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Original Research Article

A Prevalence Study of Intestinal Parasitic Infections in Children at Tertiary Care Hospital in Rajkot City of Gujarat (India)

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Abstract

Introduction: Intestinal parasitic infections are the main health problems in developing countries which can cause mortality and morbidity among infected people particularly in children. They are also associated with stunting of linear growth, physical weakness and low educational achievement in children. This study was undertaken to assess the prevalence of intestinal parasitic infections in children. ***Material and Method:*** Pediatric Patients taking treatment in P.D.U. Hospital and Medical College, Rajkot- a tertiary care hospital in Gujarat, India, were included in study. Physical and microscopic examination was carried out in the total 368 stool samples received during from period January 2015 to July 2016. ***Result:*** 51(13.86%) stool samples showed presence of ova/cyst of protozoa or helminthes. Protozoal cyst or trophozoites were found in 33 (8.97%) while helminthic eggs or larvae were found in 19 (5.16%) of positive samples. ***Conclusion:*** Protozoa are more common than helminthes. It is an important public health problem. It is necessary to develop effective prevention and control strategies including periodic deworming, health education and environmental hygiene.

Keywords: Intestinal parasitic infection in children India.

BACKGROUND

Intestinal parasitic infections are amongst the most widespread of all chronic human infections worldwide [1]. The World Health Organization (WHO) estimated that 3.5 billion people worldwide are infected with some type of intestinal parasite and as many as 450 million of them are sick as a result. Children are most frequently infected with these parasites [2].

The distribution and prevalence of various species of intestinal parasites differ from region to region because of several environmental, social, and geographical factors. They spread mostly in areas with poor sanitation and are most common in tropical developing countries of African, Asia, and South American continents [3]. They are closely associated with low household income, poor personal and environmental sanitation, overcrowding conditions and limited access to clean water, tropical climate and low latitude [4]. The poor people of under-developed nations experience a cycle where under-nutrition and repeated infections lead to excess morbidity that can continue from generation to generation. People of all ages are affected by this cycle of prevalent parasitic infections, although, children are the most affected ones [5].

Intestinal parasitic infections are caused either by protozoan or helminth parasites or both and the main clinical manifestation of the disease caused by these parasites is diarrhea [6]. Diarrhea, the passage of loose or watery stools at least three times in 24 hours, is one of the clinical manifestations of HIV infection and usually tends to be chronic [7].

Intestinal parasitic infections are the main health problems which can cause mortality and morbidity among infected people. They are also associated with stunting of linear growth, physical weakness and low educational achievement in children [8]. Moreover, they cause iron deficiency anemia, loss of appetite and other physical and mental problems [4].

About 1.45 billion people in the world were infected with Soil-Transmitted Helminths (STHs) and 5.19 million show associated morbidity in 2010 [9, 10]. Out of them STHs, 438.9 million were infected with hookworm, 819.0 million with A. lumbricoides and

464.6 million with T. Trichiura [9]. The vast majority of STH infections (67%) and YLDs (68%) occurred in Asia. When considering YLDs (years lived with disability) relative to total populations at risk however, the burden distribution varied more considerably within major global regions than between them [10].

The purpose of this study was undertaken to know the prevalence of intestinal parasitic infection in children at our place.

MATERIALS AND METHODS

The study was undertaken in Department of Microbiology, P.D.U. (Govt.) Medical College, Rajkot (Gujarat, India), from period January 2015 to July 2016. This study includes 368 pediatric cases of having suspected parasitic infections, admitted in Pediatric ward of P.D.U. (Govt.) Medical College and Hospital, Rajkot. The stool samples were collected and examined without delay by naked eye physical and microscopic examination of normal saline as well as iodine preparation [11, 12]. The percentage of the parasites were calculated to find out prevalence of parasitic infections and data were analyzed for interpretation.

RESULT

Table-1: Distribution of total and positive cases

Total number of cases	Number of positive cases
368	51 (13.86 %)

Out of 368 total number of cases, 51 (13.86%) cases were positive for various intestinal parasitic infections.

Table-2: Gender wise distribution of total and positive cases

Gender	Total number of cases (n=368)	Number of positive cases (n=51)
Male	**200 (54.35%)**	**33 (64.71%)**
Female	**168 (45.65%)**	**18 (35.29%)**
Total	**368 (100%)**	**51 (100%)**

Out of 51 positive samples, intestinal parasitosis was seen more in male patients (64.71%) in comparison to female (35.29%).

Table-3: Age wise distribution of total and positive cases

Age (Years)	Total number of cases (n=368)	Number of positive cases (n=51)
<1	**55 (14.94%)**	**0 (0.00%)**
1-5	**227 (61.68%)**	**26 (50.98%)**
6-10	**56 (15.21%)**	**14 (27.45%)**
11-13	**30 (8.15%)**	**11 (21.56%)**
TOTAL	**368 (100%)**	**51 (100%)**

Maximum number of cases were 26 (50.98%) from age group of 1 to 5 years followed by 14 (27.45%) cases in age group 6 to 10 years, 11 (21.56%) cases in age group 11-13 years and in age group <1year no positive case observed.

Table-4: Parasite wise distribution of positive cases

INTESTINAL PARASITES	POSITIVE CASES
E.histolytica (Cyst-24, Trophozoites-1)	25 (49.01 %)
Eggs of A. lumbricoides	11 (21.56 %)
Giardia lamblia (Trophozoites-4, Trophozoite + Cyst-3)	7 (13.72 %)
Eggs of H.nana	3 (5.88 %)
Egg of Trichuris trichiura	2 (3.92 %)
Egg of Ancylostoma duodenale	2 (3.92 %)
Eggs & larvae of A. duodenale +Trophozoites of Giardia lamblia	1 (1.96 %)
TOTAL	51 (100 %)

Entamoeba histolytica infection was commonest intestinal parasitic infection constituting 25 (49.01%) followed by A. lumbricoides 11(21.56%), Giardia lamblia 7(13.72%), H.nana 3(5.88%), T.trichiura 2(3.92%), Ancylostoma duodenale 2(3.92%). Mix infection of A.duodenale and trophozoites of G. lamblia was observed 1 (1.96%) case. Protozoal cyst or trophozoites were found in 33 (8.97%) while helminthic eggs or larvae were found in 19 (5.16%) of positive samples.

DISCUSSION

Table-5: Comparison according to the total and positive cases

Study	Number of cases	
	Total	Positive
Hitesh Assudani et al-13.33% [13]	180	24 (13.33%)
Present study	368	51 (13.86%)
Ana Maria Fonseca *et al*., [14]	93	15 (16.10%)
Sharmila Tandukar *et al*., [15]	455	75 (16.50%)
Boonchai Wongstiwilairoong *et al.,* [16]	472	107 (22.70%)
O gunlesi Tinuadi *et al*., [17]	300	70 (23.30%)
Sneka P *et al*., [18]	220	53 (24.00%)
Alemayehu Getachew *et al*., [19]	425	171 (40.20%)
Ali Saad R. Alsubaie *et al*., [20]	258	148 (57.40%)

Various studies from different regions have shown different prevalence rates ranging from 13.33% to 57.40%. In present study, intestinal parasitic infection was found 51 (13.86%) cases out of total 368 cases which is nearly similar to study of Hitesh Assudani *et al*., (13.33%) [13], Ana Maria Fonseca et al (16.10%) [14], Sharmila Tandukar et al (16.50%) [15]. Alemayehu Getachew *et al*., (40.20%) [19] & Ali Saad R. Alsubaie *et al.*, (57.4%) [20] showed higher prevalence.

The wide variation in the prevalence of intestinal parasites may be due to variations in factors like geographic area, quality of drinking water supply, sanitation and other environmental conditions.

Table-6: Comparison according to the gender

Study	Gender	
	Male	Female
Sneka P *et al*., [18]	75.40%	24.60%
Hitesh Assudani *et al*., [13]	75.00%	25.00%
Present study	**64.71%**	**35.29%**
Bishnu Raj Tiwari *et al*., [21]	59.40%	40.60%
Shardulendra Prasad *et al*., [22]	47.42%	52.58%
Ossama M. Zakaria *et al.,* [23]	44.90%	55.10%

In the present study prevalence of intestinal parasitic infection was seen more among male patients (64.71%) then the females (35.29%). This finding is consistent with a study done by Sneka P *et al*., Hitesh Assudani *et al.*, and Bishnu Raj Tiwari et al. Shardulendra Prasad *et al* did not find significant difference in gender. Study conducted by Ossama M. Zakaria showed slightly higher prevalence in Female.

Male predominance can be explained by the fact that behavior of male gender make them more likely to come in contact with contaminated water, dirt, food, feces and other source of infection.

Table-7: Comparison according to the Age group

Study	Age group (In Year)			
	<1	1 to 5	6 to 10	11 to 13
Present study	0.00%	50.98%	27.45%	21.56%
Sharmila Tandukar *et al*., [15]	0.00%	9.33%	58.67%	32.00%
Sneka P *et al.,* [18]	0.00%	22.64%	52.83%	24.53%
Hitesh Assudani *et al.,* [13]	12.50%	25.00%	33.33%	29.17%
Nikmah Salamia Idris *et al*., [24]	5.00%	57.50%	25.00%	12.50%

Present study shows higher prevalence in age group of 1 to 5 years (50.98%) which is in accordance with study conducted by Nikmah Salamia Idris *et al*., (57%). Studies conducted by Sharmila Tandukar *et al*., & Sneka P *et al.*, showed higher prevalence in age group of 6 to 10 years. Immature immunity, lack of awareness of personal hygiene makes this group more vulnerable to intestinal parasitic infection. Least commonly infected age group in present study is of <1 year (0.00%) which is similar to the study conducted by Sharmila Tandukar *et al.*, (0.00%) and Sneka P *et al*., (0.00%).

Table-8: Comparison according to parasite observed

Study	Types of parasites						
	E.histolytica	**A. Lumbricoides**	**G.lamblia**	**H.nana**	**T. trichiura**	**A.duodenale**	**Mix (A. duodenale + Giardia lamblia**
Present study	49.01%	21.57%	13.73%	5.88%	03.92%	03.92%	01.96%
Sharmila Tandukar *et al.*, [15]	16.00%	05.30%	58.70%	12.00%	02.60%	00.00%	02.60%
Supriya Panda *et al.*, [25]	37.68%	00.00%	37.68%	11.59%	00.00%	08.70%	00.00%
Bishnu Raj Tiwari *et al.*, [22]	00.00%	17.82%	07.47%	46.56%	00.57%	27.58%	00.00%
Hitesh Assudani *et al.*, [13]	25.00%	08.33%	37.50%	00.00%	00.00%	04.17%	00.00%
Ali Saad R. *et al.*, [20]	33.70%	14.30%	23.60%	06.20%	09.30%	01.20%	00.00%
Abdulla A.Hama *et al.*, [26]	06.23%	00.19%	35.06%	05.35%	00.00%	00.00%	00.00%
Mamie Eleanor S. *et al.*, [27]	26.00%	19.00%	29.40%	22.20%	23.30%	25.00%	00.00%

In present study E. histolytica (49.01%) infection was common followed by A. Lumbricoides (21.57%), Giardia lamblia (13.73%). The most common parasite encountered in present study was E.histolytica (49.1%) which is in agreement with the study conducted by Supriya panda *et al*., (37.68%) and Ali Saad R. Alsubaie et al (33.70%). Many studies have shown Giardia lamblia as predominant parasite infecting human Sharmila Tandukar *et al*., (58.7%), Hitesh Assudani *et al*., (37.5%), Abdulla A. Hama *et al*., (35.06%), Mamie Eleanor Sackey *et al*., (29.4%), but in our study it was 13.73% only. Study conducted by Bishnu Raj Tiwari *et al*., showed H.nana (46.56%) as predominant parasite.

The difference in prevalence rate of individual parasites may be due to variation between geographic regions, communities, ethnic groups and seasonal variation.

The high rates of infection by *E. histolytica* in the current study might be due to improper hygiene including dirty or contaminated hands, especially after defecation, before eating and when preparing food in study population. In the developing world, amoebiasis causes some 450 million infections *per annum*, about 50 million incidents and about 1,00,000 deaths. Invasive amoebiasis is prevalent in the whole of South East Asia and the Indian subcontinent. Invasive amoebiasis is prevalent in the whole of South East Asia and the Indian subcontinent.

CONCLUSION

The present study shows that, intestinal parasitic infection is a major public health problem in children. Interventions including health education and personal hygiene to children and their parents are required. There is need to promote mass scale deworming and health promotion campaigns to create awareness about health and hygiene.

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