

# Eggs and Larvae of Intestinal Helminths in Fingernail Among Rickshaw Puller, Labors and Vendors in Dhaka City

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## ABSTRACT

The present study was carried out during the months of June 2021 to May 2022 to observe the prevalence of eggs and larvae of gastrointestinal parasites in the nails of the vendors and rickshaw pullers within Dhaka city. Out of 200 individuals examined, 64% were with the helminth parasites in their fingernails. The prevalence of helminth parasite in the left hand of rickshaw pullers (75.45%) was higher, as they belong to an underprivileged community and their sanitary condition was poor and they were not aware of their personal hygiene. The vendors who lived in the house had a comparatively low rate of infection (46.95%) but those who lived in the street area had a higher rate of infection (87.05%). The vendors who used to wash their hands before taking meals and after defecation with soap and water had lower prevalence of infection (18.60%) and those who regularly cut their nails had the lowest rate of infection (15.78%). In nail samples of vendors and rickshaw pullers, the prevalence of *Ascaris lumbricoides* was 64%, *Ancylostoma* was 55%, *Trichuris trichiura* was 36.50%, *Strongyloides stercoralis* was 32.50%. The prevalence of helminth parasites was higher in the rainy season (75.71%) and lower in the summer season (50%).

**Keywords:** Parasitic Infestation; Seasons; Underprivileged People and Poor Sanitation

## Introduction

Parasites present a recurrent and undesirable threat to the well-being of millions of people in the tropics and subtropics and to domesticated animals in all parts of the world. The cost of parasites in terms of human misery and economic loss is unbearable. The poorest people in the world suffer from this greatest burden of infection beyond doubt [1]. Parasitic infection is a neglected tropical disease (Hotez, et al. [2]) and a leading public health concern of common endemicity in Bangladesh. About 24% of the total population of the world is infested with soil-transmitted helminth infections [3] and *Ascaris lumbricoides*, hookworm, and *Trichuris trichiura* are the most dominant parasites [4]. A large part of the population of Dhaka city living in the slum area suffers from various diseases and malnutrition [5]. The vendors and the rickshaw pullers are the most vulnerable and helpless among all the members of the slum community and 7

among 20 vendors usually die before they reach the age of 5 years [6]. Many factors like poor hygiene habits, low standard of living, lack of health education, ignorance, poverty, poor socioeconomic conditions and general insanity of the major of the population facilitate this state (Khanum, et al. [7]). These aspects are associated with scarcity and underdevelopment, and in that sense, intestinal parasitism can be considered 'disease of poverty' [8].

Parasitism not only affects physical health but also affects mental health. *Ascaris lumbricoides* and *Trichuris trichiura* were recorded to cause growth retardation, anemia in children, and lowliness in the intelligence of males [9]. Parasites may cause chronic blood loss, with long-term effects on the physical and intellectual growth of children which may result in malnutrition, anemia and successive deficiency in both mental and physical growth [10]. A study was conducted on school children in Nepal where 44.0% prevalence was measured, and hookworm was the most dominant intestinal helminth (13.0%)

(Yong, et al. [11]). Another research on the adult patient revealed 20.4% infection were *Ascaris lumbricoides* (10.7%) and *Trichuris trichiuria* (6.7%) were the predominant helminth infections, followed by hookworm [12]. There is scanty data found on intestinal parasitic infections among adult age groups, while most studies done in several countries focused on parasitic infections among children [13]. Therefore, the present study was undertaken to investigate the prevalence of parasitic infestation, the socioeconomic condition and personal hygiene practices of the rickshaw pullers, vendors and day laborers who work on streets of different areas of Bangladesh and to correlate the relevant parameters in order to find out the real causes of parasitic infection among them.

## Materials and Methods

The study was conducted among the vendors, rickshaw pullers and day laborers of different areas of Dhaka city. The period of study was from June 2021 to May 2022. Two hundred fingernail samples were tested in the Parasitology Laboratory, Department of Zoology, University of Dhaka. The nails were moistened into a clean sterile container containing normal saline. Fingernail clippings were collected from both hands using sterile nail clippers and placed in labeled containers containing 70% alcohol. Samples were subjected to complete direct microscopic examination within 1 to 2 hours of collection. Then the samples were re-examined by applying the formol-ether concentration method. The larvae, eggs and cysts were

detected under the microscope (10x and 40x) and identified by [14-16]. Other data like the type of toilet, type of professions, hand washing habits, and sanitation knowledge were obtained with the aid of a structured questionnaire.

## Result and Discussion

The present investigation was a cross-sectional type of study conducted by questioning the male vender and rickshaw pullers to determine their responsiveness to nail-cutting behavior regarding helminth infections in the male and their knowledge about helminthiasis. A total of 200 people comprising 110 rickshaw pullers, 50-day labor, and 40 vendors were enlisted for this study. Out of 200 nail samples, 128 samples were found positive. The overall prevalence of intestinal parasites among the overall population studied was 64%. The parasites detected from the fingernails of vendors and rickshaw pullers were *Ascaris lumbricoides*, *Ancylostoma duodenale*, *Trichuris trichiuria*, and *Strongyloides stercoralis* with prevalence rates of 64%, 55%, 36.50% and 32.50% respectively (Table 1). *Ascaris lumbricoides* showed the highest prevalence and *Strongyloides stercoralis* showed the lowest prevalence. This is comparable to a prevalence of 98.7% and 83.9% found in other studies conducted in Abeokuta, Nigeria [17]. It is however in contrast to a prevalence of 29.1% (Andargie, et al. [18]) and 41.1% [19,20] reported that the overall parasitic infestation was 78.7%, 86.9% and 84.0% for *A. lumbricoides*, *N. americanus* and *T. trichiura* respectively which was very much co-related to our study.

**Table 1:** Prevalence of helminth parasite in nail cut sample.

Name of parasite	Total sample examined	No. of positive cases	Prevalence of the
<i>Ascaris lumbricoides</i>	200	128	64%
<i>Ancylostoma duodenale</i>		110	55%
<i>Trichuris trichiura</i>		73	36.50%
<i>Strongyloides stercoralis</i>		65	32.50%

In the present study 200 samples collected from the street area in Dhaka city were divided into three categories. Out of 110 rickshaw pullers, helminth infection in the left hand was 75.45% where the right-hand infection was found 54.54% and a lower infestation rate was observed among the vendors (in left hand 30% and in right hand 17.5%). In the case of day labor, helminth infection in the left hand was 66% and in the right hand, infection was 40% (Table 2). [21] conducted a similar study on children where they measured nematode infection in the left hand 75.75% and in the right hand 54% in rickshaw pullers which supports the present investigation. In this investigation, the respondents were found to lack appropriate hand-washing habits after defecation, more helminths were detected in the

left hand. The inadequate hygiene practice might have been baffled by the fact that most rickshaw pullers, vendors, or day laborers were those from the lower socioeconomic class with a low level of education. In addition, none of the respondents of this study at the amenities had been appropriately skilled in good hygiene practices. In this study, the occurrence of gastrointestinal helminth with regard to the occupation of respondents was investigated. No relationship between occupation and the presence of helminth eggs and larvae in nails was found. Out of 200 samples, 83 (75.45%) rickshaw puller was infected, 33 (66%) day laborers and 12 (30%) vendors were infected by any of the helminth parasites (Table 3).

**Table 2:** Occurrence of helminth parasites in the left and right hands of the respondents.

Occupation	Left Hand			Right Hand		
	Sample examined	No. of positive cases	% of positive cases	Sample examined	No. of positive cases	% of positive cases
Rickshaw puller	110	83	75.45	110	60	54.54
labor	50	33	66	50	20	40
Vender	40	12	30	40	7	17.5
Total	200	128	64	200	87	43.50

**Table 3:** Distribution of helminth parasite according to the occupation of the respondents.

Occupation	No. of samples examined	No. of infected cases	% of infected cases
Rickshaw puller	110	83	75.45
Day labor	50	33	66
Vender	40	12	30

The present investigation clearly directs the relationship between living patterns and the presence of parasites in nails. The vendors who live in a temporary house had a low rate of infection (46.95%) than those who live in the street area (87.05%). (Table 4) As hand-to-mouth transmission is a potential route of transmission for most intestinal parasites the prevalence of infection among the respondents depends on the habits of washing their hands after defecation. The present study marked that the people who wash their hands with

only water after defecation has the highest infection (80.55%) than those who used to wash their hands with soil and water (72.30%). Who wash their hand with soap and water (18.60%) that reveals that by maintaining proper hygiene they could prevent parasitic infections (Table 5). [22] found a 62.08% prevalence of helminth parasites who wash their hand with soap and 80% who wash their hand without soap which partially agreed with the present study.

**Table 4:** Occurrence of helminth parasites according to types of living places.

Living place	Total cases examined	Total positive cases	% of positive cases
Temporary shed of slum on street	115	54	46.95
On-street	85	74	87.05

**Table 5:** Infection of helminth parasites according to the habits of washing their hands after defecation.

Hand washing habit	Total cases examined	Total positive cases	% of positive cases
Soap with water	43	8	18.60
Soil with water	85	62	72.30
Only water	72	58	80.55

The fairly high prevalence rate of intestinal parasites marked in this study is a reflection of poor personal hygiene practices and sanitation. The vendors and the rickshaw puller may carry the eggs of helminths directly with their hands after defecation by ignorance, illiteracy, lack of awareness and absence of mind. Not only this but also when they wash their hand with dirty water (which was contaminated with the parasite) the eggs and larvae of the parasite might be stored inside their nails. This study detected that the parasites were markedly lower (15.78%) among persons with trimmed fingers than the rate (83.21%) with untrimmed fingers. (Table 6) People who take unwashed or exposed food have the risk of higher infections. Due to the lack of opportunity of having food at home, the subjected

persons usually take unwashed or exposed food. The present study indicates a higher prevalence of infection as many of the vendors, rickshaw pullers and day labors take exposed or unwashed foods. In the present investigation, in the rainy season, the prevalence rate of the parasite was higher (75.71%) and in summer the prevalence of the parasite was less (Table 7 & Table 8), because of the temperature, soil moisture, and environmental condition. As the prevalence rates of fingernail parasites in this study were considerably higher, the rates of the infections are of public health consequence. However, it is a global public health issue in poor and underprivileged areas having a close association with the ecological condition and knowledge of hygiene and sanitation [23].

**Table 6:** Infestation of helminth parasite in relation to nail-cutting habits of respondents.

Nail cutting habits	Total no. sample examined	Total no of infected cases	% of infected cases
Irregular	143	119	83.21
Regular	57	9	15.78

**Table 7:** Distribution of helminth parasite infection in relation to different habits.

Habits	Total cases examine	Total positive cases	% of positive cases
Nail biting	75	60	80
Taking exposed food	30	9	30
Taking unwashed food/fruits	95	59	62.10

**Table 8:** Seasonal variation of the prevalence of the parasite in nail cut sample.

Season	No. of samples examined	Positive cases	Percentage of infestation
Rainy season	70	53	75.71%
Winter season	70	45	64.28%
Summer season	60	30	50 %

Poverty is an important factor associated with intestinal parasitic infection and the government should boost poverty reduction programs. Proper personal hygiene, defecation, feeding habits, and health promotion campaigns can control the transmission of these parasites (Alo, et al. [24]). Moreover, the activities related to an increased risk of infection comprise the habits of not washing hands before eating, not washing fruits and vegetables before eating, consumption of uncovered food and not trimming fingernails.

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