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Prevalence of Parasitic Infections among School Children in Bhaili, Durg, Chhattisgarh, India

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A B S T R A C T

In developing countries including India intestinal parasitic infection is a major health problem. From different parts of the country many studies have been done. However, very few studies have been done from our area i.e. Durg, Chhattisgarh. About 2 billion people are infected with parasite globally. Children are most affected by parasite although it affected in all age group. Children become prime victim who affect their physical and mental development, ability to learn and school attendance. The present study was conducted in the Department of Microbiology, CCMMC, Bhaili, Durg Dist. Chhattisgarh; India. The objective of this study was to evaluate prevalence of parasitic infection among school children and their association with socio- demographic, environmental and behavioral habits of school children. The specimen was selected randomly. This study was conduct among 250 children (6-15 years of age) from the above school. Stool sample were collected and brought immediately to the microbiology laboratory at department of microbiology for processing. The specimens were examined by both macroscopically and microscopically for the presence of parasite. Parasitological standard examination methods were followed. Out of total 250 stool sample was collected from school children in this study, 160 were male and 90 were female. A total of 78 were positive for one or more parasite. Out of total positive 53.9% were protozoan, 38.5% were helminthes and 7.7% were mixed type. *Entamoeba histolytica* 38.5% and *Ascaris lumbricoides* 19.2% were the commonest protozoan and helminthes respectively. The other parasite found were *Giardia lamblia* 19.2%, Hookworm 10.3%, *Taenia* spp 5.1%. Multiple parasitisms were found in 7.7% children. The present study shows 31.2% parasitic infection which is still important health problems in our region. Health awareness program, personal hygiene, hand washing as well as uses of sanitary latrine and treatment of food to reduce the incidence of parasitic infection should be carried out in these communities.

Introduction

Form the time of Antony van Leeuwenhoek, a Dutch draper of Holland, who observes sundry material by using single lensed microscope of his design, which referred to as animalcules. For centuries to this era parasitic infection have been causing high mortality and morbidity to mankind worldwide especially in the developing countries like India (Sucheta *et al.,* 2013). In developing countries, intestinal parasitic infections are major health problem

among children worldwide is aggravated by poverty, malnutrition, poor health and climate (Shakya *et al.,* 2012). Parasitic infections are affected in all age group whereas children are most affected (Markell and Voge, 1965; Steketee, 2003). Children living in low poverty are probably suffering from parasitic infection of rural communities among poorest sector (Tripathi Kiran *et al.,* 2014). Intestinal parasitic infection has become prime victim in children, which affect their physical and mental development, ability to learn and school attendance. (Agrawal *et al.,* 2012)

All over the world, especially developing countries parasitic infection is responsible for causing morbidity and mortality. Therefore it is known as 'cancers of developing countries (Tiwari *et al.,* 2013). According to WHO approximate over 270 million pre-school children and over 600 million of school children are living in parasitic transmitted area and in need of treatment and prevention. In developing countries, about 750 million episodes of diarrhea occur which results in five millions death (Bhandari *et al.,* 2011; Singh *et al.,* 2010). Parasitic infections are major problem in India like other developing countries. Globally reported commonest parasitic infection are *Ascaris lumbricoides*, Hookworm, *Enterobius vermicularis, Trichuris trichiura, Entamoeba histolytica/ dispar* and *Giardia lamblia* (Misra Shobhaa *et al.,* 2013; Supriya Panda *et al.,* 2012). In India overall prevalence of parasitic infection varies from about 13% to 68% (Swapna Kotian *et al.,* 2014). In developing countries high prevalence of intestinal parasitic infections are associated with factors like low literacy rate, poverty, poor hygiene, lack of potable water and climate area. There are still many communities or localities for which epidemiological information is still not available although there are many studies have been conducted on prevalence of parasitic infection among school children.

However monitoring of parasitic infection and their factors is necessary for approaching the problem because they reflect health education of the community which provides basic data for control for future infection.

The objective of this study was to evaluate prevalence of parasitic infection among school children of Bhaili, Durg district of Chhattisgarh and their association with socio-demographic, environmental and behavioral habits of school children.

Materials and Methods

This cross sectional study was conducted in Sahhashikaya Higher Secondary School located in Bhaili, Durg district of Chhattisgarh state located in central east India after obtaining permission from respective authority. The specimen was selected randomly. This study was conduct among 250 children (6-15 years of age) from the above school. Considering the subject purpose and procedure of study, all teachers, children and their parents were informed through the principle of school before collecting the sample.

Explaining in conversational language small presentation, projecting the picture of various forms of parasites and their disease were shown with advantage of stool examination. The procedure for stool collection was thoroughly explained and clean plastic stool containers were distributed to every student on the day before specimen collection with identification number and name. Next day the stool sample were collected and brought immediately to the microbiology laboratory at department of microbiology for processing.

Macroscopic Examination: All stool samples were examined macroscopically for presence of blood, mucus, adult worms, segments of tapeworm, and larvae. The consistency of

stool as formed, loose or watery or soft with color and odor were noted.

Microscopic Examination: All stool samples were examined by direct microscopic examination. Saline and Iodine wet mount were performed for the presence of parasitic cysts, trophozoites and ova and larva and also presence of leukocytes and erythrocytes.

Concentration technique as Formal ether concentration method was also done and again the sediments were examined by microscopically again (wet mount and iodine preparation).

After finding the parasitic ova in stool sample Mac master slide method was also performed for counting parasitic ova per gram. Positive stool sample with presence of parasites were informed and referred to pediatric OPD of our hospital for treatment.

Results and Discussion

Total 250 stool samples were collected from school children of age group 6 to 15 years in a clean, dry screw capped plastic container. Collected stool samples were examined by wet mount (saline and iodine wet mount preparation method) and also by formal ether concentration method. Out of total 250 samples 160 were male and 90 were female school going children were included in this study. Total 78 (31.2%) stool samples intestinal parasites were found out of 250 samples in which 46(28.75%) were male and 32 (35.6%) were female as shown in table 1 and 2. The prevalence of parasitic infection was significantly higher among female children 32(35.6%) out of 90 than male children 46(28.75%) out of 160 (Table 2).

The chi-square statistic is 1.2428. The *p*-value is 0.264929. The result is *not* significant at $p < 0.05$.

According to the age highest infection rate was significantly observed in children between 5 to 10 years (41.1%), followed by 10-15 years (25.6%) as shown in table 3.

The chi-square statistic is 6.4352. The *p*-value is 0.011188. The result is significant at $p < 0.05$.

42(53.9%) Protozoa and 30(38.5%) helminthes and 6(7.7%) mixed (both protozoa and helminthes) were detected out of total positive for parasite. *E. histolytica* (38.5%), *G. lamblia* (19.2%), *Ascaris lumbricoides* (19.2%), Hookworm (10.3%) and *Taenia* spp (5.1%) were commonest protozoan and helminthes respectively as shown in table 4.

Especially in developing countries parasitic infection represents relevant clinical problems which are responsible for mortality and morbidity in children and adults with variation from region to region, communities and ethnic group and even seasonal variation (Peruzzi *et al.,* 2006). Because of changes in life style and social behavior in communities, prevalence of parasitic infection may vary.

Different epidemiological studies will provide understanding health status of community (Aher and Kulkarni, 2011).

In this study, the prevalence of parasitic infection among school children was found to be 31.2%. This finding was line up with a study conducted in school children of rural community in India was 30.4% by Aher and Kulkarni (2011). However high prevalence of intestinal parasitic infection have reported about 42.14%, 50% to 65% among school children as studies carried out in different parts of India Dr. Sucheta *et al.,* (2013), Chakma *et al.,* (2000) and Sugunan *et al.,* (1996). According to the study of Bora *et al.,* prevalence was found to be 31.5% which was similar to this study (Bora *et al.,* 2006).

Table.1 Number and percentage of students showing the positive of intestinal parasite

No. of students	Result	Percentage (%)
78	**Positive**	**31.2**
172	**Negative**	**68.8**
250	**Total**	**100**

Table.2 Showing the positive for parasite according to sex

Sex	Total	Positive	Percentage (%)	P-value
Male	160	46	28.7	0.26
Female	90	32	35.6	
Total	250	78	31.2	

Table.3 Showing the prevalence for parasite according to age

Age group	Total Number	Positive	Percentage (%)	P- value
5-10 Years	90	37	41.1	0.01
10-15 Years	160	41	25.6	

Table.4 Showing prevalence of parasites species in children

Type of parasite	Total Positive	Percentage
Protozoa	**42**	**53.9**
Entamoeba histolytica	30	38.5
Giardia lamblia	15	19.2
Helminthes	**30**	**38.5**
Ascaris lumbricoides	15	19.2
Taenia spp	4	5.1
Hookworm	8	10.3
Mixed(Both Protozoa and Helminths)	6	7.7
Total	**78**	**31.2**

Fig.1, 2, and 3 Shows as *E. histolytical*, *Ascaris lumbricoides* and *G. lamblia* respectively

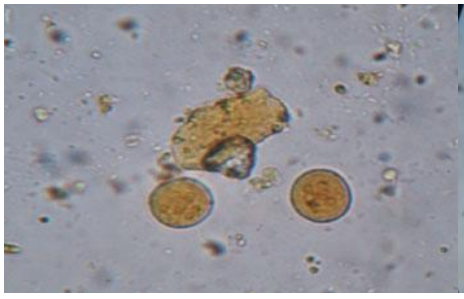

Fig.1

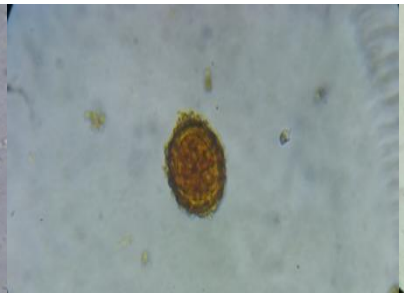

Fig.2

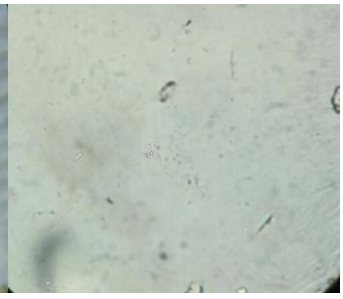

Fig.3

Study conducted by Rashid *et al.,* prevalence was 22.3% (Rashid *et al.,* 2011) whereas study of Dr. Sucheta *et al.,* prevalence in school going children in Vadodara was 42.14% (Sucheta *et al.,* 2013) which was quite lower and higher than this study. However in study of Dambhare *et al.,* (2010) intestinal parasitic infection was found only 7.56% of school children in rural area. The distribution over a wide area might be due to behavioral and social factors affecting the degree of infection.

In this study, prevalence of parasitic infection was slighter higher in female 35.6% than males 28.75% which is quite similar to study of Vincent P. Gyang *et al.,* (2017) and Panda et at (2012) In the study of Shakya et at (2012) and Tamirat *et al.,* (2017) also shows higher prevalence rate in females than male. Where as in the study of Dr. Sucheta *et al.,* (2013) shows that there was no significant prevalence in respect to gender.

Base on the age of children, highest prevalence was found among aged 5-10 years followed by 10-15 years. This shows similar to the result of previous studies of Khanal *et al.,* (2011), Shakyae *et al.,* (2012). This higher prevalence in age group 5-10 years may be due to unhygienic behavior, lack of sanitation and lack of proper care of children by their parents.

In this study Helminthes was dominating by Protozoa was similar to most of the findings from India. *E. histolytica* (38.5%) was the commonest parasite from protozoa whereas *Ascaris lumbricoides* (19.2%) was the commonest helminthes found in this study which was quite similar to the other studies from other parts of the India and from around the world. Study of Gelaw *et al., E. histolytica* found as commonest protozoan (Gelaw *et al.,* 2013). Other studies conducted in different areas revealed different species which are found more prevalent as study of Dambhare *et al.,* (2010), Marothi and Singh *et al.,* (2011), Ragunathan *et al.,* (2010), Bisht *et al.,* (2011), Davane *et al.,* (2012), Rashid *et al.,* (2011). In this study *Giardia lamblia* 19.2% which was alter in compared to other study found in children from India Dr. Sucheta *et al.,* (2013), Sehgal *et al.,* (2010) and Aher *et al.,* (2011). *Ascaris lumbricoides* 19.2% followed by Hookworm 10.3%, *Taenia* spp 5.1%. Multiple parasites was detected in 7.7% of children which was less as comparing to the other studies Ouattara *et al.,* (2010), Magar *et al.,* (2011) and Rituparna *et al.,* (2017).

According to the guideline of US Department of Health 2013, suggest that people from developing countries of Africa and Asia are highly susceptible to parasitic infection, which may cause seriously illness as they may lead to even death (UD Department of Health and Human Services, 2013).

The present study shows 31.2% parasitic infection which is still important health problems in our region. This prevalence may be due to poor personal hygiene, poor sanitation, illiterate about health education poor socioeconomic condition and other factors. Therefore, health awareness program, personal hygiene, hand washing as well as uses of sanitary latrine and treatment of food to reduce the incidence of parasitic infection should be carried out in these communities. More and more work to be carried out still to reach more of these communities.

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