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PREVALENCE OF INTESTINAL PARASITIC INFECTIONS IN SCHOOL CHILDREN OF BANDAGAI, TALASH, DIR LOWER, PAKISTAN

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Abstract- Cross-sectional study of 137 stool samples were conducted, aimed to find out how common intestinal parasites infection in school going children's of Lower Dir, Khyber Pakhtunkhwa, Pakistan. The collected samples were preserved in 70% ethanol and carried out to the laboratory of Parasitology, Department of Zoology, University of Malakand for parasite examination. Through direct smear methods slides were prepared and examined under microscope. Evidence of intestinal parasitic infection was noted by the presence of parasites eggs and cysts in the stool specimens. Over-all 62.04% (85/137) were found to be infected. The age group from 8-9 were found to be more infected (68.32%) followed by age group 6-7 (67.57%) and (67.57%) in age group 4-5. Male 73.81% (n=62) were found to be more infected than female 43.39% (n=23). Observed parasites were *Ascaris lumbricoides, Entamoeba histolytica, Taenia saginata, Hookworms, Trichuris trichiura*. Based on the findings of the current analysis, it was determined that the study region offers the best chance of surviving these illnesses against which we have no effective resistance. These types of studies should be conducted on a regular basis to better understand the dangers of parasite infections and to improve human health.

Index Terms- Zoonotic, intestinal, pathogens, prevalence, cross-sectional

INTRODUCTION

Infections caused by intestinal parasites are a burning issue in developing and underdeveloped countries. Intestinal parasitic infections are the major cause of mortality in the world [1] and especially in school-age children [2]. The prevalence of these infections is closely related to poor environmental hygienic conditions, health status, and poverty [3]. Poor nutrition and parasitic infections are the major causes of anemia and diarrhea in school-age children. It also affects health and growth, educational qualities, and mental health [4]. The prevalence of intestinal parasites is throughout the world and it effects both sexes [5]. These parasites are of major hazards because of their rapid prevalent rate and their effect on nutritional and immune status of the population. Children playing on the ground and sand are more vulnerable to these helminths' infections. World health organization estimated that more than one billion people including 400 million school-age children are chronically infected by these soil-transmitted helminths infections. The global prevalence and cases of intestinal infection of helminths worms in school-age children is 320 million by Roundworm, 233 million by Whipworm, 239 million by Hookworm, and 128 million for other nematodes. The severity of these infections depends upon the number of nematodes worms present per person. But the major target of these infections is the school going children which present the major issue around the world. These parasitic infections negatively affect the growth, physical and mental health of school-age children [6]. *Strongyloides stercoralis* is intestinal parasitic nematode but its severity and prevalence is much more less than *Ascaris lumbricoides* or hookworm infections. The general symptoms of *Strongyloides stercoralis* include nausea and vomiting, abdominal pain, and diarrhea. These symptoms are common in 50 percent of the infected cases. *Strongyloides stercoralis* is of public importance in children. The prevalence of this parasite in Bangladesh is common in 7-10 years children. The percentage is 30 percent in school-going children. These children are at a high risk of mortality and nutritional deficiency due to the infection of this intestinal parasite. *Strongyloides stercoralis* is widely distributed at the tropics and subtropics levels. But there is a link between malnutrition and the prevalence of this intestinal parasite. Most ions and minerals are diminished like sodium, potassium, and chloride which ultimately come out during vomiting. All forms of intestinal inflammation caused by parasites lead to growth failure but they also affect nutrient balance and direct metabolism [7]. Another causative agent of intestinal infection is a common nematode *E. vermicularis* with a wide range of geographic distribution in developing nations. Mostly it affects tropical people because its eggs cannot survive in dry and hot arid conditions. 400 million people affected by this intestinal parasite throughout the world. This infection is acquired by beating the egg of *E. vermicularis* having 3rd stage larva. The infection is mostly transmitted through hands contact with the anus, contaminated food, and water. Soon the larva emerged from the eggs and travel into the caecum to become sexually mature. Eggs may also be found on bed and clothing which may be either ingested or inhaled. It is a pinworm of the large intestines and a common infection of children. The general symptoms of pinworm infection are anal itching and irritability, abdominal discomforts loss of appetite, loss of weight, insomnia, and urinary tract infections. It may penetrate the submucosa and extraintestinal sites like the vagina, uterus, ovary, lung, liver, and breast which leads to ectopic enterobiosis [8].

Besides nematodes, protozoa are also the leading cause of intestinal infections. Amoebiasis and giardiasis also cause intestinal diseases by ingesting food and water which contain cysts of these parasites. The main agent which causes amoebiasis is *E. histolytica* and that of giardiasis is *G. lamblia*. Amoebiasis kills one lakh people per year around the world. On the other hand, the incidence of *G. lamblia* is up to one million per year. Its symptoms include severe abdominal pain, severe diarrhea, and mal-absorption syndrome[9]. Prevalence of *E. histolytica* intestinal infections have variation in prevalence rate been reported and are mostly related to social, behavioral, physiological, nutritional, and ecological factors. It includes the low level of facilities, sanitation, lack of education, and ingestion of contaminated food and water [10]. Infections with gastrointestinal parasites are practically universal, with undeveloped areas having the highest incidence rates. Similar to this, among the top 10 illnesses in the globe, amoebiasis, ascariasis, ancylostomiasis, and trichuriasis are prevalent [11-13] The aim of this study was to find out intestinal parasites in school-aged children and possible infections caused by these parasites.

MATERIALS AND METHODS

STUDY SITE

The specimen was collected from different primary school going children of Bandagai, Talash, Dir lower, Khyber Pakhtunkhwa, Pakistan. Dir lower surrounded by Chitral in the north, Malakand in the south, and the east by district swat, to the west is Dir upper/ (Afghanistan). The total area the district was reported as 1585km^2 with a population of 717649 approximately, having cold winter with dry and hot summer. Annual rainfall is about 600mm to 1100mm reported, with cold winter and pleasing worm season [14].

SAMPLE COLLECTION

For this research single sample techniques were used. Stools were collected from primary school-going children age ranges from 4-11 years. This data of fresh Stools was collected from almost 3 primary schools of Bandagai, Talash, Dir Lower. The student was provided with labeled small plastic bottles with instruction to return the bottles with a small portion of their stools. Then the stools were preserved in 70% ethanol and carried out to the laboratory.

LABORATORY ANALYSIS

The collected stools were carried out to the parasitology laboratory department of the Zoology University of Malakand Dir lower. At the laboratory, the stools were macroscopically and microscopically examined by direct smear method. In the macroscopic analysis the color, odor, smell, mucus, and blood in stools were observed. Slides were prepared by simple saline and iodine preparation technique and then examined for the identification of trophozoites, cysts, eggs, larvae, and worms.

DATA ANALYSIS

Data were analyzed by using SPSS version 21.

RESULTS

During the study total, 150 specimens were collected from school children out of these 13 samples were rejected due to the use of the wrong medium while the rest 137 samples were studied under the microscope for observation of intestinal parasitism. These subjects are related to different age groups ranges from 4-11 years. 84/137 male were sampled while 53/137 female students were sampled listed in table 1, figure 1.

Table1: Sampled students according to gender-wise and age group.

Age group (years)	Male	Female	Total
4-5	19	12	31
6-7	23	14	37
8-9	25	16	41
10-11	17	11	28
Total	84	53	137

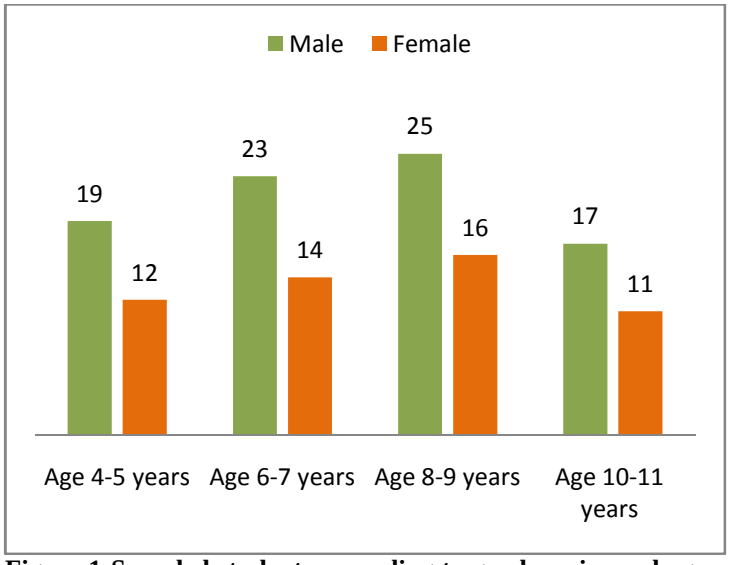

Figure 1:Sampled students according to gender-wise and age group.

The over-all infection of helminth parasitism in the studied samples was 62.043% (n=85), while 37.95% (n=52) were found with no parasitism at all. The highest prevalence (68.32%) were found in age group of 8-9 years children while lowest parasitic infection were found in age group of 10-11 years (42.86%) listed in table 2, figure 2.

Table 2 Age-wise prevalence of intestinal parasitic infection among school going children's.

Age group	Positive n (%)	Negative n (%)
4-5	20 (64.52)	11 (35.48)
6-7	25 (67.57)	12 (32.43)
8-9	28 (68.32)	13 (31.71)
10-11	12 (42.86)	16 (57.14)
Total	85 (62.04)	52 (37.95)

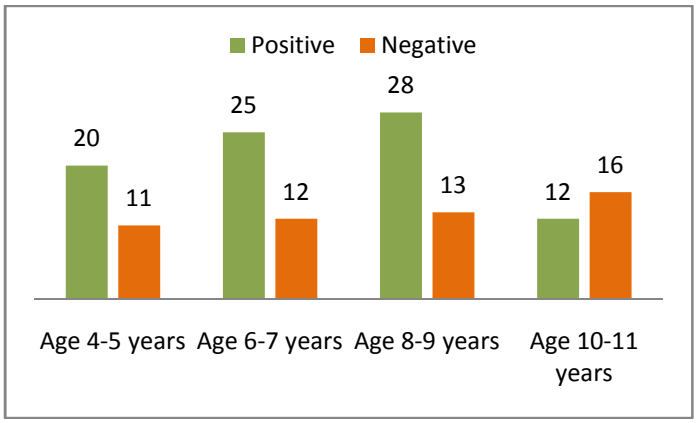

Figure 2:Age-wise prevalence of intestinal parasitic infection among school going children's.

Male of age group 8-9 were found to be more infected (88.00%), followed by age group of 6-7 years (82.61%) and (68.42%) in age group of 4-5 years, mentioned in table 3.

Table: 2Frequency of human intestinal parasites according to age group and gender among school going children's

Age (Years)	Male		Female		Total n %
	+ive	-ive	+ive	-ive	
4-5	13	6	7	5	31(21.63)
6-7	19	4	6	8	37(27.01)
8-9	22	3	6	10	41(29.93)
10-11	8	9	4	7	28(20.44)

The sample studied overall 73.81% (n=62) of males were found to be more infected than females 43.39% (n=23). During the current work different parasites species were observed with highest prevalence of *Ascaris lumbricoides* 46.774% (n=29), followed by *E. histolytica* 38.71% (n=24), *T. saginata* 6.45% (n=4). Lowest prevalence was reported for Hookworm 4.84% (n=3) and *T. trichiura* 3.23% (n=2) in males. Female students were also found to be infected with same parasites with different intensity, the most prevalent one was *Ascaris* 43.48% (n=10), followed by *E. histolytica* 30.43% (n=7), *T. saginata* 8.69% (n=2), Hookworm 13.04% (n=3) and *T. trichiura* 3.23% (n=1). The *T. saginata* and *T. trichiura* were less prevalent in females listed in table 4.

Table: 4 Frequency of observed intestinal parasites among school going children's at Talash, Dir Lower, Pakistan

Parasites	Frequency(n)	Percentage (%)
Ascaris lumbricoides	39	45.88
E. histolytica	31	36.47
T. saginata	6	7.05
Hook worm	6	7.05
Trichuris trichiura	3	3.52
Total parasites	85	100

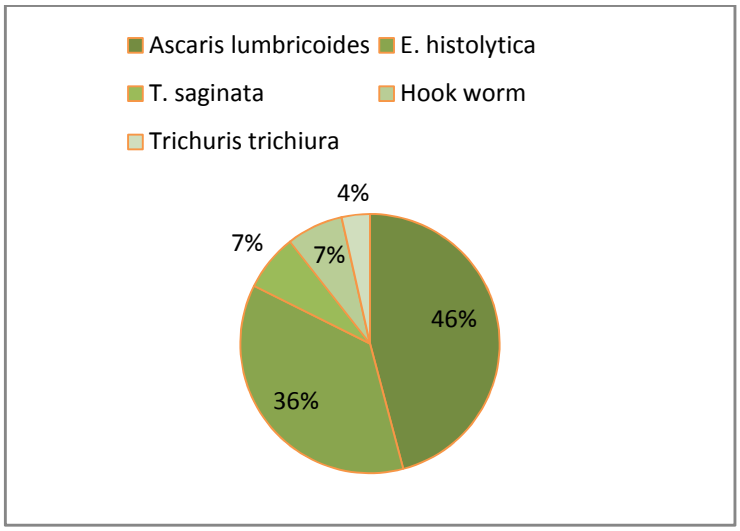

Figure 3:Frequency of observed intestinal parasites among school going children's at Talash, Dir Lower, Pakistan

DISCUSSION

Intestinal parasites infection is one of the major health problems, particularly in developing countries, related to poverty, personal and environmental hygiene, type of living condition, overcrowding, insufficient health care, an association of parasitic infection with age and sex of the children were studied.Intestinal parasite prevalence in primary school children aged 4 to 11 years was investigated and were found to be more prevalent (62.043%) in kids, according to the current study. Worldwide Two billion people were infected with intestinal parasites [15]. The great

prevalence is found in children due to poor resource settings [16]. Children are more suffer from intestinal parasites because of lack of personal and fecal hygiene conditions, do not wash hands before a meal, and immature immune systems [17]. In Bareilly district study conducted and reported the prevalence of intestinal parasites in primary school children which is 22.1% [18]. A similar study conducted on primary school children in rural Peshawar, approximately 66% were found with various helminths infections [19]. Also reported in rural Ethiopia high prevalence of 88.2% is found in school children [20]. In our study the prevalence of parasites was higher in male students (73.81%) than female students (43.39%) similar to the study conducted by [21] that male were prevalent than female because male has a low immune response and high rate of infection. Due to working outside in communities and exposed unsanitary environment male were more prevalent than female [22]. The higher prevalence was found among males as compared to females reported in school children in Gaza Palestine [23].In addition, research of the incidence of intestinal parasites among school children in district upper Dir found that female pupils had a greater prevalence than male students (Ullah et al., 2014). There is a link between age and parasite prevalence, according to the statistics. In this study, the age group 8-9 was the most prevalent (68.32%) followed by (67.57%) in age group 6-7 and (67.57%) in age group. The increased prevalence of intestinal parasite infection is largely due to age. Intestinal parasites are prevalent in the intermediate age range of 6-9 years old, according to our findings. Other researchers found a similar age-related difference in the prevalence of school children.The highest prevalence was found in age group 6-14 in Karnataka during the study on E. histolytica [24]. In this study, the intestinal parasites *Ascaris, E. histolytica, T. saginata, Hookworm, T. trichiura*were identified in stool samples. The prevalence of *Ascaris* was higher in both male and female followed by *E. histolytica, T. saginata*, Hookworm, and *T. trichiura*. A similar identification of intestinal parasites found in other studies like most prevalent intestinal parasites were *Ascaris lumbricoids, Giardia lamblia*, and *Entamoeba histolytica* in children reported by [18]. In children, the more prevalent parasites found the *Ascaris lumbricoids, S. stercoralis, T. trichiura*, Hookworm, *Giardia lamblia* noted by [25]. The most prevalent intestinal helminths were *Ascaris, T. trichiura* and *T. saginata* reported by [26]. The factor which associated with prevalence of parasitic infection in children is poverty, drinking of contaminated water, illiteracy, poor hygiene and overcrowded conditions. These parasites are usually associated with malabsorption syndromes and gastrointestinal morbidity [27].

The high prevalence in developing countries is due to socio-economic conditions such as inadequate housing, poor health services, low level of awareness and education, lack of access to sanitation facilities and clean drinking water [28].The differences in the incidence of certain intestinal parasites in different places could be related to a variety of environmental, personal behaviors, cultural, and geographical constraints. To reduce this threat, it is crucial to implement a health education plan and treat patients properly. According to medical professionals, the drugs recommended for control include mebendazole, albendazole, and pyrantel, pamoate. When there is a combined helminthic and protozoal infection, the medication albendazole is strongly advised [29].

CONCLUSION

In the prevalence of school going children's intestinal parasites in Bnadagai, Talash, Dir Lower, Pakistan, the most prevalent are *Ascaris lumbricoides,* and *E. histolytica.*

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