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

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Abstract:- The fundamental objective of present research was to examine the Ascarislumbricoidesamong students of urban (Jalalabad City) and rural(Khogyani) schools in Nangarhar Afghanistan. For accomplishment of research objective, totally 400 samples were obtained from students of selected schools and further procedure applied byformal-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 was collected from Jalalabad city school and the remaining 200 samples was collected from a local school in Khogiani district of Nangarhar province.Data was analyzed using the R x64 3.3.1 version. One-way analysis of variance (ANOVA) was applied to evaluate the statistical difference groups. Tukey HSD test was applied as post hoc test. The outcomes indicated 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 higherin 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.

Keywords:- *Ascarislumbricoides, Rural, Urban, Schools, Children.*

I. INTRODUCTION

Ascariasis infection is a major health problem with up to 1.2 billion people infected worldwide (CDC, 2020). 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 (Denhams*et al.*, 1985),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 (Braids, 1986).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., 1988). 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 parasitoses (Cooper *et al*., 1988).

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(Krzysztof *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.

➢ *Research Objectives*

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

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

II. METHODOLOGY

➢ *Sample*

The overall population of 400 children were studied in two age groups; 7-10 yrs. and 10-13 yrs. Of these, 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 weretransported 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 datawere subjected to descriptive statistical analysis using the R x64 3.3.1 software. One-way analysis of variance (ANOVA) was applied to evaluate the statistical difference groups. Tukey HSD test was applied for post hoc test. In addition, Chi square statistical test was used to determine the association of the prevalence of *A. lumbricoides* infection among school children with the studied risk factors. Values obtained were considered statistically significant at $P \leq 0.05$.

III. RESULTS

A total of 400 fecal samples were examined for the presence of Asarislumbricoides eggs. Of these 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 AscarisLumbricoides 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 wise prevalence*

In Urban areas schools children's, the infection was higher in 7-10 years old than 10-13 years old (Table. 1).

➢ *Sex wise prevalence*

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 AscarisLumbricoides 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 wise prevalence*

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

- *Sex wise prevalence*

The prevalence of Ascariasis was higher in male than females (Table. 2).

IV. DISCUSSION

The common occurrence of Ascarislumbricoides infection is developing countriessuch as Afghanistan with school children carrying the hardest hit of the associated morbidity. Data was gathered regarding the Ascarislumbricoides among students of urban (Jalalabad City) and rural (Khogyani) schools in Nangarhar Province, Afghanistan. Totally 400 samples were collected from students of these schools and processed using 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 was collected from Jalalabad city school and the remaining 200 samples was collected from a local school in Khogiani district of Nangarhar province. The outcomes indicated 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.

This will be the first findings that has reported the prevalence of *A. lumbricoides*infection among school childrenin eastern Afghanistan according our knowledge. The major strength of this study lies on the unprecedentedly large panel of arrays of diagnostic techniques used. The diagnostic rigor resulted in high quality data regarding the prevalence of the parasite in the area. Prevalence observed here isthus 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. In practice, the microscopic technique especially the direct smears are widely used in endemic areas, in both clinical and research settings including the healthcare facilities in Nangarhar province which could impede the true prevalence of the infection in the area.

V. CONCLUSION AND RECOMMENDATION

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.

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