

Incidence and Socioeconomic Impact of Intestinal Parasitic Infections among School Going Children of Private and Public Sectors Schools

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ABSTRACT

Background: Parasitic infection is one of the most common infections in school age children because of poor quality of water, deprived sanitation system and lack of enough health care facilities in underdeveloped countries. Parasitic infections lead to anemia, growth retardation, weight loss, and other physical and mental health problems in children. Current study is designed to evaluate frequency of different intestinal parasitic infections and possible associated risk factors among school students in of District Buner Pakistan.

Material and method: This Descriptive cross-sectional study was conducted at Riaz Clinical Laboratory District Buner. All asymptomatic school going children between 5 to 15 years' age of both genders were included in the study. Those students who had present with symptoms of gastrointestinal infection were excluded from the study. A total of 440 samples were collected from different public and private school's children. Out of total 240 samples were collected from public sector schools and 200 samples from private sector school's children. A pretested structured questionnaire was used to gather data on socio-demographic and associated risk factors. The adequate stool specimens were collected in sterile, screw capped disposable plastic container. All samples were examined under microscope using a direct wet mount and formal ether concentration technique. Data was analyzed through SPSS-22 and presented in the form of tables, Pie chart and bar graphs.

Results: Out of 440 samples, 23.63% (104/440) were positive for an ova and cysts of different parasites. The parasite positivity ratio is greater in public sector school children (30%) compare to private sector school children (16%). *Taenia saginata* were most common parasite (8.4%) in school age children followed by *Hymenolepis nana* (5.68%), *Ascaris lumbricoides* (5.45%), *Enterobius vermicularis* 1.13%, and *Strongyloides stecoralis* (0.68%) were least common parasite in District Buner, Khyber Pukhtoonkhwa.

Conclusion: Major contributor for the high prevalence of parasitic infections in public school children were found to be poor personal and environmental hygiene, lack of proper sanitation, contaminated food and water supply, personal habits of the children like nail biting and finger sucking, illiterate mother and low socio-economic status of the individuals.

Keywords: Intestinal parasites, Worm infestation, School going children, Socioeconomic impact

INTRODUCTION

Intestinal parasitic infections are serious and often fatal diseases that have a long-term impact on children in school. They are among the world's most frequent and underappreciated infectious illnesses.^{1,2} These infections are a significant public health concern because they can cause anaemia (iron deficiency), stunted development in children, and other health problems.³ These infections can also cause nutritional deficiency, growth retardation and impaired mental health which will impact negatively on brain function and learning capacity.⁴ According to a WHO survey, 3.5 billion people are infected and 450 million suffering from active parasitic infections, the most of which are children. Parasitic infections account for 16 million deaths, out of the estimated annual deaths in developing countries from these parasites which are transmitted widely and need care and control.⁵

Regardless of all the medical and pharmaceutical advancement, parasitic infections remain the most common infection in the world, particularly in developing countries cope with water insufficiency, poor sanitation and lack of enough health care services.⁶ Most studies have demonstrated that absence of education, lack of toilets, occurrence of diarrhea, improper disposal of human excreta, level of sanitation in households and lower socio-economic status are related to the high burden of intestinal parasites, a study conducted in 2003 in Kabul stated that 57.3% of children between 8 and 15 years of age were infected.⁷ Removing of helminthic infections may enhance children's nutritional status. On providing anti-helminthic medication, weight gain was estimated to be 10 percent higher than anticipated.⁸ It is known that intestinal helminthic infections are still remaining a significant causative factor for malnutrition and other health problems among children attending Primary schools.⁹

Due to universal diversity and harmfulness of intestinal parasitic infections in children, multiple studies have been carried out on the prevalence and burden of intestinal parasites in various

cities of Pakistan like Karachi, Rawalpindi, Islamabad, Lahore, Sargodha and Abbottabad.¹⁰ Except for a few, none of these papers revealed the incidence of intestinal parasites in children from public and private schools. Because there is little or no information on these parasites in the region, it was decided to conduct this study on the relative frequency of intestinal parasites among schoolkids in district Buner to address this gap. As a result, the current study aims to compare the incidence of intestinal parasites and determine the causes of parasitic infection among students between the ages 5 to 15 in District Buner, Pakistan.

MATERIAL AND METHODS

This Descriptive cross-sectional study was conducted from October 2019 to December 2019 at district Buner, Khyber Pakhtunkhwa, Pakistan. The research samples consist of 500 school students but only 440 students (88%) participated voluntarily. All asymptomatic school going children between 5 to 15 years' age of both genders were included in the study. Those students who had present with symptoms of gastrointestinal infection were excluded from the study. A total of eight schools were randomly selected among them four schools were private sector and four were public sectors of District Buner. Out of total, 240 stool samples were collected from public sector schools and 200 samples from private sector school's children. Among total 200 samples were collected from girls (45%) and 240 (55%) stool samples from boys.

A pretested structured questionnaire was used to gather data on socio-demographic and associated risk factors. Information about age, gender, residence, father income, household water source, mother education, family details, personal habits like finger sucking and nail biting and personal complaints of the participant were collected through the questionnaire. The adequate stool specimens were collected in sterile, screw capped disposable plastic container. The stool samples (0.5–1.5 gr) were

obtained without additives and transferred to the laboratory within 4 hours of collection. All samples were examined under microscope using a direct wet mount and formal ether concentration technique. Data was analyzed through SPSS-22 and presented in the form of tables, Pie chart and bar graphs.

RESULTS

Intestinal parasite infection was found in 104 (23.63 percent) of the 440 stool samples. There was a significant difference in infection between students in public and private schools with p-value less than 0.05. 72 (30%) of the 240 Government school children tested positive for parasites. Infections were found in 32 (16%) of 200 children at a private school. The five different types parasites infected boys and girls in both types of schools in District Buner. As a result, 62 (25.83%) of the 240 male students were sick, while 42 (21%) of the 200 female students were afflicted. There was a significant difference in infection rates between the two groups p0.05).

Multiple illnesses were also found in children from both public and private schools, with 17 (3.8 percent) of the 440 students harbouring three different kinds of diseases (Table 3.6).

Table 1: Prevalence of Multiple infections for both government and private schools

Multiple Parasites	Government N=240	Private N=200	Total
H. Nana + T. Saginata	6 (2.5%)	3 (1.5%)	9 (2.04%)
H. Nana + Ascaris L.	3 (1.25%)	2 (1%)	5 (1.13%)
Ascaris L. + S. Stecoralis	2 (0.83%)	1 (0.5%)	3 (0.68%)

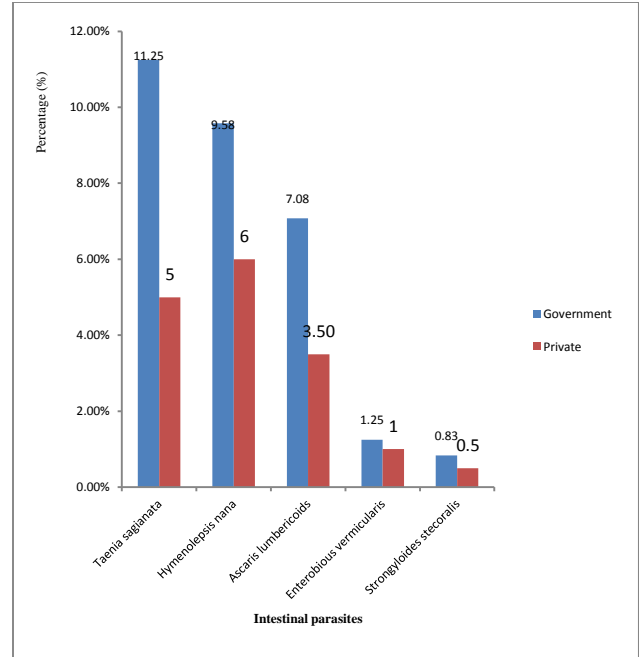


Figure 1: shows the prevalence of intestinal parasite infection in children from both public and private schools.

Table 2:

Variables	Government Sector Schools	Private Sector Schools	Total
Gender			
Male	130 (54.2)	110 (55)	240 (54.5)
Female	110 (45.8)	90 (45)	200 (45.5)
Age (Years SD)	9.7 (2.6)	9.5 (2.5)	9.6 (2.6)
Frequencies			
Positive			
One Type Parasite	72 (16.3)	32 (7.27)	104 (23.63)
Multiple Type Parasite	11 (2.50)	06 (1.36)	17 (3.86)
Negative	168 (38.18)	168 (38.18)	336 (76.36)
Social Status			
Mother Education			
No Formal Education	39 (16.3)	9 (4.5)	48 (10.9)
Primary level	109 (45.4)	27 (13.5)	136 (30.9)
High School level	67 (27.9)	125 (62.5)	192 (43.6)
Inter Level	25 (10.4)	39 (19.5)	64 (14.5)
University level	0	0	0
Residence status			
Rural	240 (54.5)	200 (45.5)	440 (100)
Urban	0	0	0
No. of rooms In house			
Less than 4	29 (12.1)	25 (12.5)	54 (12.3)
More than 5	211 (87.9)	175 (87.5)	386 (87.7)
Family type			
Combined family	174 (72.5)	159 (79.5)	333 (75.7)
Separated family	66 (27.5)	41 (20.5)	107 (24.3)
Toileted Home			
Yes	100 (100)	100 (100)	100 (100)
No	0	0	0
Water Source			
Tape water	100 (100)	100 (100)	100 (100)
Filter water	0	0	0
Hand washing habits			
Yes	92 (20.9)	160 (36.3)	252 (57.3)
No	148 (33.6)	4 (9.09)	188 (42.7)
Finger sucking			
Yes	69 (15.7)	7 (1.6)	76 (17.3)
No	171 (38.9)	193 (43.9)	364 (82.7)
Nail biting			
Yes	69 (28.7)	7 (3.5)	76 (17.3)
No	171 (71.3)	193 (96.5)	364 (82.7)

Economic Status			
Father Income			
Low	136 (30.9)	0	136 (30.9)
Middle	104 (23.6)	200 (45.5)	304 (69.1)
High	0	0	0
Personal Complaints			
Lack of Appetite			
Yes	45 (10.2)	5 (1.1)	50 (11.3)
No	195 (44.3)	195 (44.4)	390 (88.7)
Abdominal Discomfort			
Yes	76 (17.3)	11 (2.5)	87 (19.8)
No	164 (37.3)	189 (42.9)	353 (80.2)
Peri-Anal Itching			
Yes	2 (0.45)	2 (0.45)	4 (0.9)
No	238 (54.1)	198 (45)	436 (99.1)
Parasitic infection history			
Yes	141 (32.04)	19 (4.3)	160 (36.4)
No	99 (22.5)	181 (41.1)	280 (63.6)
Anti-Parasitic Medication			
Yes	19 (4.3)	35 (7.9)	54 (12.3)
No	221 (50.2)	165 (37.5)	386 (87.7)

DISCUSSION

In this cross-sectional investigation, it was shown that government school kids had a higher incidence rate of intestinal parasite infections (30%) than private school students (16 percent). The findings of this study reveal that intestinal parasite infection affects students of both genders in both government and private elementary schools surveyed, regardless of where they live. The findings suggest that the study population has a low degree of intestinal parasite infection, with 23.63 percent compared to 54 percent in a research done in District Bannu, KPK.¹⁰

A statistically significant link was discovered between children's nail biting and fingertip sucking behaviour and the presence of parasites. Intestinal parasites are known to be intimately linked to sanitary behaviour, and members of the same family can readily become infected. In comparison to children who had their nails clipped, those who had not had their nails cut had a higher prevalence of parasite infection. Gender and age of children, dietary habits, and the number of people living in the household are some of the parameters that have no statistical variance in the development of intestinal parasites.

Government school students are infected at a higher rate (23.63%) than kids at private institutions (16 percent). This may be because public schools have huge acres of land for various sports, which gives rise to parasite spread from contaminated soil, and the administration is not enhancing social facilities to the public schools, such as water supply facilities, to make sure total removal of these infections. In addition, private schools have superior amenities than public schools, such as clean restrooms and adequate drinking water. The government opposes medical education for children in school, where these children may be educated about basic hygiene and behaviour.

Because all learners interact more or less the same environmental conditions that facilitate parasite transmission and persistence, the same five kinds of parasite species were discovered in kids from both schools. Poor sanitation, poor personal hygiene, and comparable socio-demographic behaviour of the pupils were among the environmental variables discovered throughout this study. The study also discovered a significant proportion of poverty among the community's parents of affected children. We discovered that there may be a link between poverty and parasite incidence since more students with impoverished parents came back positive for parasites.

In a research done in District Bannu, Khyber Pukhtoonkhwa, parasite infection was found in 54 percent of primary school children. *Ascaris Lumbricoides* (15 percent), *Enterobius vermicularis* (12 percent), *Hymenolepis nana* (10 percent), *Taenia saginata* (7 percent), *Entamoeba histolytica* (7 percent), *Giardia lamblia* (2 percent), and *Ancylostoma Deudernale* (2 percent) were among the parasites discovered (1 percent)¹⁰. *Taenia saginata*

(8.4 percent), *Hymenolepis nana* (5.68 percent), *Ascaris lumbricoides* (5.45 percent), *Enterobius vermicularis* (1.13 percent), and *Strongyloides stecoralis* (1.13 percent) were the parasites found most often in this study (0.68 percent).

CONCLUSION

Intestinal parasite illnesses in school children have been identified as a public health issue that is on the rise as a result of poor socioeconomic level. Uneducated mothers, low social status fathers, and the availability of safe drinking water, as well as the presence of unhygienic toilets, open defecation, and the practise of not washing hands before meals and after using the toilet, were all determinants of a high prevalence of intestinal parasites. To tackle the problem in the study region, improvements in the health education, clean water supply, bathroom facilities, individual and environmental hygiene, shoe wearing, and hand washing behaviours are all critical.

The information gathered in this study is also useful in determining the clinical existence of human gastro-intestinal parasites in this region. The healthcare and education departments must take immediate measures to reduce the workload of parasitic infections in Pakistan's schools and other institutions by improving the health care system, health education, and regular diagnostic testing and recognition of infections in schoolchildren. These are all possible and desirable holdings in human evolution that will ascertain Pakistan's future.

Recommendations: The findings of this study highlight the critical need for schools to build and maintain sanitary facilities. Consistent anti-parasitic efforts, environmental hygiene through the creation of sanitary facilities, and commitment to personal hygiene principles through health education would all go a long way toward reducing the plague of gastro-intestinal parasites in children. The involvement of parents and other stakeholders in the development and implementation of interventions is critical to their effectiveness.

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