Nangarhar University
International Journal of Biosciences

Received: 05 August 2022
Accepted after revision: 20 Oct 2022
Published Online: 25 Feb 2023

ORIGINAL ARTICLE Vol 2, Issue 1 (2023) e-ISSN: 2957-9988

Prevalence of Ascaris Lumbricoides in School Children of Nangarhar Province, Eastern Afghanistan

Nassary Noor Agha[1], Waziri Mohammad Yunas[1], Memlawal Redwanullah[2*], Ismailzai Abdulwajid[2],Kadwal Mohammad Hamid[2]

[1]Pre-clinic department., Veterinary Science Faculty, Nangarhar University, Nangarhar2601, Afghanistan.

[2]Para-clinic department, Veterinary Science Faculty, Nangarhar University, Nangarhar2601, Afghanistan.

*Corresponding author Email: dr.memlalwal100@gmail.com

ABSTRACT

Backgroud: The rising major health concern with high rate of prevelence is Ascariasis in developing countries. The fundamental objective of present research was the parasitological investication estimating the prevelence of Ascaris lumbricoides based on age and sex among students of urban (Jalalabad City) and rural (Khogyani) schools in eastern, Afghanistan.

Materials and Mehtods: For accomplishment of research objective, totally 400 samples were obtained from students of selected schools and further procedure applied by formal-ether concentration technique. The entire population of 400 students in two groups of ages; 7-10 years and 10-13 years are chosen. 200 samples were collected from Jalalabad city school and the remaining 200 samples were collected from a local school in Khogiani district of Nangarhar province. Descriptive analysis of obtained data was performed using the R x64 3.3.1 version.

Findings: The results reviewed that in Urban areas schools twenty three were found positive and infection rate was 11.5%. In Urban areas schools children's, the infection was higher in 7-10 years old than 10-13 years old. The results documented that disease pattern in male and female children's was higher in males compared to females. Whereas, in rural areas schools 28, were found positive and infection rate was 14%. Furthermore, the occurrence of Ascariasis in rural areas schools children's, was higher in 7-10years old than 10-13 years old.

Conclusion: The recorded high contamination rate in young male children indicate to emphasize on better and improved sanitation and should be educated on the mode of infection and epidemiology of the parasite. The findings may also stimulate the development of customised strategies for the improved control and prevention of Ascaris infection Nangarhar.

Keywords: Ascarislumbricoides; Rural; Urban; Schools; Children

INTRODUCTION

Ascariasis infection is a major health problem with up to 1.2 billion people infected worldwide . A high rate of prevalence is observed in third world countries (Kucik et al, 2004).

Asciariasis is caused by Ascarislumbricoides,an intestinal nematode (round worm). Ingesting of infective eggs in contaminated food and water causing infection of human and fecally contaminated hands also infect human. After being ingested, in the circulation hatches where they are carried to the heart and lungs(Andrade et al, 2001). A few worm infection might be symptomless (Denham et et al, 1984),Worm masses of Ascaris L. can cause obstruction (Mosawi et al, 2019) or perforation of the intestine and occasionally obstruction of the bile ducts and pancreatic ducts (Dangana et al., 2011).Ascariasis effects may also contribute substantially to child morbidity when associated with malnutrition, pneumonia, enteric diseases and vitamin A deficiency (De Silva et al, 1997). It has also been associated with also been associated with stunted growth (Fernando et al, 2002). Harold et al. (1983) reported that Ascariasis can occur at any ages, mostly prevalent in the children of 5 to 9 years of age. Schoolchildren and young adults are more vulnerable. In male and female, the incidence is almost the same; due to poor hygiene and soil pollution causing the poor classes in urban and rural areas are most affected by the parasite. Infection is a household affair, the family being the unit of dissemination, infected children, provides the chief source of soil contamination by their indiscriminate defecation in door yards and earthen-floored houses, where the resistant eggs remain viable for long periods. By using adequate latrine, the soil can be prevented from becoming faecally pollution of Ascariasis. Avoiding the use of untreated human faeces as fertilizer and treating infected individuals are a part of a controlled program. It is also possible to be controlled by preventing eggs from being ingested by washing the hands before eating, avoiding eating of uncooked vegetables, green salads and fruits which may be contaminated with Ascaris eggs from polluted soil (Seo, 1983). In tropical countries where warm, wet climate enhances the transmission of the infection, infection occurs with highest prevalence (Holland et al, 2014). Fecal contamination is one of the most serious environmental health problems in poor countries (Ostan et al, 2007).

Intestinal parasitic infections negatively affect the health and development of a high proportion of school-age children. (Ezeamama et al, 2005). Although the major focus has been on prevalence of intestinal helminthes infection, fewer studies have investigated the socio economic effects of transmission of intestinal helminthes and namely Ascaris. It has been reported that the lack of standard toilets and education, occurrence of diarrhea, lower socio-economic status, inadequate disposal of human excreta and the level of sanitation in households are related to Ascariasis is a major health concern in Afghanistan with a 36% rate of transmission (Pullan et al, 2010). Factors such as limited access of Afghan people to clean drinking water, sanitary standard toilets and health services put Afghanistan in a high risk of ascariasis. According to a previously performed study, ascariasis is the most prevalent intestinal infections in eastern Afghanistan, especially among children (Korzeniewski et al, 2014).

Likewise, Afghan farmers use human feces as fertilizer for agricultural products such as vegetables, if not cleaned properly, in turn can cause Ascariasis. Urban residents and especially school children are considered as highly susceptible population against ascariasis. The factors such as polluted water and high population has put cities in risk of infection as well. Similar to cities, children in rural areas and remote towns are in the first line of the risk. This purpose of this study is to find the prevalence of ascariasis in Nangarhar province, Afghanistan. Also the information about the key factors affecting the infection in school children urban and rural areas. To our

knowledge, this is the first study conducted on this population and area about the prevalence of ascariasis. parasitoses (Cooper et al, 1988).

Research Objectives

The research was conducted in order to accomplish the given objectives:

- Study of age and sex in school children infected by Ascariasis.
- Comparative study of Ascariasis in children in urban and rural societies.
- Giving awareness to school children about Ascariasis.

MATERIALS AND METHODS

Sample

The overall population of 400 children were studied in two age groups; 7-10 yrs. and 10-13 yrs. 200 samples were collected from Jalalabad city school and the remaining 200 samples were collected from a local school in Khogiani district of Nangarhar province.

Fecal sample collection

Data was collected through direct interview schedule and recorded in a questionnaire which included information about age, sex, weight, height and socio-economic situation. Stool samples were collected in clean and dry wide mouthed container. The schedule is prepared maintaining relevance with the objective of the study. Before launching the survey, the questionnaire was be pre- tested and improved accordingly.

Fecal samples examination

Samples were transported to laboratory and was studied by flotation and sedimentation methods and through light microscope. The lab examination was performed in parasitology laboratory of veterinary science faculty of Nangarhar University.

Laboratory Investigations

Microscopy

Macroscopically checked the stool samples to observe the odor, color, presence of mucus and/ or blood. Microscopically examined the stool samples after collection in 24 hours. Eggs and larvae of the parasite examined using multiple approaches. The stool samples were concentrated using the formal-ether concentration technique and examined for the presence of Ascaris eggs by direct smears using normal saline and iodine solutions. Besides, sodium nitrate and zinc sulphide floatation techniques, Biermann and stool egg counting techniques were adopted to investigate and count worm eggs and larvae

Data Analysis

The obtained data were subjected to descriptive statistical analysis using the R x64 3.3.1 software.

RESULTS

A total of 400 fecal samples were examined for the presence of Asarislumbricoides eggs. 200 from Urban and 200 from rural areas. In Urban areas schools 23, were found positive and infection rate was 11.5% (**Table 1).**

Table. 1: Age and sex wise prevalence of Ascaris Lumbricoides in Urban areas, Schools:

		Number of Sample	Positive	Infection Percentage
Age	7-10 years	100	14	14
	10-13 years	100	9	9
Sex	Male	120	18	15
	Female	80	5	6.25

Age and sex wise prevalence

In Urban areas schools children's, the infection was higher in 7-10 years old than 10-13 years old (Table. 1). An analysis of disease pattern in male and female children's showed that infection was higher in males compared to females (Table. 1). In rural areas schools 28, were found positive and infection rate was 14% **(Table. 2).**

Table. 2: Age and sex wise prevalence of Ascaris Lumbricoides in rural areas, Schools:

		Number of Sample	Positive	Infection Percentage
Age	7-10 years	100	17	17
	10-13 years	100	11	11
Sex	Male	154	22	14.2
	Female	46	6	13

Age and sex wise prevalence

The occurrence of Ascariasis In rural areas schools children's, was higher in 7-10years old than 10-13 years old. The prevalence of Ascariasis was higher in male than females (Table. 2).

DISCUSSION

The common occurrence of Ascaris lumbricoides infection in developing countries carrying the hardest hit of the associated morbidity. A performed parasitological research in 2002 by German Armed Forces health service recorded in Kabul, among 217 local workers from the international military base, 64% were infected with intestinal helminths and protozoa, with Ascaris lumbricoides predominance observed 22.1% (Scheid and Thomas, 2004). WHO performed screening examination of stool samples taken from 1001 children aged 8-15 years in four provinces of Afghanistan, the results demonstrated the occurrence of intestinal helminthiasis in 47% of Children with the 41% predominance of Ascaris lumbricoides (Gabrielli et al., 2005).

Afghanistan is high risk country due to contaminated water and soils, many other etiologies are committed in transmission of Ascaris lumbricoides, as the health sector still rely on non-governmental organization's aids, the lack of health service workers leads to problems with epidemiological control in contaminant areas. The deficiency of basic drugs and medical equipment, chronic infective and parasitic disease vectors and migration to different societies are among the major contaminating factors (Wallace et al., 2002; Korzeniewski, 2009).

The essential matter of life, water contamination with pathogenic agents is common and 31% of Afghan households have access to safe drinking water. Meanwhile, about 5-7% of the Afghan community has to basic standard toilets (UNEP, 2008).

The poverty in Afghan society observed more than half of Afghan population (WHO, 2015). Due to limited diagnostic and therapeutic facilities of health services, Afghans are often treated by a trial and not proper method using a very poor assortment of pharmaceuticals. The low awareness of hygiene and lack of disease prevention strategy in Afghan society make easier spreading of infectious disease. Possibly even 90% of Afghan people may be infected with more than one parasite (Korzeniewsk et al., 2014). In literature, it has not been will recorded the information concerning infections caused by intestinal parasites in Afghanistan such as Ascaris lumbricoides, Giardia intestinalis, Entamoeba histolytica and so on (McCaw and Delay, 1985). This study results are in accordance to (Korzeniewski et al., 2017) findings, which carried out in Afghanistan. This study will represent the first findings of prevalence of A. lumbricoides infection among school children in eastern Afghanistan. Prevalence observed here is likely to approach the true prevalence of A. lumbricoides infection among children, in contrast to other prevalence studies, where generally only one microscopic technique is used. This approach led to several important observations concerning the presence of the parasite in the target population of Nangarhar province.

CONCLUSION

The results of study demonstrated a relatively high prevalence of A. lumbricoides infection among school children in Nangarhar Province with potential health consequences. Based on the results and investigations, more attention should be given to awareness, treat the infected people and training should be conducted to school children on the mode of infection and epidemiology of the parasite.

Acknowledgment

We are pleased to express our sincere thanks to HEDP for their financial support and schools administrative staff during sample collections.

Conflict of interest

All authors expresses no conflict of interest in any part of research, manuscript and submission to the journal.

REFERENCES

Andrade, C., Alava, T., De Palacio, I. A., Del Poggio, P., Jamoletti, C., Gulletta, M., & Montresor, A. (2001). Prevalence and intensity of soil-transmitted helminthiasis in the city of Portoviejo (Ecuador). *Memórias do Instituto Oswaldo Cruz*, *96*, 1075-1079.

Dangana, A., Abayomi, R. O., Way, G. D., & Akobi, O. A. (2011). Survey of Ascaris lumbricoides among pupils of primary school in Jos south local government area of Plateau State, Nigeria. *African Journal of Microbiology Research*, *5*(17), 2524-2527.

Cooper, E. S., & Bundy, D. A. P. (1988). Trichuris is not trivial. *Parasitology Today*, *4*(11), 301-306.

Cooper, E. S., Whyte-Alleng, C. A. M., Finzi-Smith, J. S., & MacDonald, T. T. (1992). Intestinal nematode infections in children: the pathophysiological price paid. *Parasitology*, *104*(S1), S91-S103.

Denham, D. A. (1984). Ascaris lumbncoides in English schoolchildren. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *78*(4), 566-567.

De Silva, N. R., Chan, M. S., & Bundy, D. A. P. (1997). Morbidity and mortality due to ascariasis: re-estimation and sensitivity analysis of global numbers at risk. *Tropical Medicine & International Health*, *2*(6), 513-518.

Korzeniewski, K., Augustynowicz, A., & Lass, A. (2014). Prevalence of intestinal parasites in Afghan community on the example of patients treated in Ghazni Provincial Hospital. *International maritime health*, *65*(2), 68-72.

Deployment Health Medical Center. Operation Enduring Freedom. USA 2005. Available at: http://www.pdhealth.mil/deployments/enduring-freedom/concerns.asp.

Ezeamama AE, Friedman JF, Acosta LP, Bellinger DC, Langdon GC, Manalo DL, Olveda, RM, Kurtis JD and Mcgarvey ST. (2005). Helminthes infection and cognitive impairment among Flipino children. Am J Trop Med Hyg (2005) 72: 540-548.

Feranando FC, Enrique C, Martha MT and Isabelle R, (2002). The risk of A. lumbricoides infection in children as an environmental health indicator to guide prevention activities in Caparo and Alto Caparo, Brazil.

Gabrielli AF, Ramsan M, Naumann C, Tsogzolmaa D, Bojang B, Khoshal MH, Connolly M, Stothard JR., Montresor A, & Savioli L. (2005). Soil-transmitted helminths and haemoglobin status among Afghan children in World Food Programme assisted schools. Journal of helminthology, 79(4), 381–384. https://doi.org/10.1079/joh2005316.

Harold W, Brown, Franklin A, Neva F (1983). Basic Clinical Parasitology Fifth edition Epidemiology of Ascaris lumbricoides.

Holland CV, Taren DL, Crompton DWT, Nesheim MC, Sanjur D, Barbeau I, Tucker K, Krzysztof Korzeniewski, A. A. (2014). Prevalence of intestinal parasites in Afghan community on the example of patients treated in Ghazni Provincial Hospital. Int Marit Health 65, 2, 68–72.

Korzeniewski K, Augustynowicz A, Lass A. (2014). Prevalence of intestinal parasites in Afghan community on the example of patients treated in Ghazni Provincial Hospital. International maritime health. 65. 68-72. 10.5603/IMH.2014.0016.

Korzeniewski, K. (2009). Health hazards in Central Asia on Afghanistan example. *International Journal of Health Science*, *2*(1).

Korzeniewski K, Chung W, Augustynowicz A, Lass A, & Ik K. (2017). Current status of intestinal parasitic infections among inhabitants of the Ghazni and Parwan provinces, Afghanistan. Family Medicine & Primary Care Review, 19(1), 23-28. https://doi.org/10.5114/fmpcr.2017.65087

Kucik, C. J., Martin, G. L., & Sortor, B. V. (2004). Common intestinal parasites. *American family physician*, *69*(5), 1161-1168.

McCaw, B. R., & DeLay, P. (1985). Demographics and disease prevalence of two new refugee groups in San Francisco: The Ethiopian and Afghan refugees. *Western Journal of Medicine*, *143*(2), 271.

Mosawi, S. H., Dalimi, A., Charkhi, M. A., Baarae, O., Darman, A., Mosavi, M., & Stanikzai, H. (2019). Gallbladder perforation due to Ascaris lumbricoides in a pregnant woman and 6 year old girl from Afghanistan: Case report. *Iranian Journal of Parasitology*, *14*(3), 477.

Östan, İ., Kilimcioğlu, A. A., Girginkardeşler, N., Özyurt, B. C., Limoncu, M. E., & Ok, Ü. Z. (2007). Health inequities: lower socio-economic conditions and higher incidences of intestinal parasites. *BMC public health*, *7*(1), 1-8.

Pullan, R. L., Smith, J. L., Jasrasaria, R., & Brooker, S. J. (2014). Global numbers of infection and disease burden

of soil transmitted helminth infections in 2010. *Parasites & vectors*, *7*, 1-19.

Seo, B. S. (1983). Control problems of ascariasis in Korea with special reference on the related biology and epidemiology. *Collected Papers on the Control of soil-transmitted Helminthiasis*, *2*, 194-216.

United Nations Environment Programme. Afghanistan's Environment 2008. National Environmental Protection Agency of the Islamic Republic of Afghanistan, Kabul 2009.

Wallace, M. R., Hale, B. R., Utz, G. C., Olson, P. E., Earhart, K. C., Thornton, S. A., & Hyams, K. C. (2002). Endemic infectious diseases of Afghanistan. *Clinical Infectious Diseases*, *34*(Supplement_5), S171-S207.

World Health Organization. (2015). *World health statistics 2015*. World Health Organization.