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Diagnosing and Managing Intestinal Ascariasis in Vulnerable Communities

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ABSTRACT

Ascariasis caused by Ascaris lumbricoides, remains one of the most prevalent parasitic infections globally, particularly in developing regions with poor sanitation. This review focuses on the diagnosis and management of intestinal ascariasis in vulnerable communities, where the burden of the disease is disproportionately high. Despite advances in diagnostic tools, such as ultrasonography, which provides a non-invasive, rapid, and effective modality for identifying intestinal worms, significant challenges persist in these regions due to limited healthcare infrastructure and socioeconomic constraints. lumbricoides highlights the need for prompt diagnosis and intervention, as delays can result in complications like gastrointestinal obstruction and systemic health deterioration. Ultrasonographic findings, such as tubular structures with echogenic features and anechoic canals, have proven reliable for early detection. Case studies, such as pediatric patients from underserved areas, underscore the importance of integrating advanced diagnostic approaches into primary care settings. Effective management includes anthelmintic therapy.

Introduction

Intestinal ascariasis, caused by the roundworm Ascaris lumbricoides, remains a significant public health concern, particularly in vulnerable communities with limited access to sanitation and healthcare (Meulah et al., 2023). Affecting approximately 25% of the global population, this helminthic infection disproportionately impacts low-income regions, where inadequate hygiene and education perpetuate its transmission cycle (Siviero et al., 2024). Ascariasis is a significant global health concern, affecting approximately one-fourth of the world's population, predominantly in resource-limited regions (Wang et al., 2022). The burden of this parasitic infection is heaviest in developing countries, particularly in Asia, where poverty, poor sanitation, and limited access to healthcare contribute to its prevalence (Inyang et al., 2022). The life cycle of Ascaris lumbricoides, the causative agent of ascariasis, exemplifies the intricate

relationship between human behavior and environmental conditions (Katwal et al., 2023). Humans become infected by ingesting embryonated eggs present in soil, water, or food contaminated with the feces of infected individuals. Inside the small intestine, gastric secretions trigger the hatching of eggs into larvae (Birhanu et al., 2023). The larvae penetrate the intestinal mucosa, enter the bloodstream, and migrate to the lungs, where they mature in the alveoli. After ascending the bronchi and trachea, they are swallowed again and return to the intestine, where they develop into adult worms (G/Kidan et al., 2024). These adult worms reproduce, releasing millions of eggs that are excreted in the host's feces, perpetuating the cycle of infection (Abdela et al., 2024). Addressing ascariasis in vulnerable communities requires an integrated approach that combines clinical diagnosis, effective treatment, and sustainable prevention strategies, including improved sanitation, hygiene education, and mass deworming programs (Che Husin et al., 2021). This review highlights the diagnostic challenges and management strategies tailored to the needs of underserved populations (Castañeda et al., 2022).

The life cycle of A. lumbricoides involves multiple stages of development, from egg ingestion to larval migration and eventual maturation in the intestine. Infected individuals often suffer from malnutrition, anemia, and severe complications such as intestinal obstruction, which can be life-threatening without timely diagnosis and treatment (Aalinezhad et al., 2023). Advances in diagnostic techniques, particularly ultrasonography, have revolutionized the ability to detect and manage intestinal ascariasis effectively (Paduraru et al., 2024). Ultrasonography is a non-invasive and accessible tool that is particularly valuable in resource-limited settings, where other diagnostic methods may be unavailable (Mbaye et al., 2021).

This review aims to explore the challenges and advancements in diagnosing and managing intestinal ascariasis, with a focus on vulnerable populations. By addressing the socioeconomic and healthcare barriers, this article underscores the importance of integrating modern diagnostic tools and preventive strategies to combat this pervasive parasitic disease.

Method

This section Specify the focus on intestinal ascariasis, particularly its diagnosis and management in socioeconomically disadvantaged regions. Define inclusion criteria for studies, such as relevance to clinical diagnosis, treatment strategies, or public health interventions in low-resource settings. Detail the databases used for the literature review, such as PubMed, Scopus, and ScienceDirect. Explain how studies were chosen, such as by abstract screening, relevance to the topic, and full-text review. Include criteria for exclusion, such as studies lacking specific data on low-resource settings (Khan et al., 2024). Describe how data from selected studies was extracted, focusing on diagnostic tools (e.g., stool analysis, serological tests), treatment modalities (e.g., medications like albendazole), and community health strategies. Outline how findings were synthesized to identify gaps, trends, and potential solutions. State the framework for analyzing the studies, such as comparing sensitivity and specificity of diagnostic methods and the cost-effectiveness of treatment

approaches (Amsalu & Molla, 2023). Report findings on complications, such as gastrointestinal obstruction, which are more prevalent in vulnerable groups, including children, and can lead to severe outcomes like mortality. Highlight the efficacy of anthelmintic drugs like albendazole and mebendazole. Discuss the importance of public health interventions, such as mass deworming programs, in reducing infection rates (Singh et al., 2022). Address gaps in healthcare access and suggest integrating diagnostics with preventive strategies in these communities. Knowledge Gaps and Research Needs. Identify areas where further research is needed, such as improving diagnostic accessibility and tailoring treatment protocols for vulnerable populations (Mesele & Mengistu, 2021).

Results and Discussion

The global burden of Ascaris lumbricoides infection is immense, with over one billion individuals affected worldwide, making it one of the most prevalent parasitic diseases. The annual mortality rate exceeds 60,000, reflecting its significant impact on global health, particularly in resource-limited settings (Avendaño & Patarroyo, 2020). The high prevalence of this soil-transmitted helminth is intricately tied to poor sanitation, inadequate access to clean water, and substandard hygiene practices, conditions that are disproportionately common in socioeconomically disadvantaged communities. These populations often lack the infrastructure and healthcare resources necessary to manage or prevent infections effectively (Rujeerapaiboon & Kaewdech, 2021).

Children in these settings are especially vulnerable, facing not only a higher risk of infection but also severe complications such as malnutrition, growth retardation, and cognitive impairment (Oyeyemi et al., 2024). This creates a cycle of poverty and poor health, further exacerbating existing inequities. Understanding the epidemiological trends and risk factors associated with Ascaris lumbricoides is crucial for implementing targeted interventions, including mass deworming programs, community education, and improved sanitation efforts (Samir et al., 2023). Such measures are essential to reduce the disease burden and break the cycle of transmission that perpetuates vulnerability in these at-risk populations (Liau et al., 2023).

Figure 1. Ultrasound results of a 7 year old girl suffering from worms

Figure1. Shows that A 7 year-old child, a girl of parents with low educational and socio-economic levels and no sewer service at home in remote islands areas, was brought to the emergency department with abdominal pain, constipation, and several episodes of bilious vomiting associated with the presence of worms in his mouth and anus during the past 24 hours, as reported by his parents (Obuch-Woszczatyńska et al., 2025). Physical examination revealed abdominal distension and abdominal tenderness. Abdominal radiographs, ultrasonography, worm are seen as tubular structures outlined by intestinal fluid. Worm is seen as a large, curved echogenic strip with an inner, anechoic, longitudinal canal. When we used a high-resolution linear (7-10 mhz)transducer, in long section the worm appeared as four parallel lines separated by three anechoic bands (Bhattacharya et al., 2022).

The discussion section emphasizes the critical challenges and opportunities in diagnosing and managing intestinal ascariasis, particularly in vulnerable communities. Ascariasis, caused by Ascaris lumbricoides, remains a pervasive health issue in low-resource settings due to inadequate sanitation, limited healthcare access, and poor hygiene practices (Qian et al., 2021). The diagnostic challenges include the lack of sensitive, point-of-care testing methods in these regions, which hinders early detection and management efforts. Traditional stool microscopy, though cost-effective, often fails to detect light infections, necessitating advancements in molecular diagnostic techniques (Alemu et al., 2024). Management strategies must integrate repeated mass drug administration (MDA) programs, which have shown efficacy in reducing worm burden and interrupting transmission (Thapa et al., 2021). However, MDA requires complementing interventions, including improved water, sanitation, and hygiene (WASH) initiatives to address the root causes of infection (Asfaw et al., 2022). Community education is pivotal in fostering sustainable behavioral changes, such as avoiding contact with contaminated soil and ensuring proper food hygiene practices (Harada et al., 2024). Furthermore, disparities in healthcare access must be addressed through policies that prioritize vulnerable populations, particularly children and rural residents (Magnaval et al., 2022). Strengthening surveillance systems can also improve disease monitoring and inform targeted interventions. A holistic approach combining medical, environmental, and educational strategies offers the most promise for controlling ascariasis and reducing its impact on public health (Israyil et al., 2021).

Conclusion

Intestinal ascariasis remains a significant public health challenge, particularly in vulnerable and socioeconomically disadvantaged communities. Despite being largely preventable, the high burden of Ascaris lumbricoides infections continues due to inadequate sanitation, limited healthcare access, and a lack of widespread diagnostic and treatment resources. Early diagnosis, effective treatment, and continuous mass deworming programs are essential to reducing the morbidity and mortality associated with ascariasis. Furthermore, improving hygiene, water, and sanitation infrastructure (WASH) is critical to breaking the transmission cycle. Innovative diagnostic techniques and community-based health education

control of this disease. By focusing on these multifaceted approaches, including public health policies that prioritize at-risk populations, significant strides can be made in managing and eventually eliminating intestinal ascariasis. Ultimately, concerted efforts across healthcare, education, and environmental improvements will be key to reducing the global impact of this preventable parasitic infection.

References

Aalinezhad, M., Jafarpishe, M. S., Naderi, Y., Shahsavan, M., & Souri, Z. (2023). Coincidence of Ascariasis with Appendicitis in a Pediatric Patient with abdominal Pain; a Case Report. *Archives of Academic Emergency Medicine*, *12*(1), e11. https://doi.org/10.22037/aaem.v12i1.2187

Abdela, A. F., Abera, M. T., Salah, F. O., Tesfaye, Y. M., Ebsa, Y. G., & Kebede, A. G. (2024). Ascending cholangitis in a child: A rare case of biliary Ascariasis visualized by ultrasound. *Radiology Case Reports*, *19*(9), 3942–3945. https://doi.org/10.1016/j.radcr.2024.05.063

Alemu, N. S., Metaferia, Y. Y., & Woldemariam, M. W. (2024). Small bowel obstruction caused by massive (>250) ascariasis worms in adult female patient, a case report. *International Journal of Surgery Case Reports*, *121*, 109946. https://doi.org/10.1016/j.ijscr.2024.109946

salu, A., & Molla, Y. (2023). Gallbladder Perforation with Choledochogastric Fistula Due to Ascaris Infestation, a Case Report. *International Medical Case Reports Journal*, *Volume 16*, 443–447. https://doi.org/10.2147/IMCRJ.S421611

Asfaw, Y. A., Asrat, G. T., Uddo, T. B., Asfaw, B. A., Anand, A., Huang, H., Firew, E. D., & Anugu, N. R. (2022). Successful Management of Biliary Ascariasis in a High-Endemic Zone and Low-Resource Setting in Ethiopia. *Case Reports in Infectious Diseases*, *2022*, 1–4. https://doi.org/10.1155/2022/8201398

Avendaño, C., & Patarroyo, M. A. (2020). Loop-Mediated Isothermal Amplification as Point-of-Care Diagnosis for Neglected Parasitic Infections. *International Journal of Molecular Sciences*, *21*(21), 7981. https://doi.org/10.3390/ijms21217981

Bhattacharya, P., Kumar, M., Kumari, A., & Kumar, S. (2022). Risk Factors, Clinical Features, and Outcomes of Acute Pancreatitis in Children in Endemic Zone of Ascariasis in Eastern Bihar: A Hospital-Based Study. *Cureus*. https://doi.org/10.7759/cureus.26177

Birhanu, A. M., Mohammed, S. H., Gossaye, B. T., & Kebede, M. A. (2023). Ascariasis causing small bowel obstruction in an adult female: A case report. *International Journal of Surgery Case Reports*, *109*, 108486. https://doi.org/10.1016/j.ijscr.2023.108486

Castañeda, C., Valbuena, D., Salamanca, W., Acevedo, D., & Pedraza, M. (2022). Case Report: Laparoscopic Management of Acute Appendicitis Resulting from Ascaris lumbricoides. *The American Journal of Tropical Medicine and Hygiene*, *107*(1), 130–131. https://doi.org/10.4269/ajtmh.21-1245

Che Husin, N., Mohamad, I. S., Ho, K. Y., Soh, J. Y., Syed Aziz, S. H., & Zakaria, Z. (2021). Biliary ascariasis – A vicious cycle. *Malaysian Family Physician*, *16*(2), 83–85. https://doi.org/10.51866/cr1078

G/Kidan, M., Fayisa, S. T., Hailu, S. S., & Abebe, A. T. (2024). Ascariasis: A common disease with uncommon presentation in a resource limited setting. A case report. *Radiology Case Reports*, *19*(4), 1560–1564. https://doi.org/10.1016/j.radcr.2023.12.063

Harada, Y., Iwashita, H., Moriyasu, T., Nagi, S., Saito, N., Sugawara-Mikami, M., Yoshioka, K., Yotsu, R., & on behalf of Japan NTD Study Group. (2024). The current status of neglected tropical diseases in Japan: A scoping review. *PLOS Neglected Tropical Diseases*, *18*(1), e0011854. https://doi.org/10.1371/journal.pntd.0011854

Inyang, B., Koshy, F. S., George, K., Poudel, P., Chalasani, R., Goonathilake, M. R., Waqar, S., George, S., Jean-Baptiste, W., Yusuf Ali, A., & Mohammed, L. (2022). An Overview of Ascariasis Involvement in Gallbladder Disease: A Systematic Review of Case Reports. *Cureus*. https://doi.org/10.7759/cureus.32545

Israyil, Z., Gul, A., Memtily, N., Abulizi, A., Emet, G., & Niyaz, B. (2021). Traditional herbal medicine therapy of gallbladder ascariasis: A case report. *Journal of Medical Case Reports*, *15*(1), 26. https://doi.org/10.1186/s13256-020-02571-x

Katwal, S., Oli, R., Bhusal, A., Bhandari, S., Ghimire, A., & Lama, R. (2023). An unusual finding: Biliary ascariasis in a pregnant patient managed conservatively—a case report. *Annals of Medicine & Surgery*, *85*(10), 5200–5203. https://doi.org/10.1097/MS9.0000000000001205

Khan, G., Khan, S., Idrees, M., Khan, H., & Faheem, H. (2024). Foreign Body Appendicitis Coexisting With Ascariasis in a Pediatric Patient: A Case Report. *Cureus*. https://doi.org/10.7759/cureus.59632

Liau, M. Y. Q., Toh, E. Q., & Shelat, V. G. (2023). Opisthorchis viverrini—Current Understanding of the Neglected Hepatobiliary Parasite. *Pathogens*, *12*(6), 795. https://doi.org/10.3390/pathogens12060795

Magnaval, J.-F., Bouhsira, E., & Fillaux, J. (2022). Therapy and Prevention for Human Toxocariasis. *Microorganisms*, *10*(2), 241. https://doi.org/10.3390/microorganisms10020241

Mbaye, P. A., Fall, M., Sabounji, M. S., Ndoye, N. A., A Zeng, F. T., Wellé, I. B., Seck, N. F., & Ngom, G. (2021). Diverticulite de Meckel d'origine ascaridienne chez l'enfant: À propos d'un cas. *Pan*

African Medical Journal, *39*. https://doi.org/10.11604/pamj.2021.39.92.29237

Mesele, G., & Mengistu, Z. (2021). Live ascaris in urinary bladder: A case report. *Journal of Medical Case Reports*, *15*(1), 480. https://doi.org/10.1186/s13256-021-03045-4

Meulah, B., Bengtson, M., Lieshout, L. V., Hokke, C. H., Kreidenweiss, A., Diehl, J.-C., Adegnika, A. A., & Agbana, T. E. (2023). A review on innovative optical devices for the diagnosis of human soil-transmitted helminthiasis and schistosomiasis: From research and development to commercialization. *Parasitology*, *150*(2), 137–149. https://doi.org/10.1017/S0031182022001664

Obuch-Woszczatyńska, O., Bylińska, K., Krzyżowska, M., Korzekwa, K., & Bąska, P. (2025). Parasites in Sewage: Legal Requirements and Diagnostic Tools. *Pathogens*, *14*(1), 86. https://doi.org/10.3390/pathogens14010086

Oyeyemi, O. T., Ogundahunsi, O., Schunk, M., Fatem, R. G., & Shollenberger, L. M. (2024). Neglected tropical disease (NTD) diagnostics: Current development and operations to advance control. *Pathogens and Global Health*, *118*(1), 1–24. https://doi.org/10.1080/20477724.2023.2272095

Paduraru, A. A., Lupu, M. A., Popoiu, C. M., Stanciulescu, M. C., Tirnea, L., Boia, E. S., & Olariu, T. R. (2024). Cystic Echinococcosis in Hospitalized Children from Western Romania: A 25-Year Retrospective Study. *Biomedicines*, *12*(2), 281. https://doi.org/10.3390/biomedicines12020281

Qian, M.-B., Li, H.-M., Jiang, Z.-H., Yang, Y.-C., Lu, M.-F., Wei, K., Wei, S.-L., Chen, Y., Zhou, C.-H., Chen, Y.-D., & Zhou, X.-N. (2021). Severe hepatobiliary morbidity is associated with Clonorchis sinensis infection: The evidence from a cross-sectional community study. *PLOS Neglected Tropical Diseases*, *15*(1), e0009116. https://doi.org/10.1371/journal.pntd.0009116

Rujeerapaiboon, N., & Kaewdech, A. (2021). Massive biliary ascariasis: An unusual cause of acute cholangitis. *BMJ Case Reports*, *14*(3), e239784. https://doi.org/10.1136/bcr-2020-239784

Samir, K., Subash, T., Subash, A., Bilal, H., Shah, H. H., & Dave, T. (2023). Noninvasive diagnosis of Ascaris lumbricoides in the common bile duct: A pediatric case report of acute pancreatitis. *Clinical Case Reports*, *11*(9), e7940. https://doi.org/10.1002/ccr3.7940

Singh, S., Chand, P., Kundal, S., Singh, G., & Kundal, D. (2022). Incidental Finding of Ascaris in Peritoneal Cavity During Laparotomy for Blunt Trauma Abdomen: A Rare Case. *Cureus*. https://doi.org/10.7759/cureus.24970

Siviero, I., De Almeida, U. V. B., Penna, C. R. R., Di Puglia, E. B. M., & Simões, B. C. B. (2024). Abdominal complications of ascariasis in childhood. *Jornal de Pediatria*, *100*(5), 460–467.

https://doi.org/10.1016/j.jped.2024.02.001

Thapa, S., Gautam, K., Chand, S., Khadka, A., & Neupane, R. (2021). Successful Conservative Management of Uncomplicated Gallbladder Ascariasis. *Cureus*. https://doi.org/10.7759/cureus.17160

Wang, Y., Huang, R., Li, C., & Li, W. (2022). Acute abdomen caused by torsion of the omentum: A pediatric case report. *Medicine*, *101*(15), e29184. https://doi.org/10.1097/MD.0000000000029184