Diyala Journal of Medicine

ORIGINAL RESEARCH
Published: 25 June 2025
DOI: 10.26505/djm.v28i2.1165

Investigation of *Ascaris lumbricoides* Egg Morphology and Transmission Dynamics in the Iraqi Population

Mohammed Jasim Shakir [1]

[1] Department of Microbiology, College of Medicine, University of Diyala, Diyala, Iraq.

Abstract

Background: *Ascaris lumbricoides* remains a significant public health concern, especially in settings with poor sanitation. Prevalence, transmission dynamics, and knowledge at the population level can inform the implementation of enhanced control. This study establishes the infection rate of *A. lumbricoides* in the Iraqi population, investigates factors associated with sociodemographics contributing to infection, and explores diversity in egg morphology

Patients and Methods: A total of 110 participants were involved in this cross-sectional study. Stool samples collected from each participant were examined microscopically for the presence of *A. lumbricoides* eggs. The sociodemographic data collected include age, gender, residence, educational status, occupation, hand-washing habits, and household size, as determined through structured questionnaires. Associations of these variables with infection rates were analyzed using various statistical tools. Egg morphology- decorticated and mamillated eggs- was investigated.

Results: The overall prevalence of *A. lumbricoides* was 14.64%, with a higher rate amongst rural residents, 9.09%, compared to urban people, 4.54% ($p=0.0067$). The infection rates were also strongly inversely related to education level; the highest rate was among those with no education, 7.27% ($p<0.00001$). A low infection rate was significantly associated with washing hands before meals ($p<0.00001$). The morphology varied, with the fertilized eggs showing both mamillated and decorticated morphology, while the eggs from the unfertilized females were larger, with disorganized contents internally.

Conclusion: This study reflects that high infection burdens with *A. lumbricoides* are significantly associated with sociodemographic variables, particularly education, hygiene practices, and rural residency. The diversity observed for egg morphology underlines further complications in the parasite's transmission and adaptation to environments. Sanitation improvement and extension programs may reduce the burden of infections caused by *A. lumbricoides* in Iraq.

Keywords: *Ascaris lumbricoides*, Infection, Parasites, Education, *Ascaris eggs*.

OPEN ACCESS

Correspondence: Mohammed Jasim Shakir
Email: mohammed@uodliyala.edu.iq

Website: https://djm.uodiyala.edu.iq/index.php/djm

Received: 11 November 2024
Accepted: 14 March 2025
Published: 25 June 2025

Introduction

Intestinal nematodes, predominantly *Ascaris lumbricoides*, afflict one-third of the global population. Infection may result in pulmonary and severe gastrointestinal manifestations; nevertheless, the majority of patients are asymptomatic. Inadequate sanitation is the primary source of *Ascaris lumbricoides* infection, which can lead to malnutrition, deficiencies in vitamins and minerals, and cognitive and developmental impairments. Mass pharmaceutical treatment programs for Ascaris and other neglected tropical diseases have increased in prevalence (1). This parasite induces a detrimental

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infection in the human gastrointestinal tract, and research indicates that it can persist within the human body for one to two years. Extra-intestinal ascariasis (EIA) is a condition resulting from the aberrant migration of *Ascaris lumbricoides*, potentially affecting the hepato-biliary-pancreatic (HBP) system or other extra-gastrointestinal (EGI) organs (2).

Ascaris lumbricoides impacts children's health and growth. Farm kids who eat raw vegetables and wander barefoot are more likely to have ascariasis. No symptoms indicated ascariasis. Clean water, sanitation, and facilities can prevent ascariasis (3). This disease is more common in poorer nations like Brazil due to poor infrastructure and sanitation. These places lack public health care, which helps the parasite spread, especially among the economically underprivileged and insecure, especially children (4).

The transmission route involves the intake of faecal waste, usually resulting from insufficient personal hygiene and sanitation standards. Additional significant elements encompass elevated temperatures and increased humidity levels. Infection arises from the oral ingestion of eggs, potentially leading to respiratory and gastrointestinal complications. Infection is contracted via the consumption of eggs, commonly found in soil or food. The mature worms inhabit the lumen of the small intestine, where the female lays eggs that are excreted with the faeces. Throughout the incubation phase, the eggs progress through three distinct developmental stages before being exposed to the external environment. When consumed by a human host, the parasite's eggs incubate in the small intestine. After a short travel, the larvae return to the small intestine to mature and mate. (5).

Female worms generate approximately 200,000 eggs. Notably, *A. lumbricoides* eggs may be unfertilised, corticated, or decorticated. Unfertilised eggs are larger than fertile ones (~90 µm), possess a thinner shell, and exhibit varied mamillated layers, with or without protuberances (6).

Utilizing wastewater in agricultural contexts may promote the spread of parasite infections. The utilization of recycled wastewater in agricultural environments seems to contaminate the soil and crops with detrimental parasites, thus elevating the likelihood of health complications for individuals who come into contact with the procedure. Utilizing wastewater for irrigation poses possible health hazards, which can be mitigated by implementing multi-barrier protective measures (7).

The interaction between children who are infected with parasites and those who are more vulnerable, whether in a home or school setting, combined with their frequent activities involving handling soil and the habit of putting dirty hands in their mouths, are factors that significantly raise the risk of infection in children aged 1 to 12 years (4). Although adults typically do not exhibit symptoms of specific parasitic diseases, possibly due to alterations in hygiene practices or acquired immunity from childhood, children are still highly vulnerable to intestinal parasitic infections since they can be exposed to these pathogens from early infancy. Children who do not have established hygiene routines are the most vulnerable category and are at a considerably higher risk of infections. The conducive settings for the proliferation of parasitic infections are mostly attributed to the high level of interaction among children and the prevalent unsanitary surroundings, often stemming from insufficient training of personnel (8, 9).

The primary clinical manifestation identified in persons diagnosed with Ascaris lumbricoides was reported abdominal discomfort. Intestinal obstruction, intussusception, cholangiohepatitis, pancreatitis, and acute appendicitis are potential

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acute abdominal consequences resulting from a severe helminthic infection (10).

Commonly utilised anthelminthic agents for preventing parasite migration in ascariasis patients include 400 milligrams of albendazole administered once daily, 100 milligrams of mebendazole taken twice daily for three days, or 500 milligrams once daily, and 11 milligrams per kilogram of pyrantel pamoate given once daily, with a recommendation for pregnant women to take up to one gramme of this medication (11).

Patients and Methods

Study design: This is a cross-sectional study that includes 110 subjects from Thi-Qar Province, Iraq, including different age groups. The study was conducted in 3 months, starting from the first of December 2023 to the end of February 2024. This study aims to explore and evaluate the genetic diversity of *Ascaris lumbricoides in the* Iraqi population and also investigate the dynamics of transmission of this common parasite.

This is a two-pronged investigation. The first is a well-structured questionnaire that includes questions regarding demographics, sanitation facilities, the presence of waste sources and waste collection, different hygiene practices, and the previous infection or symptoms of *Ascaris lumbricoides*. The second approach is the practical part, in which stool samples were collected from all participants using a noninvasive method. The samples were transported to the lab in an ice pack for examination.

Inclusion criteria: Regarding the current study, the inclusion criteria include individuals from different age groups and educational backgrounds. Participants shouldn't have severe or chronic health conditions that may affect the results.

Exclusion criteria: On the other hand, individuals who live outside the selected city and who have taken antiparasitic medication in the last six months are excluded from taking part in this study. Pregnant women and individuals with severe health conditions are also excluded. The exclusion criteria also include unwillingness and inability to complete the study procedure.

Sample examination: Direct microscopic examination was performed to identify eggs of *Ascaris lumbricoides* to estimate the presence of the eggs using the Kato-Katz technique (12). The isolation of *Ascaris lumbricoides* eggs from the samples was conducted using the flotation method, which is characterized by a clearer view and accuracy. Direct microscopic examination was done for the eggs to make morphological analysis, including shape, size, and appearance under a microscope (16). Morphological analysis is important to assess genetic diversity.

Statistical analysis

All the data obtained from the questionnaire and samples were organized and statistically analyzed using the Social Package for Social Science (SPSS) version 25.0. Evaluation of genetic diversity and transmission dynamics in Iraqi population was conducted. Moreover, Descriptive statistics will summarize demographic data, educational level, occupation and hygiene practices. Also, the F-test is used to assess the correlation between morphological variations, epidemiological factors, and parasite prevalence.

Results

Prevalence of *Ascaris lumbricoides*: Figure 1 demonstrates that the prevalence of *Ascaris lumbricoides* is 14.64%, as 15 participants tested positive for the infection, and 95 (86.36%) were found to be negative for the infection.

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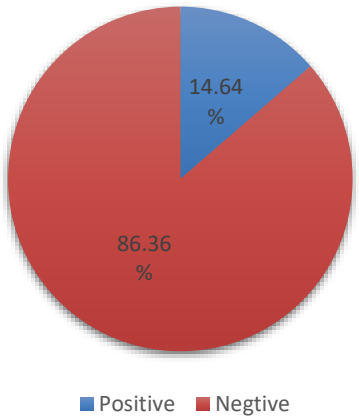

Figure 1. Prevalence of *Ascaris lumbricoides* among participate.

Sociodemographic distribution and its correlation with the prevalence of *Ascaris lumbricoides*: Table 1 provides significant insights by elucidating the correlation between sociodemographic characteristics and the prevalence of *Ascaris lumbricoides* infection. Firstly, the examination of the age groups reveals no statistically significant correlation with the prevalence of infection. This is supported by a p-value of 0.065177, somewhat higher than the conventional threshold of 0.05. Although the infection rate is most significant among those under 18 years (83%), it decreases considerably in older age groups. There are no reported cases in the 36-45 age group, and the prevalence is only 2.73% in those over 45.

Conversely, the geographic location of one's residence demonstrates a robust and statistically significant association with the occurrence of infections, as indicated by a p-value of 0.0066545. The statistics indicate that people living in rural areas have a far greater level of infection (9.09%) than those in urban areas (4.54%).

Regarding gender, the obtained p-value of 0.215548 indicates that there is no statistically significant relationship between gender and the prevalence of infection. While females exhibit a somewhat greater infection rate (9.09%) than males (4.54%), the numerical disparity is not statistically significant, suggesting that both genders are equally vulnerable to infection.

Table 1. Correlation of sociodemographic characteristics to Ascaris lumbricoides prevalence.

			prevalence				p. Value
			No		Yes		
			%	No.	%	No.	
Age	15.45%	17	c	6	23	Less than 18	0.065177
	50.91%	56	5.45%	6	62	18-35	
	11.82%	13	0%	0	13	36-45	
	8.18%	9	2.73%	3	12	More than 45	
Residence	30.91%	34	9.09%	10	39	Rural	0.0066545
	60%	66	4.54%	5	71	Urban	
Gender	43.64%	48	4.54%	5	53	Male	0.215548
	42.73%	47	9.09%	10	57	Female	
Significant difference between two independent variables at 0.05 level.							

Educational level and occupation among participants and their correlation to prevalence: The analysis of educational attainment and employment status, and their association with the occurrence of *Ascaris lumbricoides* infection, uncovers significant trends as shown in Table 2. The p-value of <0.00001 indicates a strong and statistically significant correlation between

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educational level and infection prevalence. The infection rate is highest among participants who lack formal education, with 7.27% of persons being infected. This incidence exhibits a progressive decline with higher levels of education. Within the population with primary education, the infection rate decreases to 0.91%, whereas those with secondary education exhibit a somewhat elevated rate of 5.45%. Significantly, individuals who have completed a university education or higher have not reported any instances of infection (0%).

When analyzing occupation, the p-value of 0.986607 suggests that there is no statistically significant relationship between occupation and the prevalence of infection. The prevalence rates of infection among students, employed persons, and the unemployed are reported to be 4.54%, 5.45%, and 3.64%, respectively.

Table 2. Educational level and occupation among participants and correlation to prevalence.

			prevalence				p. Value
			No		Yes		
			No.	%	No.	%	
Educational level	No formal education	14	8	7.27%	6	5.45%	<0.00001
	Primary education	20	1	0.91%	19	17.27%	
	Secondary education	28	6	5.45%	22	20%	
	University or higher	486	0	0%	48	43.64%	
occupation	Student	35	5	4.54%	30	27.27%	0.986607
	employed	46	6	5.45%	40	36.36%	
	unemployed	29	4	3.64%	25	22.73%	
Significant difference between two independent variables at 0.05 level.							

Habits of washing hands, the number of people in the house, and sanitation are correlated with the prevalence of *Ascaris lumbricoides*: A statistically significant correlation is found between handwashing practices and infection rates, with a p-value of less than 0.00001 for both handwashing after using the toilet and handwashing before and after meals. Individuals who regularly followed hand hygiene practices after using the toilet did not have any documented infections, whereas those who only occasionally or seldom washed their hands had higher infection rates of 2.73% and 9.09%, respectively. In a similar vein, individuals who consistently engage in handwashing before and after meals also did not experience any infections. Conversely, those who adhered to this
practice only occasionally or seldom had infection rates of 3.64% and 6.36%. Regarding sanitation, the statistics indicate a little rise in the occurrence of infections among individuals who use outdoor toilets as opposed to indoor toilets. However, this finding lacks statistical significance, as evidenced by a p-value of 0.508644. The statistical analysis reveals a significant correlation between household size and infection prevalence, as indicated by a p-value of 0.002157. Higher infection rates were observed in larger households, especially those with more than six members, at 11.82%, compared to smaller households, where infection rates were significantly lower or absent, as shown in Table 3.

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Table 3. Correlation between hand washing habits, sanitation and number of people living in home and prevalence of Ascaris lumbricoides.

			prevalence				p. Value
			Yes		No		
			No.	%	No.	%	
Washing hands after the toilet	Always	67	0	0%	67	60.91%	<0.00001
	Sometimes	28	3	2.73%	25	22.73%	
	Rarely	13	10	9.09%	3	2.73%	
	Never	2	2	1.82%	0	0%	
Washing hands before and after meals	Always	67	0	0%	47	42.73%	<0.00001
	Sometimes	29	4	3.64%	2	1.82%	
	Rarely	10	7	6.36%	3	2.73%	
	Never	4	4	3.64%	0	0%	
sanitation	Indoor toilet	84	13	11.82%	71	64.55%	0.508644
	Outdoor toilet	26	2	1.82%	24	21.82%	
	No toilet	2	0	0%	2	1.82%	
Number of people living in house	1-3	18	0	0%	18	16.36%	0.002157
	4-6	44	2	1.82%	42	38.18%	
	More than 6	51	13	11.82%	38	34.55%	
Significant difference between two independent variables at 0.05 level.							

Source of drinking water, regular waste collection and presence of source of contamination and correlation with *Ascaris lumbercoides* prevalence: The statistical analysis reveals a significant correlation between the source of drinking water and the prevalence of infection, as indicated by a p-value of 0.0196869 as elucidated in Table 4. The infection rate was highest (9.09%) among those who depend on tap water, but significantly lower infection rates of 2.73% and 1.82% were observed among those who use well water and bottled water, respectively. There is a significant association between regular waste collection and infection prevalence, as shown by a p-value of <0.00001. Among regions that implement routine waste collection, the infection rate is notably low at 0.91%, compared to a significantly higher rate of 12.73% in regions lacking regular waste collection. Furthermore, the existence of a contamination source, such as adjacent sewage or stagnant water, is strongly linked to a greater occurrence of infection, as indicated by a p-value of 0.00182. Within regions where a source of pollution exists, the prevalence of infection is 9.09%, compared to 4.54% in regions without such contamination.

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Table 4. Source of drinking water, regular waste collection, and sources of contamination percentages, and correlation to Ascaris lumbricoides prevalence.

			prevalence				p. Value
			No		Yes		
			No.	%	No.	%	
Drinking water source	Tap water	50	10	9.09%	40	36.36%	0.0196869
	Bottled water	29	2	1.82%	27	24.55%	
	Well water	31	3	2.73%	28	25.45%	
Regular waste collection	Yes	76	1	0.91%	75	68.18%	<0.00001
	No	34	14	12.73%	20	18.18%	
Presence of source of contamination	Yes	35	10	9.09%	25	22.73%	0.00182
	No	75	5	4.54%	70	63.64%	
Significant difference between two independent variables at 0.05 level.							

History and symptoms associated with *Ascaris lumbricoides* infection: The analysis of the data investigating the association between familial infection history, prior parasite treatment, symptomatology, and *Ascaris lumbricoides* infection uncovers several significant connections as shown in Table 5.

A p-value of 0.00021 indicates a robust correlation between a family history of prior infections and the prevalence of Ascaris lumbricoides. Within the group of participants who had a familial background of infection, 9 individuals (8.18%) were indeed infected, but 16 individuals (14.55%) were not. Conversely, the infection rate among individuals without a familial background was comparatively lower, at 5.45%. These findings suggest that a familial background of parasitic infection may be a predisposing factor, possibly resulting from common environmental circumstances or individual genetic vulnerability.

The analysis of prior medication usage for parasites does not exhibit a statistically significant association with infection, as indicated by a p-value of 0.258298. Although there is a greater infection rate (10.91%) among individuals who had previously used medication for parasites, this correlation is not sufficiently robust to establish a definitive protective or risk factor. This implies that re-infection may still occur even after previous treatments, or that access to treatment does not entirely prevent future infections.

Symptoms exhibit a strong and statistically significant association with the prevalence of infection, as indicated by a p-value of <0.00001. The infection rate among asymptomatic individuals was remarkably low at 0.91%, whereas those who reported symptoms, such as fatigue (2.73%), diarrhea (3.64%), and abdominal pain (6.36%), had relatively higher rates of infection.

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Table 5. Source of drinking water, regular waste collection, and sources of contamination percentages, and correlation to Ascaris lumbricoides prevalence.

			prevalence				p. Value
			No		Yes		
			No.	%	No.	%	
Previous infection in family	Yes	25	9	8.18%	16	14.55%	0.00021
	No	85	6	5.45%	79	71.82%	
Previous medication of parasites	Yes	74	12	10.91%	62	56.36%	0.258298
	No	36	3	2.73%	33	30%	
symptoms	No symptoms	69	1	0.91%	68	61.82%	<0.00001
	Fatigue	14	3	2.73%	11	10%	
	Diarrhea	7	4	3.64%	3	2.73%	
	Abdominal pain	20	7	6.36%	13	11.82%	
Significant difference between two independent variables at 0.05 level.							

Diversity of egg morphology of *Ascaris lumbricoides* among participants: Figure 2, A and B show a fertilized *Ascaris lumbricoides* egg without the outer mammillated coat. The egg is smooth, with a round to oval shape. The loss of the outer layer may be an environmental phenomenon or may have occurred during handling. The lack of a mammillated coat does not preclude the presence of a thick chitinous layer, and the embryo remains well-preserved. The size ranged from 45-60 mm for Figure 2A, where in Figure 2B, it is larger, approximately 50-70 mm long. Where Figure 2C shows the typical fertilized *Ascaris lumbricoides* egg, which is oval to round, and about 60-70 micrometers long. The outer protein layer of the egg is well-defined and mammillated, which is characteristic of freshly excreted eggs. The shell, comprising an outer protein layer, a chitinous middle layer, and an innermost lipid layer, provides resilience in various environmental conditions.

Figure 2D represents an unfertilized egg that has lost the outer mammillated layer, leaving it smooth and much thinner. The internal contents of the egg are disorganized, with granular material filling the egg. This would be consistent with an unfertilized egg. This egg is larger than the usual fertilized eggs due to a lack of embryonic development, and it has a thinner, less developed shell. The size range observed is 60-80 mm long. All the eggs showed viability in size, fertilization, and being mamillated or decorticated. Sixty percent of the eggs were decorticated, while forty percent were milled.

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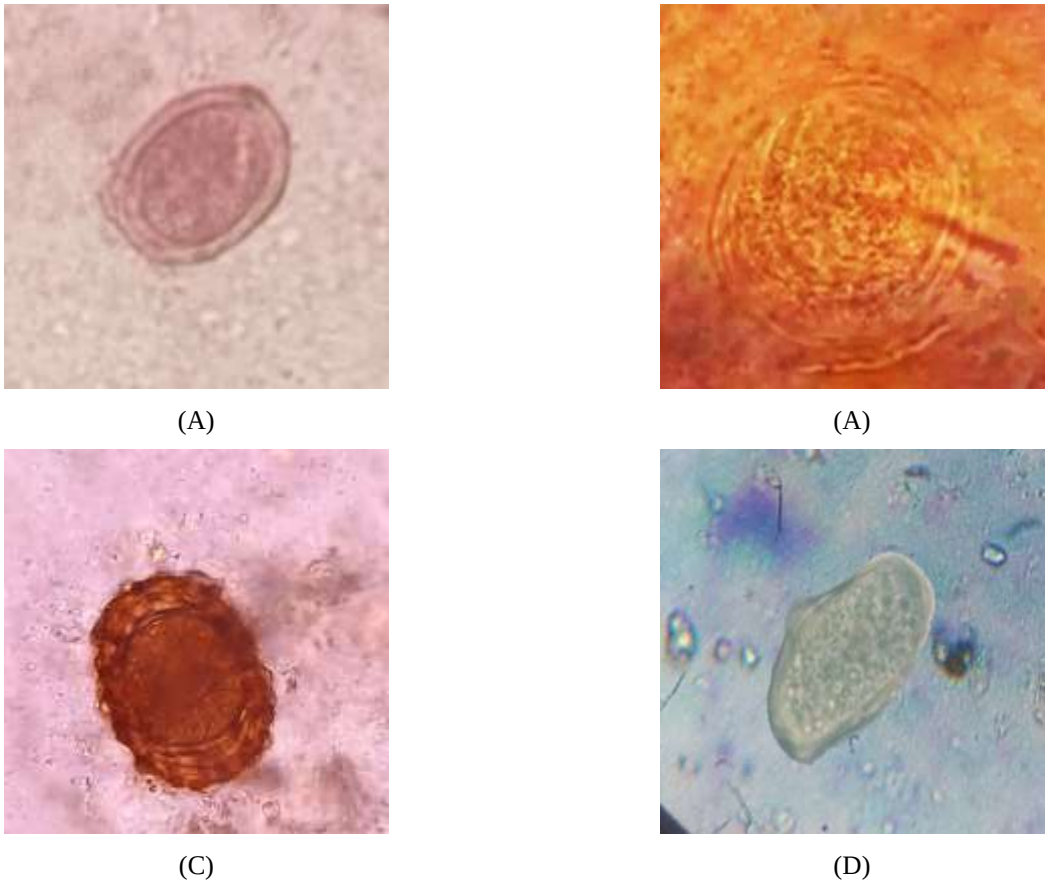
DOI: 10.26505/djm.v28i2.1165



(A) (A)

(C) (D)

Figure 2. The eggs of Ascaris lumbricoides from participants, fertilized decorticated (A), fertilized decorticated (B), fertilized mamillated (C), and unfertilized decorticated (D).

Discussion

The present study indicated the prevalence of *Ascaris lumbricoides* at 14.64%. A study at Al-Mustaqbal University College in Iraq showed a marginally higher prevalence of 18.48% (13). A global meta-analysis determined the overall prevalence of A. lumbricoides to be 11.01%, exhibiting considerable regional disparities.

The current study deviates from this trend, indicating the highest prevalence among individuals aged 18-35. This contrasts with findings from Venezuela, where *A. Lumbricoides infections were markedly lower in all age groups above 16 than in* children under 5 years old (14). The disparity in prevalence among age groups may be attributed to variations in public health strategies, especially mass drug administration (MDA) programs.

This study indicates that the prevalence is greater in females than males, although no significant correlation was identified (15). A survey in District Karak, Pakistan, confirmed infection prevalence was higher in females than males, with rates of 53% for females and 45% for males (16). While in Venezuela, the prevalence was markedly lower in females than males (14). Conversely, the results from the United States and earlier studies indicated no notable gender-based disparities (17). The disparities in gender-related prevalence may be affected by regional behavioral factors, occupational exposure, or cultural practices that differentially impact sanitation and hygiene for males and females.

The results of the present study indicate a significantly higher prevalence of *A. lumbricoides* infection in rural regions compared to urban areas. (14). A recent study found that 69% of the infected

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individuals resided in rural areas, whereas only 31% were from urban regions (16). The increased incidence in rural areas is likely attributable to various factors, particularly the use of night soil (human excrement) as fertilizer, a prevalent practice among farmers in certain regions (18). The current study revealed that the highest prevalence of A. lumbricoides infection occurred among participants lacking formal education. These results align with a study conducted in Honduran communities, which demonstrated a significant correlation between education and *A. lumbricoides* infection (p = 0.01) (19).

Conversely, occupation did not exhibit a significant correlation with prevalence in the present study. This does not correspond with prior research indicating a substantial correlation between *A. lumbericoides* infection and occupation, especially among individuals engaged in agricultural labor (20). A robust correlation has been documented between the prevalence of *A. lumbricoides* and occupation in previous studies, with food handlers and farmers exhibiting the highest infection rates (21). The notable correlation between *A. lumbricoides* prevalence and occupation observed in this study may be ascribed to the substantial population of rural workers engaged in agriculture, thereby heightening their exposure to contaminated soil and inadequate sanitation practices. The present study revealed a significant correlation between handwashing practices and household size with Ascaris lumbricoides infection, while sanitation showed no correlation. Previous studies, including in Sri Lanka, have noted a greater prevalence among children who failed to wash their hands before meals (41.5%) or following defecation (52.6%) (22). An additional study in Indonesia identified substantial correlations between handwashing before eating (p = 0.004), post-eating (p = 0.027), and following defecation (p = 0.04) and intestinal parasitic infections (23).

The present study revealed a significant correlation between household size and the risk of Ascaris lumbricoides infection. These results align with prior research. In Brazil, residents of densely populated households were more susceptible to severe Ascaris infection than those living in less crowded environments (24). A recent study in Ethiopia found that children from households with two or more children under five years of age had a higher likelihood of infection compared to those from households with fewer children (25). A positive correlation was identified in Nigeria between the *Ascaris lumbricoides* parasite load and family size (26), drinking water source, waste disposal practices, and proximity to pollution sources, which were significantly associated with Ascaris prevalence in the present study.

In Iraq, the incidence of ascariasis was demonstrated to rise with unsafe drinking water, and contamination sources near residential areas were identified as significant factors in the proliferation of *Ascaris lumbricoides* infections in Iraq (27, 28). The findings emphasize the importance of environmental hygiene in transmitting *Ascaris lumbricoides* and other parasitic infections. Efficient sanitation and access to clean water are crucial in mitigating the risk of infections in impacted areas. This study emphasizes the influence of familial *Ascaris lumbricoides* infections, indicating that individuals with a family history of *Ascaris* exhibit increased susceptibility to the infection. This corresponds with earlier research, which identified the familial history of *Ascaris* as a risk factor for infection prevalence (29). Abdominal pain, diarrhea, and fatigue were the most frequently reported symptoms in infected participants (30, 31). Regarding egg morphology, 40% of the eggs in this study exhibited mammillation, whereas 60% were decorticated. The findings align with another study, which reported that 56.3% of eggs exhibited mammillation (16).

The variation may be attributed to environmental

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exposure of eggs, genetic differences among *A. lumbricoides* populations, and varying egg size, which may indicate genetic diversity in parasite development. The lack of embryonic development or reduced shell thickness may result in larger eggs. Decorticated and mamillated eggs exhibit prolonged viability, demonstrating the parasite's adaptability. Morphological variations may be associated with genetic factors influencing parasite transmission and survival across diverse environments (32, 33). This capacity enables the parasite to survive and continue the parasite life cycle.

Conclusions

The present study has consequently highlighted the prevalence, sociodemographic distribution, and some key environmental factors associated with the infection of *Ascaris lumbricoides* among the population in Iraq. The parasitic infection rate in this study suggests that this infectious disease is still a public health problem. Sociodemographic variables such as rural residence, lack of formal education, and poor hygiene practices, particularly handwashing, are significantly associated with infection rates. Analysis also underlines the main determinants of transmission: household size, source of drinking water, and waste collection. Besides, there is genetic variability in egg morphology in decorticated and mamillated varieties. This paper highlights that sanitation, education, and the delivery of public health initiatives are crucial in reducing the transmission of infections. It was recommended that further studies are needed to understand the morphology of eggs transmitted from humans to distinguish the ways of transmission and the environmental factors involved in the exposure to the parasite.

Source of funding: No source of funding.
Ethical clearance: Ethical approval to perform the research acquired from the Scientific and Ethical Committees / College of Medicine / University of Diyala (No:2024MJS886).

Conflict of interest: None.

Acknowledgments: I extend my sincere thanks and gratitude to everyone who contributed or supported me during the research process, whether through moral support or scientific advice. I especially thank the staff at the Thi-Qar Public Health Laboratory for their technical and technological support and dedicated efforts that contributed to the completion of this research.

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Diyala Journal of Medicine

ORIGINAL RESEARCH
Published: 25 June 2025
DOI: 10.26505/djm.v28i2.1165

دراسة مورفولوجيا بيض دودة الاسكارس اللومينية وديناميكيات انتقالها في السكان العراقيين

[1] محمد جاسم شاكر

الملخص

الخلفية: دودة ***Ascaris lumbercoides*** تشكل مصدر قلق كبير للصحة العامة، وخاصة في البيئات ذات الصرف الصحي السيئ. وفي هذا المجال، يمكن أن تشكل معدلات الانتشار وديناميكيات الانتقال والمعروفة على مستوى السكان أساسًا لتطبيق تدابير للمكافحة المعززة.

الأهداف: تهدف هذه الدراسة إلى تحديد معدل الإصابة بدودة ***Ascaris lumbercoides***بين سكان العراق، ودراسة العوامل المرتبطة بالظروف الاجتماعية التي تساهم في الإصابة، واستكشاف التنوع في اشكال البيض.

المرضى والطرق: شارك في هذه الدراسة ما مجموعه ١١٠ مشاركًا. تم أخذ عينات البراز التي تم جمعها من كل مشارك للفحص المجهري بحثًا عن بيض دودة ***Ascaris lumbercoides***. تشمل البيانات الاجتماعية التي تم جمعها العمر والجنس والإقامة والحالة التعليمية والمهنة وعادات غسل اليدين وحجم الأسرة من خلال استبيانات منظمة. تم تحليل ارتباطات هذه المتغيرات بمعدلات الإصابة باستخدام تحاليل إحصائية مختلفة. تم دراسة في اشكال البيض - البيض المقشر والمخصب.

النتائج: كان معدل انتشار A. lumbricoides الإجمالي ١٤,٦٤٪، مع معدل أعلى بين سكان الريف، ٩,٠٩٪، مقارنة بسكان المدينة، ٤,٥٤٪ (ص = ٠,٠٠٦٧). كانت معدلات الإصابة مرتبطة عكسيا بمستوى التعليم؛ كان أعلى معدل بين أولئك الذين ليس لديهم تعليم، ٧,٢٧٪ ($p<0.00001$). وجد أن معدل الإصابة المنخفض مرتبط بشكل كبير بغسل اليدين قبل الوجبات ($p<0.00001$). اختلفت الاشكال، حيث أظهرت البيض المخصبة اشكالا مخاطية ومقشرة، في حين كانت بيض الإناث غير المخصبة أكبر، مع محتويات غير منظمة داخليًا.

الاستنتاج: تعكس هذه الدراسة أن الأعباء العالية للإصابة بـ A. lumbricoides مرتبطة بشكل كبير بالمتغيرات الاجتماعية والديموغرافية، وخاصة التعليم وممارسات النظافة والإقامة الريفية. إن التنوع الملحوظ في اشكال البيض يؤكد على المزيد من التعقيدات في انتقال الطفيليات وتكيفها مع البيئات. إن برامج تحسين الصرف الصحي والإرشاد قد تقلل من عبء العدوى التي تسببها ***Ascaris lumbercoides***في العراق.

الكلمات المفتاحية: ***Ascaris lumbricoids***، العدوى، الطفيليات، التعليم، بيض الاسكارس.

المؤلف المراسل: محمد جاسم شاكر

الايميل: mohammed@uodliyala.edu.iq

تاريخ الاستلام: ١١ تشرين الثاني ٢٠٢٤

تاريخ القبول: ١٤ اذار ٢٠٢٥

تاريخ النشر: ٢٥ حزيران ٢٠٢٥

[1] فرع الاحياء المجهرية - كلية الطب – جامعة ديالى – ديالى - العراق.