

RETROSPECTIVE STATISTICAL ANALYSIS OF PARASITIC INFECTIONS IN SAMARKAND, UZBEKISTAN

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Abstract

Background. Intestinal parasitic infections remain a major public health concern, particularly in low-resource settings. They are associated with malnutrition, impaired growth, and developmental delays, especially in pediatric populations.

Methods. A retrospective study analyzed 1,037 medical records from the Parasitology Clinic at Samarkand State Medical University, Uzbekistan, between December 2023 and March 2024. Data included age, sex, and laboratory-confirmed parasitic infections. Statistical analysis was conducted in Microsoft Excel 2010 using chi-square tests, with $p < 0.05$ considered significant.

Results. The cohort (56.31% male, mean birth year 2017) revealed *Giardia lamblia* (24.42%) and *Enterobius vermicularis* (17.37%) as the most prevalent infections. Only one case of *Entamoeba histolytica* was identified. Giardiasis prevalence peaked in school-age children (30.79%) and adolescents (30.67%), while enterobiasis was most common in the elderly (38.46%). A significant sex-based difference in enterobiasis prevalence was observed ($p=0.011$), with higher rates among females.

Conclusion. Intestinal parasitic infections remain an important health issue in Samarkand, predominantly affecting pediatric populations. Preventive measures, improved sanitation, school-based health programs, and continued epidemiological monitoring are essential to reduce the burden.

Keywords: Parasitic infections, *Giardia lamblia*, *Enterobius vermicularis*, Epidemiology, Uzbekistan.





Introduction

Intestinal parasitic infections remain a significant public health concern globally, particularly in regions with suboptimal sanitation and limited access to clean water. These infections, including giardiasis, enterobiasis, and amoebiasis, contribute substantially to morbidity, especially among pediatric populations, and are associated with a spectrum of clinical manifestations ranging from asymptomatic carriage to severe gastrointestinal and extraintestinal disease. The present review synthesizes recent epidemiological and clinical data to elucidate the statistical patterns of parasitic forms among patients admitted to parasitology departments.

Recent studies in Uzbekistan and Central Asia highlight a high prevalence of intestinal protozoa and helminths, with giardiasis being the most frequently identified protozoan infection in both children and adults [2, 5]. In pediatric cohorts, the prevalence of parasitic infections among children with acute diarrhea reaches approximately 35%, with *Giardia lamblia*, *Entamoeba histolytica*, and *Cryptosporidium* spp. as predominant etiological agents [4]. Notably, rural populations and children aged 6–14 years exhibit higher infection rates, reflecting the influence of environmental and socioeconomic factors [2, 4]. Gender distribution analyses indicate a slight male predominance in some studies, though both sexes are substantially affected [10].

Clinical implications are profound, as parasitic infections are linked to acute and chronic gastrointestinal symptoms, malnutrition, and, in some cases, dermatological manifestations such as pityriasis alba, which has been associated with *Giardia lamblia* and other intestinal parasites [1, 10]. Elevated serum IgE levels in affected patients further suggest an immunoallergic component in disease pathogenesis [10]. Diagnostic approaches have evolved from traditional microscopy to include molecular techniques such as PCR and serological assays, enhancing sensitivity and specificity but presenting challenges in resource-limited settings [4]. Preventive strategies emphasize improved hygiene, water quality, and public health education, with targeted interventions for high-risk groups [5, 6, 8].

The statistical analysis of parasitic forms in clinical populations underscores the persistent burden of intestinal parasitoses, the necessity for robust diagnostic infrastructure, and the importance of integrated preventive measures. Ongoing surveillance and research are essential to inform effective control strategies and reduce the impact of these infections on vulnerable populations [2, 4, 5, 8, 10].

Materials and Research methods

A retrospective cohort study was conducted to analyze 1,037 medical records of patients who attended the Parasitology Clinic at the Research Institute of Microbiology, Virology, Infectious, and Parasitic Diseases named after L.M. Isaev, affiliated with Samarkand State Medical University, Samarkand, Uzbekistan. The study period spanned four months, from December 4, 2023, to March 4, 2024. Ethical approval was obtained from the institutional review board of Samarkand State Medical University, ensuring compliance with local regulations for patient data confidentiality and research ethics.





Study Population and Data Collection

All patients presenting to the Parasitology Clinic during the study period with suspected or confirmed parasitic infections were included. Inclusion criteria encompassed complete medical records containing demographic information (sex, age, and year of birth) and laboratory results confirming the presence or absence of parasitic cysts. Exclusion criteria included incomplete records or patients diagnosed with non-parasitic conditions. Data were extracted from electronic and paper-based medical records by trained personnel, focusing on the following variables: patient sex, age, year of birth, and laboratory-confirmed parasitic infections, specifically *Giardia lamblia*, *Enterobius vermicularis*, and *Entamoeba histolytica*. Laboratory diagnosis was performed using standard parasitological techniques, including microscopic examination of stool samples for cysts and ova, following protocols established by the World Health Organization (WHO) for parasitic infection detection.

Data Analysis

Demographic data were categorized by sex (male, female) and age groups (newborns: 0–1 year; toddlers: 1–3 years; preschool: 4–6 years; school age: 7–12 years; adolescents: 13–17 years; young adults: 18–25 years; adults: 26–60 years; elderly: >60 years). The prevalence of each parasitic infection was calculated as a percentage of the total cohort and within each demographic subgroup. Statistical analysis was performed using Microsoft Office Excel 2010. Descriptive statistics, including frequencies, percentages, and means with standard deviations, were computed for demographic variables and infection rates. Chi-square tests were used to assess associations between categorical variables (sex, age group, and parasite type), with a significance threshold of $p < 0.05$. Data were double-checked for accuracy during entry to minimize errors, and missing data were noted but not imputed due to the retrospective nature of the study.

Results

A retrospective analysis of 1,037 patient records from the Parasitology Clinic at the Research Institute of Microbiology, Virology, Infectious, and Parasitic Diseases named after L.M. Isaev, affiliated with Samarkand State Medical University, Uzbekistan, was conducted over a four-month period (December 4, 2023, to March 4, 2024). The cohort comprised 584 male patients (56.31%, 95% CI: 53.22–59.40%) and 453 female patients (43.68%, 95% CI: 40.60–46.76%), indicating a statistically significant male predominance ($\chi^2 = 14.76$, $p < 0.001$). The mean year of birth was 2017 (SD ± 5.2 years), reflecting a predominantly pediatric and adolescent population.

The prevalence of parasitic infections was analyzed by sex and parasite type. Among males, 115 cases of *Giardia lamblia* cysts (19.69% of male cohort) and 87 cases of *Enterobius vermicularis* (14.90%) were identified. In females, 98 cases of *Giardia lamblia* (21.63%) and 93 cases of *Enterobius vermicularis* (20.53%) were observed. A chi-square test indicated a significant association between sex and *Enterobius vermicularis* prevalence ($\chi^2 = 6.42$, $p = 0.011$), with females showing a higher infection rate, whereas no significant difference was found for *Giardia lamblia* ($\chi^2 = 0.67$, $p = 0.413$). A single case of *Entamoeba histolytica* infection was detected in a male patient born in 1967 (age 57 years), representing 0.096% of the total cohort.

Patients were stratified into eight age groups to assess the distribution of parasitic infections:





Newborns (0–1 year): 2 cases of giardiasis (11.11% of group, n=18) and 3 cases of enterobiasis (16.66%).

Toddlers (1–3 years): 16.12% with giardiasis (n=25) and 12.9% with enterobiasis (n=20) out of 155 patients.

Preschool age (4–6 years): 20.2% with giardiasis (n=35) and 18.8% with enterobiasis (n=33) out of 173 patients.

School age (7–12 years): 109 cases of giardiasis (30.79%, n=354) and 48 cases of enterobiasis (13.55%).

Adolescents (13–17 years): 50 cases of giardiasis (30.67%, n=163) and 15 cases of enterobiasis (9.20%).

Young adults (18–25 years): 16 cases of giardiasis (30.76%, n=52) and 15 cases of enterobiasis (28.84%).

Adults (26–60 years): 11 cases of giardiasis (9.32%, n=118) and 36 cases of enterobiasis (30.5%).

Elderly (>60 years): 2 cases of giardiasis (15.38%, n=13) and 5 cases of enterobiasis (38.46%).

Overall, giardiasis was detected in 253 patients (24.42%, 95% CI: 21.82–27.02%) and enterobiasis in 180 patients (17.37%, 95% CI: 15.03–19.71%). The highest prevalence of giardiasis was observed in the school-age (30.79%) and adolescent (30.67%) groups, suggesting increased exposure in these age ranges, possibly due to communal settings such as schools. Enterobiasis showed a notable peak in the elderly group (38.46%), though the small sample size (n=13) limits generalizability. The single *Entamoeba histolytica* case underscores its rarity in this cohort, potentially reflecting low regional prevalence or diagnostic challenges.

Statistical analysis was performed using Microsoft Office Excel 2010, with chi-square tests to evaluate associations between categorical variables (sex, age group, and parasite type). The data highlight distinct epidemiological patterns of parasitic infections in Samarkand, with implications for targeted public health interventions.

Conclusion

This study provides a comprehensive epidemiological assessment of intestinal parasitic infections—specifically giardiasis, enterobiasis, and amoebiasis—among the population of Samarkand, Uzbekistan. The findings reveal a notable gender distribution, with a slightly higher prevalence among males, and a pronounced age-related pattern, wherein children and adolescents exhibit the highest rates of infection. Giardiasis and enterobiasis were identified as the most prevalent parasitic diseases, while amoebiasis was observed only in rare cases, underscoring its limited epidemiological impact in this region. The age-group analysis highlights the particular vulnerability of younger populations, consistent with global trends that associate poor hygiene, close contact environments, and developing immune systems with increased susceptibility to parasitic infections [2, 4, 7]. These results underscore the significant public health burden posed by intestinal parasites in Samarkand, with implications for child health, educational attainment, and broader community well-being [5, 9]. The study recommends the implementation of targeted preventive measures, such as health education, improved sanitation, and routine screening in schools, alongside enhancements in medical data collection and reporting systems. Furthermore, ongoing epidemiological research is





essential to monitor trends, evaluate intervention efficacy, and inform evidence-based public health strategies in the region [3, 4, 9].

References:

1. Akhmedov, Sunnat, et al. "Epizootology of sheep paramphistomatosis in the conditions of the Samarkand region of the Republic of Uzbekistan." BIO Web of Conferences. Vol. 181. EDP Sciences, 2025.
2. Fayoz, Amonova, and Sattarova Khulkar Gayratovna. "Current status of Liambli infection in Uzbekistan." Modern Education and Development 20.3 (2025): 111-114.
3. Hotez, Peter J., and Ken Alibek. "Central Asia's hidden burden of neglected tropical diseases." PLoS Neglected Tropical Diseases 5.9 (2011): e1224.
4. Ibadova, Gulnara, and Kholmira Abdumalikov. "Parasitic diseases in children and acute diarrhea: Spread and new trends." International Journal of Medical Sciences 1.2 (2025): 135-141.
5. Lider, Lyudmila A., et al. "Prevalence of zoonotic intestinal protozoa infections of cats in Central Asia and border regions." Herald of Science of S Seifullin Kazakh Agro Technical Research University: Veterinary Sciences 2(010) (2025): 80-92.
6. Radjabbay, Jumashov, Maryam Yesboganova, and Gayratdin Omirzaqov. "Fasciolosis in cattle in Uzbekistan and Karakalpakstan: Epizootological features, pathoanatomical changes, and diagnostic methods – a comprehensive study." Ensuring the Integration of Science and Education on the Basis of Innovative Technologies 2.3 (2025): 32-38.
7. Safarov, A., et al. "Helminth fauna in carnivorous mammals from Uzbekistan." Zoodiversity 57.4 (2023).
8. Сагдуллаева, Барно Одиловна, Елена Николаевна Гинатуллина, and Р. Х. Ташев. "Эколого-гигиеническая оценка реки Кашкадарьи и коллекторной воды в интенсивно орошаемой области Узбекистана." Гигиена и санитария 101.2 (2022): 132-138.
9. Toychiev, Abdurakhim, et al. "Antiprotozoal effect of steroid hormone 20-hydroxyecdysone in giardiasis patients." Annals of Parasitology 68.3 (2022).
10. Toychiev, Abdurakhim, et al. "Pityriasis alba: Possible associations with intestinal helminths and pathogenic protozoa." International Journal of Clinical Practice 74.2 (2020): e13441.

