

Original Article

Prevalence of Intestinal Protozoan & Worms Infestation in Primary School going Children of 5-10 years of age, in District Bannu

Mohammad Shoaib Khan,
Shah Jehan,
Muhammad Akram*
Rabnawaz,
Malik Zaib**
Zahina Lathif
Fida Hussian
Muhammad Naeem

Objective: The purpose of this study was to determine the prevalence of Worm & protozoan infestation in primary school children Bannu City.

Study design: Cross sectional study.

Place & Duration of study: The study was carried out in the Department of pathology, Bannu medical College Bannu & Samad clinical laboratory, Bannu in one year duration from March 2010-March 2011.

Materials and Methods: This cross sectional study deals with investigation of the prevalence of intestinal parasitic infestation in children between the ages 5-10 years. A total of 100 subjects were tested and screened for different intestinal worm at Department of Pathology, Bannu Medical College, Bannu.

Results: Of the 100 children examined, 46 children showed no ova or cyst in their stool examination, while 54 tested positive for various intestinal parasites. Seven (07) different types ova of Worm & protozoan were found. These were Ascaris Lumbricoides, Pin worm, Hymenolepis nana, Taenia saginata, Entamoeba histolytica, Giardia Lamblia and Ankylostoma deudenale. So far the highest frequency of 15% was noted for Ascaris lumbricoides, 12% for pinworm & 10% for Hymenolepis nana, followed by Taenia saginata, Entamoeba histolytica, Giardia lamblia & Ankylostoma deudenale in the percentages of 7%, 7%, 2% & 1% respectively. In our study population the more abundant was Ascaris while the least common was Giardia & ankylostoma. The common clinical presentation of children's, suffering from various intestinal parasites, of which the most common was recurrent abdominal pain & discomfort in (37.04%), diarrhea in (12.96%), bloody diarrhea in (3.7%), Vomiting in (7.4%), urticaria in (3.7%), itching in (9.26%), anemia & pale in (18.52%) and Cough in (7.41%) Children.

Conclusions: A very high percentage (54%) of children from various areas of Bannu City have intestinal worm infestation and majority of them (28.77% of positive cases) have Ascaris lumbricoides. The main risk factors for high prevalence are poor sanitation, open field defecation, unclean stagnant water source and low economic standard.

KEY WORDS: Worm infestation, Bannu, KPK.

Introduction

Infestation means lodgment, development and reproduction of arthropods. Worm invasion is referred to usually as infestation and not as an infection. The parasitic infestation is a common

cause of morbidity and mortality in pediatric population in tropical countries.¹

Worm Infestation is present in people of all ages, irrespective of sex. However young have a high infestation rate and so lead to high rate of infection in children. The prevalence of intestinal parasites varies in different regions of the world.²

Department of Biochemistry,
Pathology & Community
Medicine Bannu Medical
College, Bannu, Khyber
Pakhtunkhwa, Pakistan

* Department of Biochemistry,
Sheikh Zayed Medical College,
Lahore

** Department of Pathology,
kidney Diseases, HMC,
Peshawar, Pakistan

Address for Correspondence

Despite of improved socio-economic conditions and elevated living standards, surprisingly it is still a public health problem even in developed countries, like United States.³ Intestinal worms can cause severe complications in the people they infect, and may even lead to the death. Although simple diagnostic techniques are needed to make the specific diagnosis of the type of worm infestation, yet worms can cause severe clinical problems, patients rarely report at health centre due to its slow⁴ progress of the signs and symptoms.

Worm & protozoan infections are more prevalent among school children aged 5-10 years. They constitute 12% of the total disease burden in these children.⁵ Worm and protozoan infestation is a leading cause of iron deficiency anemia, whipworm infestation in children causes growth retardation and anemia while heavy infestation with both roundworm and whipworm causes protein energy malnutrition. It is of particular concern that these infestation have insidious constraint on cognition and learning abilities of the children.^{6,7}

Because of the high prevalence and serious adverse effects of intestinal parasitic infestation in children, many studies have been conducted in (^{8,9}) various cities of Pakistan like, Karachi, Rawalpindi, Islamabad, Lahore, Sargodha^{10,11} Northern Areas and Abbottabad. An intense deficiency was felt for a like study in Bannu. The present study is an effort to estimate the frequency of intestinal protozoan & worm infestation in the Bannu city in primary school going children (5-10 years)

Materials and Methods

This cross sectional study was conducted to find out the prevalence of protozoan & worm infestation in primary school going children of 5-10 years of age in Bannu city from March 2010-March 2011.

In this study 10 schools were randomly selected from Bannu city in which half of the schools were government school and half were private. The study was designed to include 10 children per school, so that total number of sample size comes to be 100. The study was conducted in two stages; in first stage schools were selected, situated in different areas of Bannu city. While in 2nd stage school to school visits were conducted. Children of 5-10 years 10 from each school were then selected randomly on lottery bases. Two students from each

class were then selected in these schools again on lottery base.

Selection of team members: Teams of four to five members from Batch-B of fourth year MBBS students collected the data from each school through pre developed questionnaire after obtaining written consent from parents or guardian. The questionnaire of the study was consisted in two partitions including complete child & Guardian history.

Stool examination: The fecal sample from each student was collected in pre-weighed bottles containing formaline. The visiting team instructed parents/caregivers on the method of collecting pea size (approximately 10 gm) fecal samples. These samples were then collected and transported to the Pathology Department of Bannu Medical College, Bannu for microscopic examination. Initially screened by trained technicians and then confirmed by pathologist. Simple light microscopy method was used in which samples were examined under direct light microscopy in normal saline, lugol's iodine & scotch tape technique.

Statistical Analysis: Statistical analysis was performed using open Office 2.1.0 final, Microsoft Office 2006 XP and SPSS software's version 14.0. Data was then presented through tables and diagrams. Chi-square test was applied to see level of significant.

Results

One hundred children from Primary Schools Bannu city (5-10 years) were examined & analyzed, out of which 54 positive for worm infestation.

Table (1) shows the prevalence of worm's infestation in Primary School Children of Bannu city. Seven different types of worms were found, which were *Ascaris Lumbricoides* (roundworm), *Enterobius vermicularis* (Pin Worm), *Hymenolepis nana* (hook worm), *Taenia saginata* (thread worm), *Entamoeba histolytica*, *Giardia lamblia* and *Ankylostoma Deudernale*. Of the 100 children examined, 46 children showed no ova or cyst in their stool examination, while 54 tested positive for various intestinal parasites. So far the highest frequency of 15% was noted for *Ascaris lumbricoides*, 12% for pinworm & 10% for *Hymenolepis nana*, followed by *Taenia saginata*, *Entamoeba histolytica*, *Giardia lamblia* & *Ankylostoma deudernale* in the percentages of 7%, 7%, 2% & 1% respectively. In our study population

the more abundant was *Ascaris* while the least common was *Giardia* & *ankylostoma*.

Table I: Stool examination results- prevalence of worm's infestation

Worms	N	%age
Normal	46	46%
<i>Ascaris lumbricoides</i> (Round worm)	15	15%
<i>Enterobius vermicularis</i> (Pin Worm)	12	12%
<i>Hymenolpis nana</i> (Hook worm)	10	10%
<i>Taenia saginata</i> (Thread worm)	7	7%
<i>Entameba histolytica</i>	7	7%
<i>Giardia lamblia</i>	2	2%
<i>Ankylostoma deudenale</i>	1	1%

Table (2) of the study showed the common clinical presentation of children's, suffering from various intestinal parasites, of which the most common was recurrent abdominal pain & discomfort in (37.04%), diarrhea in (12.96%), bloody diarrhea in (3.7%), Vomiting in (7.4%), urticaria in (3.7%), itching in (9.26%), anemia & pale in (18.52%) and Cough in (7.41%) Children's.

Table II: Clinical presentations of Children suffered from worm's infestation

Clinical Presentation	N	%age
Abdominal pain & discomfort	20	37.04
Diarrhea	07	12.96
Bloody diarrhea	02	3.70
Vomiting	04	7.41
Urticaria	02	3.70
Itching	05	9.26
Anemic & pale	10	18.52
Cough	04	7.41
Total	54	100

Discussion

Our study, conducted to assess the prevalence of intestinal protozoan & worm's infestation in primary school children of 5-10 years in Bannu city, has

found after careful screening that more than half of the primary school children suffer from intestinal worm infection. Our study reaffirms the findings of similar other surveys (studies) carried out earlier in other areas of Pakistan which are also confirming the very high rate of worm infestations in our population as a whole and children in particular.

The most commonly found species in our study is round worm i.e. *Ascaris lumbricoides*. They are found to infest most of the children of the community in our study place. The prevalence of *Ascaris* infestation in percentage is 15%, Pin worm 12% and *Hymenolpis nana* 10%. Our study is in close accordance with other studies carried out in various areas of the world as well as studies done in other parts of Pakistan. Various studies in different parts of the World show different percentage of worm infestations i.e. from 21% to 91%.¹⁰

The World Health Organization (WHO) estimates infection with round worm (*Ascaris lumbricoides*), whipworm (*Trichuris trichiura*) and hookworms (*Ancylostoma duodenale* and *Necator americanus*) with associated morbidity, affect approximately 250 million, 46 million and 151 million people, respectively.¹² About half the population in South India⁽¹³⁾ and 50% of school children in tribal areas of Central India¹⁴ is infected with *Ascaris lumbricoides*, *Trichuris trichiura* and/or hookworm. In a study done in Nigeria shows 49.7% intestinal helminthes with *Ascaris lumbricoides* 64.4% hookworms 10.9% and *Trichuris trichiura* in 1.1% cases studied. There were 41 (23.6%) children with polyparasitism, 33 of them were positive both for 23 *Ascaris lumbricoides* and hookworms.¹⁵

In Nepal, 86.7% of the pre-school children are infected with a single geohelminth infection and 13.3% with mixed infections⁽¹⁶⁾. Studies carried out in various parts of India have reported a prevalence of intestinal parasitism up to 30-50% and anemia from 40-73% among school going girls.¹⁷ Worm infestation as reported is 31.8% in Turkey, 19.3% in Iran, 47.2% in Afghanistan and 44% in Sudan.^{18, 19} In a similar study done in Uganda shows that 55.9% of children were infected with hookworm, *Ascaris lumbricoides* or *Trichuris trichiura*. The prevalence of *A. lumbricoides* was 17.5%, *T. trichiura* was 7.3% and hookworm 44.5%.²⁰

Studies from Pakistan have been reported prevalence rates of 77% among young²¹ children

although an Ethiopian study²² found a much lower prevalence. A relatively high prevalence of worm infections in these developing countries is due to poor socio economic conditions like presence of inadequate housing, low levels of education and awareness, poor health services, inadequate sanitation, lack of access to sanitation facilities and clean drinking water.²³ Characteristics like household crowding, level of education, religion, use of footwear when outdoors, defecation practices, cattle ownership and water sources have implications in spreading infestation.²⁴

In the urban slum of Karachi^{25, 26} the prevalence of intestinal parasitic infections was estimated to be 52.8% and 81% children from suburbs of Abbottabad have intestinal worm infestation and majority of them (48% of positive cases) have *Ascaris lumbricoides*.²⁷ In a study by Nishiura et. Al in the Northern areas of Pakistan the prevalence of *Ascaris lumbricoides* was found to be 91%.¹⁰ The present study shows almost the same results 54% for the prevalence and pattern of the worm's infestation as shown in the above studies. *Ascaris lumbricoides* infestation has become an important consideration in hepatopancreato-biliary diseases in endemic areas and requires prompt recognition and treatment to prevent complications.²⁷

In result, more than half of the primary school children in Bannu city have intestinal worm infestation. *Ascaris* is the most common infested worm found in our study. In view of the WHO recommendations, 'in areas where prevalence of mild to moderate underweight children is greater than 25% and where parasites are known to be widespread, high priority should be given to deworming program, data on prevalence of worms and trails of antihelminthic drugs are vital'. Preventive measures for safety of available drinking water and spreading awareness related to sanitation related behavior should be adopted to minimize the prevalence of worm infestation. Simple community based measures such as increasing public awareness about the drawbacks of open-air defecation, safe disposal of waste water and safe handling of drinking water can be used for easy and short-term result. Also, sanitation education campaigns are necessary to increase awareness of populations at risk to the relationship between deploying safe sanitation practices, sanitary conditions in general and worm

infestation. Such community based programs need to be strengthened.

Conclusion

The high parasite prevalence rate observed in this study supports the idea that children are the most affected groups in the community. They also serve as source of infection and therefore responsible for parasite transmission in the community at large. Their habits of going out, playing on the soil and eating without washing their hands contribute to high prevalence among them. The main risk factors for high prevalence are poor sanitation, open field defecation, unclean stagnant water source and low economic standard. Lack of awareness and 5-10 years age group are also contributing to the severity. It is therefore suggested that intervention measures have to be adopted to reduce intestinal worm infestation among children and the community.

References

1. [Al-Balla](#) SR, Al-Sekeit M, Al- Rasheed RS, Al-Hedality MA, Al- Mazrou AM. Prevalence of pathogenic intestinal parasites among preschool children in Al-Medina district, Saudi Arabia Dhu Al Qa'da 1993; 13: 259-63.
2. [Hussain](#) SM, Raza MI, Naeem S. Prevalence of intestinal parasites in northern areas of Pakistan (Baltistan division-Skardu) Biomedica 1997; 5: 60-3.
3. Kappus KD, Lundegren RG, Juranek DD, Robert JM, Spencer HC. Intestinal parasitism in the United States; Update on a continuing problem. AM J Trop Med Hyg 1994; 50:705-13.
4. Shally Awashti, Bundy DAP, Lorenzo Saviolio Helminthic infections. A clinical review. BMJ 2003; 327:431-3.
5. Roche M, Layrisse M. Hookworm anaemia. AmJ Trop Med Hyg 1966; 15:1029-1102.
6. Agbaya SS, Yavo W, Menan EI, Attey MA, Kouadio LP, Kone M. Sante. intestinal helminthiasis among school children: preliminary results of a prospective study in Agboville in Southern Cote d Ivoire. Sante 2004; 14: 143-7.
7. Watkin NE, Politt E. Stupidity or worms: do intestinal worms impair mental performance? Psychol Bull 1997; 121: 171-91.
8. Banatwala NS, Zuberi SA study of intestinal and hepatic amoebiasis. Pak J Med Res 1980; 17-12.
9. Bilqees FM, Khan A, Ahmad A. A survey of intestinal protozoan and helminth parasite Karachi. Pak J Med Res 1982; 21:54-8.
10. Nishiura H, Imai H, Nakao H, Tsukino H, Changezi MA, Hussain GA, et al. *Ascaris lumbricoides* among children in rural communities in the Northern Area of Pakistan: prevalence, intensity and associated socio cultural and behavioral risk factor. Acta Trop 2002; 83: 223-31.
11. Ahmad AK, Malik B, Shaheen B, Yasmeen G, Dar JB, Mona AK et al. frequency of intestinal parasitic infestation in children of 5-12 years of age in rural areas of Abbotabad. J Ayub Med College Abbotabad. 2003; 15: 28-30.
12. Montresor A, Crompton DWT, Hall A, Bundy DA, Savioli L. Guidelines for the evaluation of soil-transmitted helminthiasis and schistosomiasis at a community level. World Health Organization, Geneva: 1998. WHO/CTD/SIP/98.1.

13. Mani TR, Rajendran R, Munirathinam A, Sunish IP, Md Abdullah S. efficacy of co-administration of albendazole and diethylcarbamazine against geohelminthiasis: A study from South India. *Trop Med Int Health* 2002; 6: 541-8.
14. Chakma T. Prevalence of anaemia and worm infestation in tribal areas of Madhya Pradesh. *J Indian Med Assoc* 2000; 98: 567-71.
15. Sharma BK, Rai SK, Rai DR, Choudhry DR. Prevalence of intestinal parasitic infestation in school children in the northeastern part of Kathmandu Valley, Nepal. *Southeast Asian J Trop Med Public Health* 2004; 35:501.
16. Mukhopadhyay C, Wilson AG, Chawla K, Binu VS, Shivanada PG. six year SGeohelminth infection profile of children at high altitude in Western Nepal. *BMC Public Health* 2008;8:98. Available from: <http://www.biomedcentral.com/1471-2458/8/98>.
17. Kumar CS, Anand Kumar H, Sunita V, Kapur I Prevalence of anemia and worm infestation ischool going girls at Gulbargha, Karnatka. In *dian Pediatr*. 2003; 40: 70-2.
18. Okay P, Erutz S, Gultekin B, Onen O, Beser E Intestinal parasites prevalence and related factors in school children, a western city sample Turkey. *BMC Public Health* 2004; 22; 4.
19. Sayyari AA, Imanzadeh F, Bagheri Yazdi SA Karami H, Haghoobi M. Prevalence of intestinal parasitic infections in the Islamic Republic of Iran. *East Mediterr Health J* 2005; 11: 377-8.
20. Kabatereine NB, Tukahebwa EM, Brooker S, L-derman H, Hall A. Epidemiology of intestinal helminth infestations among school children in southern Uganda. *East Afr Med J* 2001; 78:283-6
21. Hafeez R, Tahir Z, Chughtazi AS. Incidence and intensity of soil transmitted helminthes in a rural area of Lahore. *Int J Pathol* 2003; 1: 36-8.
22. Tadesse G. the prevalence of intestinal helminthes infections and associated risk factors among school children in Babile town, eastern Ethiopia. *Ethiop J Health Dev* 2005; 19: 140-7.
23. De Silva NR, Jayapani VP, De Silva HJ. Socioeconomic and behavioral factor affecting the prevalence of geohelminths in preschool children. *Southeast Asian J Trop Med Public Health* 1996; 27: 36-42.
24. Traub RJ, Robertson ID, Irwin P, Mencke N, Thompson RC. The prevalence, intensities and risk factors associated with geohelminth infection in tea-growing communities of Assam, India. *Trop Med Inter Health* 2004; 9: 688-701.
25. Mehraj C, Hatcher J, Akhtar S, Rafique G, Beg MA. Prevalence and factors associated with intestinal parasitic infection among children in an uraban slum of Karachi. *PLUS ONE* 2008; 3: 3680.
26. Siddiqui MI, Bilqees FM, Iliyas M, Perveen S. Prevalence of parasitic in a rural area of Karachi, Pakistan. *J Pak Med Assoc* 2002; 52: 315.
27. Sandouk F, Haffar S, Zada MM, Graham DY, Annand BS. Pancreatic-biliary Ascariasis: experience of 300 cases: *Am J Gastroenterol* 1997 Dec; 92(12): 2264-7.