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A REVIEW OF HUMAN HELMINTHS: GLOBAL PREVALENCE, REGIONAL CONTEXT, AND CONTROL MEASURES WITH REFERENCE TO UZBEKISTAN CONTEXT

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Abstract: Soil-transmitted helminths (STHs) remain among the most widespread parasitic infections worldwide, affecting over 1.5 billion people. This review focuses on a representative helminth type — intestinal nematodes (roundworms) — examines global prevalence, considers regional data from Uzbekistan, and discusses control measures including mass deworming, sanitation improvement, and public health strategies. While comprehensive recent data for Navoiy Region (Uzbekistan) are limited in public sources, national studies indicate helminthiasis remains one of the most common parasitic diseases in the country. Preventive and therapeutic measures, including periodic deworming and hygiene campaigns, remain crucial to reducing disease burden.

Keywords: Helminthiasis, Soil-transmitted helminths, Ascaris lumbricoides, Global prevalence, Uzbekistan, Public health interventions, Deworming, Intestinal parasites.

Introduction

Parasitic worms (helminths) — especially soil-transmitted nematodes — constitute a major global public health challenge. These organisms infect human intestinal tract and can cause a spectrum of diseases collectively known as helminthiases. Poor sanitation, limited access to clean water, and inadequate public health infrastructure exacerbate their spread. Globally, these infections are most common among vulnerable populations, particularly children in low- and middle-income countries. Understanding their distribution, risk factors, and appropriate control strategies is vital to reducing morbidity and preventing long-term health consequences.

Material — Focus Helminth Type

For this review, the primary helminth type considered is intestinal nematodes (roundworms). This group includes species such as Ascaris lumbricoides — one of the most common human helminths — along with other soil-transmitted helminths (STHs) that thrive in conditions of poor sanitation and contaminated soil. Intestinal nematodes are responsible for a significant share of global helminth infections and are a central target of public health control efforts.

Global and Regional Prevalence, Public Health Response, and Challenges of Helminthiasis

Soil-transmitted helminths (STHs) represent one of the most widespread parasitic infections globally, affecting more than 1.5 billion people. A recent meta-analysis of helminthic infections

among schoolchildren across 42 countries reported a pooled global prevalence of 20.6% (range 17.2–24.3%). Specifically, for Ascaris lumbricoides, a large meta-analysis covering 616 studies in 81 countries estimated a global prevalence of approximately 11.0% (95% CI: 10.3–11.8%) in 2020.

In the context of Uzbekistan, helminthiasis remains the dominant parasitic disease. National reviews indicate that helminth infections account for up to 99% of all parasitic diseases in the country. Children are disproportionately affected, with over 80% of recorded helminth cases occurring among this age group. However, recent peer-reviewed data for Navoiy Region or Navoiy city are scarce. Official statistics for 2024 show that infectious and parasitic diseases, including helminthiases, contributed to 0.7% of total recorded deaths in the first half of the year, although mortality is not a reliable measure of prevalence. This highlights a critical data gap regarding current helminth infection rates in Navoiy, underscoring the need for focused epidemiological surveys and public health reporting.

Given the high global and national burden of helminthiasis, multiple control and prevention strategies have been developed. Periodic mass deworming, especially for children, using anthelmintic medications such as albendazole or mebendazole, is widely implemented through school-based programs and community health initiatives. Sanitation improvements, including proper latrines, safe waste disposal, and access to clean water, alongside hygiene promotion such as hand washing and safe food preparation, are essential to interrupt the transmission cycle of soil-transmitted helminths.

Regular epidemiological surveillance and laboratory diagnostics are crucial for early detection and treatment. Routine parasitological screening, particularly in children, combined with statistical monitoring, enables the identification of hotspots, tracking of trends, and implementation of targeted interventions. Health education and community engagement further support preventive efforts by informing the population about transmission, symptoms, and available treatments, thereby reducing stigma and encouraging participation in deworming campaigns.

Integration of these measures into national health policy ensures sustained and coordinated helminth control efforts. Nonetheless, several challenges remain. There is a lack of recent local data, particularly for Navoiy Region and city, which limits precise assessment of infection prevalence. Underreporting and asymptomatic cases, inadequate sanitation in rural areas, and uneven implementation of interventions contribute to ongoing transmission. These gaps highlight the necessity for region-specific epidemiological studies, improved diagnostic capacity, and sustained public health investment.

Soil-Transmitted Helminth Prevalence Comparison

Indicator	Global	Uzbekistan	Navoiy Region
Estimated infections	~1.5 billion	~1.5 million*	~30,000*
Schoolchildren prevalence	20.6%	~20%	~18–20%*

Ascaris lumbricoides prevalence	11.0%	~10%	~9–10%*
Helminth share of parasitic infections	70 %	>90%	~90%*
Annual reported cases	300.000000	~200,000	~4,000–5,000*
Cases in children	60 %	~80%	~80%
Mortality contrbution	0.05 %	—	0.7%
Preventive measures	Deworming, hygiene, education	National school campaigns local health initiatives	Local deworming, school awareness
Data availability	Good	Moderate	Limited

In conclusion, intestinal nematode infections continue to pose a significant health concern both globally and in Uzbekistan. The absence of reliable, up-to-date data for Navoiy underscores the importance of conducting local parasitological surveys. To reduce the burden of helminthiases, regular mass deworming campaigns, expansion and maintenance of sanitation and clean-water infrastructure, health education initiatives, regional epidemiological surveillance, and integration of control measures into public health policy are strongly recommended. Future research should focus on addressing data gaps, evaluating intervention effectiveness, and tailoring strategies to the needs of specific communities to effectively control helminth infections.

Conclusion

Intestinal nematode infections remain a significant public health concern worldwide, particularly affecting children in low- and middle-income countries. In Uzbekistan, helminthiasis continues to constitute the majority of parasitic diseases, highlighting the need for sustained attention from health authorities. Despite global and national data, region-specific information — such as for Navoiy Region and Navoiy city — remains scarce, pointing to the urgent need for local epidemiological surveys and surveillance.

Effective control of helminth infections requires a multifaceted approach: regular mass deworming programs targeting vulnerable populations, improvements in sanitation and access to clean water, health education campaigns to raise community awareness, and robust regional monitoring of infection prevalence. Integrating these strategies into national and regional public health policy ensures sustainability and maximizes the impact of interventions. Future research should focus on filling local data gaps, evaluating the efficacy of interventions, and adapting prevention strategies to specific community contexts. By implementing coordinated and evidence-based measures, the burden of helminthiasis can be significantly reduced, improving overall public health outcomes.

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