducherry, India.

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ABSTRACT

To compare the prevalence of intestinal parasitic infection in pre-school and school going children. By stool wet mount preparation both direct as well as performing stool concentration techniques and also modified acid fast staining to demonstrate acid fast oocyst . Prevalence rate was more in school going children though overall prevalence rate was less (15%). Giardia being the commonest parasite identified (44%).There is a significant association between nail cutting frequency, age and abdominal symptoms with parasitic infections. Decreasing prevalence rate of intestinal parasitic infection could be due to regular deworming practice among the children, even in rural area. Still it is necessary to monitor once in a while regarding the prevalence as it leads to malnutrition, underweight which in turn affect their physical and mental health.

Keywords: Ascariasis, Giardia, Parasitic infection

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ISSN: 0975-8585

INTRODUCTION

Intestinal parasitic infections are amongst the most common infections worldwide. Epidemiological research carried out in different countries has shown that the social and economical situation of the individuals is an important cause in the prevalence of intestinal parasites. A prevalence survey of intestinal parasitic infections in different regions is a prerequisite for developing control strategies. It is estimated to affect around 3.5 billion people globally; 300 million are ill, 50% of them being school-age children [1].

Parasitic infections are regarded as a serious public health problem, as they cause iron deficiency anaemia, growth retardation and other physical and mental problems [2]. Parasitic protozoa and helminthes are responsible for some of the most devastating and prevalent diseases of humans. School children are the prime victims of intestinal parasitism that affect their physical development, school attendance and ability [3].

The routes of parasitic infection are mainly through soil. It can also spread via fecal-oral route, such as by finger licking after anal scratching due to anal pruritus (Herrstrom*et al,* 1997); exposure to eggs from bed sheets, pyjamas or other fomites; inhalation of eggs in dust; and auto infection where eggs hatch on the anal mucosa and the larvae migrate up into the bowel. Transmission occurs mostly in limited environments, such as amongst families, in nurseries or boarding schools.

World Health Organization control strategy involves regular deworming of preschool and school age children. Periodic treatment reduces the intensity of infection and protects those already infected. The World Health Assembly Resolution urged countries to provide essential drugs in all health services in endemic areas particularly to children and women. WHO is firmly committed to providing treatment to all children in endemic countries.

Studies delineating the pattern of intestinal helminthic infections among preschool and school going children in Puducherry are scarce. This study mainly explores the socio demographic, environmental and behavioural sanitary habits which favour these infections.Efforts to control parasitic infections indeveloping countries typically focus on periodic anthelminthic treatment stargeted at specific risk groups.This study aids in determining the prevalence of intestinal parasitic infections in Puducherry despite the various precautional measures taken.

Aims and Objectives

The principal aim of our study is to compare the prevalence of intestinal parasitic infections among the Pre School and school going children and to estimate the group more affected and also to correlate the parasitic infection with associated factors like sociodemographic status, environmental factors & behavioural factors of children.

MATERIALS &METHODS

Across sectional study was conducted after getting ethical clearance from Institutional Human Ethical Committee (IHEC) for a period of two months in our hospital. Study includes sixty children of preschool and school going age groups. Study subjects were selected from a school after getting official permission from school authority and consent from their parents. Stool samples were collected in a wide mouthed plastic containers with identification numbers and names and processed immediately. Direct wet preparation was made using Saline and Iodine. Concentration techniques also done by Formalin – Acetone Sedimentation method [4]. All samples were also subjected to Modified Acid Fast Staining [4].to demonstrate any acid fast oocyst.The statistical analysis and the compilation of the data were done using Statistical Package for the Social Sciences (SPSS) version 16. The comparisons between the parameters were done using the chi square test and the p value was found out to access the significance. Modified Prasad scale was used to calculate the socioeconomic status.

ISSN: 0975-8585

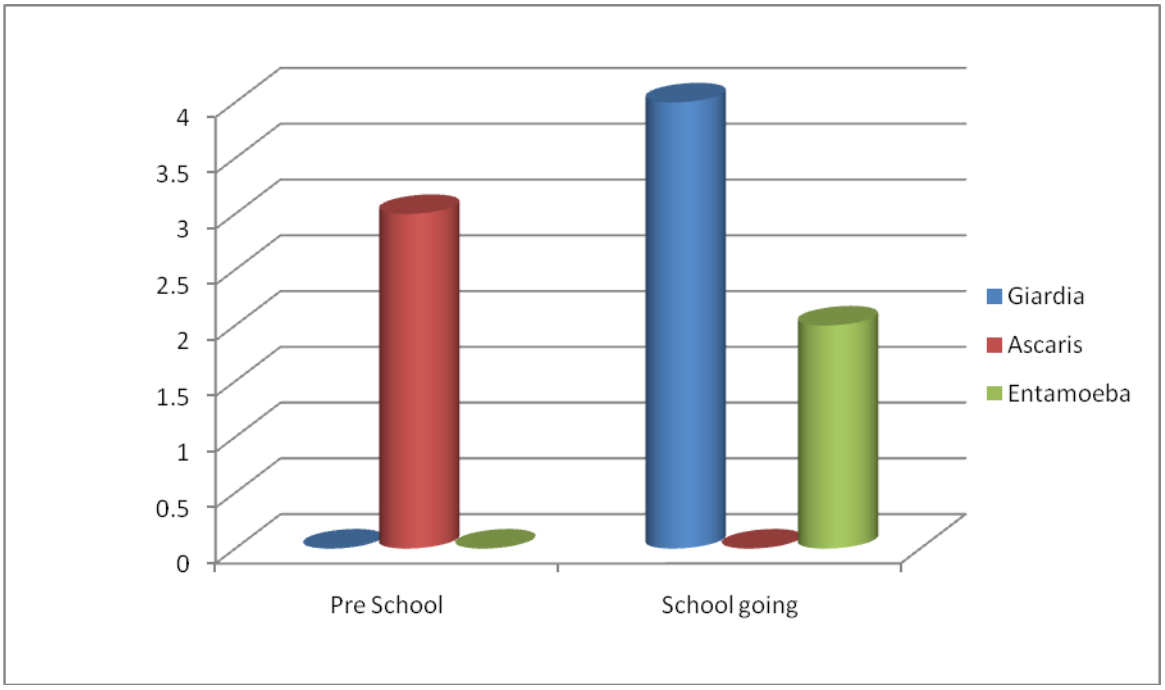
OBSERVATIONS AND RESULTS

We divided the subjects examined into two groups: Group 1 containing preschool children (between 2 to 5 years) and Group 2 containing school going children (between 6 to 12 years). Among the study population 43.3% are female and 56.7% are male.

A cross-sectional study was conducted among the 30 school going and 30 preschool children. A pre-tested structured questionnaire was used to collect socio-demographic data and possible risk factors exposure. Early morning stool samples were collected and were used to examine and count parasitic load by compound light microscope. Out of 60 study subjects, 9 (15%) of the study participants were infected with one or more parasites. Giardia was the predominant isolate (44%) followed by Ascarislumbricoides (33%) and Entamoeba coli (22%). Ascaris infections showed statistically significant associations with hand washing habit of the children respectively. Prevalence of Giardia and Ascaris was high and the diseases were a health problem in the study area which alerts public health intervention as soon as possible.

Figure 1: shows that the presence of parasitic infestations is more common among the school going children when compared to the preschool children. Among the infestations Giardia and Entamoeba are found to occur commonly among the school going children and Ascaris in preschool children.

Figure 1



A comparison was made between the result and the various parameters listed below using the chi square method. The parameters analysed were:Hand washing, Nail cutting frequency, Socio economic status, Age, Height, Weight, Abdominal symptoms and Drainage method.

From Pearson's Chi-square table we find there is a significant association between nail cutting frequency (p-value = 0.049), age (p-value = 0.036) and abdominal symptoms (p-value = 0.057). with parasitic infections. In contrast there is no significant association between hand washing method, socioeconomic status , height , weight and drainage method with parasitic infections respectively.(Table1)

ISSN: 0975-8585

Table 1: Association between the study parameters and the result obtained

Parameters	P – value
Hand washing	0.340
Nail cutting frequency	0.049*
Socio economic status	0.966
Age	0.036*
Height	0.401
Weight	0.385
Abdominal symptoms	0.057*
Drainage method	0.501

* (Association is significant,p-value < 0.05)

From the study significant association is found between the age and the presence of parasitic infections. The school going children are more affected when compared with the pre school children. Though the incidence is less in pre school children , they are found to be more susceptible to ascariasis.(Table 2)

Table 2: Parasitic positivity with the Age

Age	Ascaris	E.coli	Giardia Cyst	Negative	Chi Square	p – Value
2	2	0	0	7	34.009	0.036
3	0	0	0	11		
3.5	0	0	0	2		
4	1	0	0	4		
5	0	0	0	3		
7	0	0	0	3		
8	0	2	4	7		
9	0	0	0	14		
Total	3	2	4	51		

Nail cutting frequency has a very significant association with the parasitic infection. Parasitic positivity is less in children who trim their nail atleast twice in a month. Proper nail cutting habits can prevent the incidence of certain parasitic infections.(Table 3)

Table 3: Parasitic positivity with Nail Cutting Frequency

	Ascaris	E.coli	Giardia Cyst	Negative	Chi Square	p – Value
Biting	0	1	0	2	16.987	0.049
Once / month	1	0	2	6		
Twice / month	0	1	0	18		
>Twice /month	2	0	2	25		
Total	3	2	4	51		

It was also found thatthere is a significant association between the presence of abdominal symptoms and the incidence of parasitic infections. Stomach pain, vomiting and perianal itching are the most significant and most common abdominal symptoms that occur in association with intestinal parasitic infections.(Table4). No acid fast oocyst identified in our study.

Table 4: Parasitic positivity with Abdominal Symptoms.

	Ascaris	E.coli	Giardia Cyst	Negative	Chi Square	P – Value
Present	3	2	3	21	7.537	0.057
Absent	0	0	1	30		
Total	3	2	4	51		

ISSN: 0975-8585

DISCUSSION

WHO estimated that over half of the human race is parasitized by at least one species of helminth;ascaris, the largest intestinal roundworm of man may be found in 22% of the world's population *[5].*

Various studies were done among the prevalence of intestinal parasitic infections among children. But very few studies were done that compared the prevalence of the parasitic infections among the Pre School and school going children. Our study not only focuses on the comparison of the prevalence of parasitic infections, it also correlates the parasitic infection with associated factors like socio demographic status, environmental factors & behavioural factors of children.

Prevalence of intestinal parasitic infection in children is less (15%) in our study. A study from Mumbai in 2011, by Marothi et al [6]reported that the prevalence rate of intestinal parasites was 21.4%..This is statistically less when compared with earlier studies done by Rao et al [7] who says prevalence rate was 59.5% in the year 2003 and Patel et al [8] who concludes prevalence rate as 68% in the year 1986 at Mumbai. This is possible only due to betterment of living and proper sanitation. Health awareness camps in Mumbai these years have led to a significant drop in parasitic rate.

This low prevalence could be due to regular deworming as well as the improved individual and environmental factors like safe drinking water ,good personal habits and proper sanitation.According to a study by Rayan et al[9] the prevalence of parasites is higher among rural population of Chennai than the urban population which lays more emphasis over our study group.

Though many studies have shown that the presence of parasitic infections is more among pre school children when compared to school going children, our study goes in correlation with Vander Hoeket al [10] stating that the parasitic infections show a higher incidence among the school going children than the pre school children.Poly parasitism is seen to occur in many places with more predominance in rural areas as the study done by Holland et al [11] in Panama states. When the stool samples of the children from birth Urban and Rural areas when compared the results showed that poly parasitism occurred significantly more often in the rural than in the urban or semi-urban areas.

Of the 30 school going children examined, 6 (20%) were found to be positive for parasitic infection. Among the 6 positive samples, 4 were of giardia cyst and 2 were entamoeba. Giardia was the common pathogenic protozoa. . According to, a study conducted by Sehgal et al [12] says G.intestinalis constitutes the maximum in their study which is correlating with our findings. Butin contrast to our study another study by Anand kumar et al [13] from Karnataka reported that Ascarislum bricoidesis the leading worm infestations among children. Both giardia and entamoeba can be transmitted orally by drinking infected water and thus are environmental. Since formalin acetone concentration method is more sensitive method to demonstrate the parasites which helped to study the exact prevalence of intestinal parasitic infection in our study..

Among 30pre school children studied 3 (10%) are found to be positive for ascaris. This shows that the prevalence of parasitic infections is more among school going children than among pre school children. Ascaris is found to be the predominant parasite in almost all studies [13] of parasitic infections undertaken in children until now. This could be because the infective stages of A. lumbricoides, the embryonated eggs have enormous capacity for withstanding the environmental extremes of urban environments. A study done by Ragunathan et al [14] from Puducherry also showed high prevalence rate of parasitic infection among the children and it being ascariasis.

In a previous nationwide survey of Vietnamese, low educational levels and/or low socioeconomic status were associated with hookworm infections (Yip, 1996) [15]. We therefore analyzed the relationship between parasitic infection and the above parameters. We could not find any positive relationship, although this might have been because of the small number of study population involved in our survey.

Analysis of risk factors was evaluated based on the presence of infection. Infection rate was significantly higher in children who do not trim their nails. This shows the necessity of frequent nail cutting in children to prevent parasitic infections. There has been found to be a significant association between the presence of abdominal symptoms and the incidence of parasitic infection. Among the 9 positive samples, 8 of

them showed presence of one or more of mild abdominal symptoms like stomach pain, vomiting, loss of appetite. Hence early identification of abdominal symptoms can help us to identify the presence of parasite. According to Osei et al[16],whose study was among the Himalayan primary school children, it was seen that about one fifth of the that children examined were affected by parasitic infection and among the affected nearly 56% were malnourished with underweight shunting and wasting.

When nutritional status and anthropometry were studied with reference with intestinal infestation in a Japanese study by Phathammavong et al [17] it is concluded that the prevalence of stunting and underweight were higher among high-school children who were infested by intestinal parasites.

Since children are more susceptible to parasitic infection, deworming at a younger age becomes essential. Almost half of the children are infected with intestinal geo helminths treatable by albendazole and hence can be treated effectively. Thus deworming at an early age can thus prevent and if followed properly can even eliminate parasitic infections. Hence steps should be taken to control both of provide regular deworming, supervised school meals and health education. Limitations in our study (a) study duration and the sample size is very small. (b)The presence of only the intestinal parasites are focused.

CONCLUSION

This study shows that intestinal helminths are prevalent in high magnitude among school children when compared to preschool children. This calls for the institution of control measures, including treatment of all school – age and preschool children, improvement of sanitation and provision of clean water. One of the complications of intestinal parasitic infestation is malnutrition, which inturn leads to underweight and also prone for many other infections. This study emphasizes the need for health education, good sanitation and personal hygiene, proper cooking of food, safe drinking water and use of foot wears especially by the rural population. The impact of each measure can be maximized through a health education programme directed at school children in particular and at community in general.

Early identification of abdominal symptoms helps in the early detection of parasitic infection which helps in effective treatment as this study proves that there is significant association between presence of abdominal symptoms and parasitic infections.

ACKNOWLEGEMENT

We acknowledge the support of ICMR (Study carried out as STS project under ICMR)

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