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Original Article

Prevalence of parasitic intestinal infections in residents of welfare centers in Babol and Amol cities in 2019-2020

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Abstract

Background: Intestinal parasitic infections remain a major public health concern, particularly among vulnerable populations including the elderly and individuals with mental disabilities residing in crowded settings such as nursing homes. Given the limited data on institutionalized populations in northern Iran, this study aimed to determine the prevalence of intestinal parasitic infections among residents of welfare centers in Babol and Amol.

Methods: This cross-sectional study was conducted during 2019–2020 among 167 residents of welfare centers in Babol and Amol, northern Iran. Stool samples were examined using direct smear, Lugol's iodine staining, acid-fast staining, formalin–ether concentration, and flotation techniques to detect intestinal parasites. Data were analyzed using SPSS version 16, with descriptive statistics and the chi-square test.

Results: Overall, 8 participants (4.8%; 95% CI: 2.1–9.2%) were infected with at least one intestinal parasite, whereas 159 individuals (95.2%) were parasite-free. The most frequently detected parasite was *Entamoeba coli* (1.8%; 95% CI: 0.4–5.2%), followed by *Endolimax nana, Giardia lamblia, Trichuris trichiura, Strongyloides stercoralis*, and *Entamoeba trophozoites* (each 0.6%; 95% CI: 0.02–3.3%). The mean duration of stay in the welfare centers was 12.6 ± 0.8 years. No statistically significant associations were observed between parasitic infection and sex, age, or duration of stay ($p > 0.05$).

Conclusion: The low prevalence of intestinal parasitic infections in the studied welfare centers reflects adequate hygiene standards and effective health surveillance. Nevertheless, ongoing surveillance and preventive interventions remain essential to sustain low transmission rates in this high-risk population.

Keywords: Prevalence, Intestinal parasitic infections, Welfare centers

Introduction

Parasites are organisms that feed on other organisms and often harm them. A parasite to be identified as an intestinal parasite must have passed the life cycle stages in the intestine to be identified as an intestinal parasite. The most common ways intestinal parasites enter the human body are through contaminated food intake, skin penetration, aspiration, and spontaneous infection. Swallowing (fecal-oral routes) and water and food contamination are the main methods of transmitting protozoan infections [1]. Intestinal parasitic infections are a group of diseases caused by several species of protozoa, cestodes, trematodes, and nematodes, which are the most common infections worldwide. Intestinal parasitic infections are one of developing countries' ten major public health problems [2]. Parasitic worm agents are parasitic organisms, while protozoa are parasites with only a single cell and can reproduce in the human body [1]. Worm parasites can cause dangerous complications, such as intestinal obstruction, liver swelling, bile ducts, gallstones obstruction, ileal paralysis, pulmonary and renal complications due to *strongyloidiasis*, and extra-intestinal abscess due to ascariasis [3]. The World Health Organization(WHO) estimates that at least a quarter of the world's population is infected with soil-borne worms [4]. Intestinal parasitic infections, including protozoa and worms, affect more than two billion people. Although they have a wide geographical distribution, the incidence, severity, and duration of infection are influenced by environmental, personal, nutritional, and other characteristics related to socio-economic poverty [5, 6]. Transmission of parasitic infections to humans in conditions of poor personal hygiene is significantly possible from fecal-fecal pathways and in environmental conditions such as contamination of soil and water sources with human feces [7].

According to the WHO, about two-thirds of the world's population is infected with a type of parasite, among which parasites such as *Giardia* and *Ascaris* have the highest infection rate in these individuals. Infection with these parasites, especially in children and the elderly, leads to malnutrition, poor physical growth, anemia, and reduced learning [6]. Intestinal parasites in developing countries are widespread due to poor hygiene and personal hygiene inadequacy, poverty, illiteracy, tropical climates, and contaminated drinking water sources. As a result, the epidemiological pattern of these parasites varies in different geographical areas. It is estimated that about 60% of the world's population is infected with intestinal parasites, which may play a significant role in causing mortality, especially in children due to intestinal infections. Soil-borne worms are responsible for gastrointestinal disorders. According to the WHO, amoebiasis caused by the protozoan parasite *Entamoeba histolytica* is the most common parasitic cause of disease and mortality, with approximately 50 million infected patients reported worldwide. Next to this parasite is giardiasis caused by *Giardia lamblia*. *Ascaris lumbricoides* and *Hymenolepis nana* are the most common nematodes and cestodes that affect approximately one billion people. The most common parasitic infections worldwide include *A. lumbricoides* (20%), hookworms (18%), *Trichuris trichiura* (10%), and *E. histolytica* (10%) [8].

Worm agents and protozoa that cause parasitic intestinal infections are endemic worldwide and are an essential health issue in tropical and subtropical countries [9-12]. Children are more at risk for these infections due to increased nutritional needs and a less developed immune system. Intestinal parasitic diseases are associated with intestinal bleeding, malabsorption, nutrient deficiency, cell and tissue damage, anemia, intestinal obstruction, and mental and physical retardation in children. These cases generally lead to growth retardation, reduced mental development, absenteeism, reduced academic achievement, and malnutrition [9]. Parasitic infections of the human intestine are still significant causes of illness and death. This is why it is the most important medical issue in the world [13]. The main reasons for the high prevalence of parasitic infections in tropical and subtropical countries are increased population density, poor public health, poor sanitation, contaminated food and water, malnutrition, reduced host resistance, and environmental changes. Behavioral, biological, environmental, socio-economic, health systems and regional conditions (quality of internal and rural infrastructure), occupational and social conditions are risk factors for parasitic infections, disease transmission and mortality [14, 15].

In Iran, especially in the country's northern regions, due to geographical conditions, climate, biological and cultural characteristics of individuals, and population density, there are suitable conditions for the transmission and spread of various parasites [16]. Rehabilitation centers significantly increase the likelihood of parasitic infection among individuals. In the meantime, rehabilitation centers have special conditions because the people and children who are cared for in these places, in addition to being constantly together, also have less physical and mental health, and the observance of health principles by these people is not well [17-19]. Despite these risks, recent data on the prevalence of intestinal parasitic infections in welfare centers in northern Iran are limited. Therefore, the present study aimed to assess the prevalence of intestinal parasitic infections among residents of welfare centers in Babol and Amol and to evaluate potential demographic association.

Methods

Ethical considerations

This study, approved by the Ethics Committee of Babol University of Medical Sciences, investigated the prevalence of intestinal parasitic infections among residents of welfare centers in Babol and Amol counties during 2019–2020.

Study Design and Population

Sampling was conducted by census. Following coordination with the centers, data were collected using a researcher-developed checklist covering age, sex, duration of stay, type of disability, occupancy per room, and clinical symptoms. A total of 207 residents were enrolled under supervision of physicians, nurses, and assistants. Two fresh, unpreserved stool samples were collected from each participant at the centers and transported to the Parasitology Laboratory of Babol University of Medical Sciences for analysis. Parasite detection was performed using direct wet mount, Lugol's iodine staining, fast acid staining, Shitter flotation, and formalin–ether sedimentation techniques enabling identification of Cryptosporidium, Giardia, and Blastocystis.

Data analysis

Data were analyzed using SPSS version 16.0. Descriptive statistics were presented as mean ± SD for continuous variables and as frequency (percentage) for categorical variables. Inferential analysis included the chi-square test, with statistical significance defined at $p < 0.05$. Prevalence estimates were reported with 95% confidence intervals (CIs).

Results

Of the 207 individuals screened, 167 met the inclusion and exclusion criteria and were enrolled in the study. The mean age was 46.03 ± 1.65 years (range: 2–97 years), and 118 (70.7%) were female. Underlying comorbidities were reported in 24 (14.4%) participants: hypertension alone (n = 9), diabetes mellitus and hypertension (n = 7), diabetes mellitus (n = 3), hypothyroidism (n = 2), hypothyroidism and cancer (n = 1), hypertension and hypothyroidism (n = 1), and hypertension, diabetes mellitus, and cancer (n = 1) (Table 1).

Table 1: Frequency based on Past Medical History

Past medical history	Frequency, n (%)
Healthy	143 (85.6)
Diabetes	3 (1.8)
Hypertension	9 (5.4)
Hypothyroidism	2 (1.2)
Diabetes and Hypertension	7 (4.2)
Diabetes and hypertension, and cancer	1 (0.6)
Hypertension and Hypothyroidism	1 (0.6)
Hypothyroidism and Cancer	1 (0.6)

A history of medication use was documented in 34 (21%) participants: 33 (97.1% of medicated participants) reported prior antibiotic use, and 1 (2.9%) received chemotherapy.

Overall, eight individuals were infected with at least one intestinal parasite, yielding a prevalence of 4.8% (95% CI: 2.1–9.2%). The identified parasite species were: *Entamoeba coli* (n = 3), *Endolimax nana* (n = 1), *G. lamblia* (n = 1), *T. trichiura* (n = 1), *Entamoeba trophozoites* (n = 1), and *Strongyloides stercoralis* (n = 1) (Table 2).

Table 2: Frequency based on the type of parasite infection

Type of parasite infection	Frequency, n (%)
Endolimax nana	1 (0.6)
Entamoeba coli	3 (1.8)
Entamoeba trophozoite	1 (0.6)
Giardia lamblia	1 (0.6)
Strongyloides stercoralis	1 (0.6)
Trichuris trichiura	1 (0.6)

The mean duration of stay in welfare centers was 12.6 ± 0.8 years, with no significant difference between infected and non-infected individuals (p = 0.48).

Although parasitic infection prevalence was slightly higher in women (4.8% vs. 4.7% in men) and in individuals aged ≥41 years (6.1% vs. 3.9% in those <41 years), neither sex (p = 0.43) nor age (p = 0.39) showed a statistically significant association with infection (Table 3, 4).

Table 3: The relationship between Parasite infection and Sex

Variable		Sex		P-value
		Female, n (%)	Male, n (%)	
Parasite Infection	Negative	113 (71)	46 (28.9)	0.43
	Positive	5 (62.5)	3 (37.5)	

Table 4 : The relationship between Parasite infection and age

Variable		Age (year)		P-value
		≤ 41, n (%)	> 41 n (%)	
Parasite Infection	Negative	78 (49.05)	81 (50.95)	0.39
	Positive	3 (37.5)	5 (62.5)	

Discussion

Contamination with intestinal parasites is a health problem, especially in Iran, despite efforts by the WHO and governments to eradicate parasites and prevent and treat parasitic diseases. Mentally disabled and elderly individuals are among the high-risk groups for infection, and on the other hand, they may have mental or physical disabilities or be unable to express symptoms of possible infection. They also often lack adequate personal hygiene. Therefore, assessing the extent of infection and periodically implementing anti-parasitic control programs is essential for preventing parasitic infectious agents [20-24].

A study by Langbang et al. in 2020 aimed to investigate the prevalence of intestinal parasitic infections in urban and rural populations and showed that, among 500 fecal samples from the rural population, 40.4% were infected with intestinal parasites. Similarly, among 506 fecal samples from the urban population, 20.3% were infected. The highest incidence was observed in the 1–10-year age group [8]. In a 2019 study by Fentahun et al. among elementary school students with mental disabilities, 56.7% (237 of 418) of participants had intestinal parasitic infections [1].

In a 2019 cross-sectional study among patients referred to health centers, Tigabu et al. reported an overall prevalence of intestinal parasitic infections of 56.9%. The predominant species were *E. histolytica* (32.4%), hookworms (11.8%), and *G. lamblia* (7.4%). Mixed infections (involving two or three parasites) were identified in 3.0% and 1.4% of infected individuals, respectively. Given the high burden of infection, the authors emphasized the need for integrated interventions targeting water, sanitation, and hygiene (WASH), including ensuring safe drinking water and reducing contamination of raw vegetables [14].

In a 2019 cross-sectional study among 13,679 patients referred to the laboratory in Ethiopia, Menjetta et al. reported that 6,553 (47.9%) had at least one intestinal parasitic infection. The prevalence of intestinal helminth infections and protozoan infections was 20.3% and 27.6%, respectively. *E. histolytica* was the most prevalent protozoan (18.0%), followed by *A . lumbricoides* (15.0%), hookworms (2.0%), *Taenia spp.* (1.8%), *H. nana* (0.7%), *S. stercoralis* (0.3%), and *S. mansoni* (0.2%); *E. vermicularis* was the least prevalent (0.1%) [13].

In a 2016 cross-sectional study at Ghaem Shahr Rehabilitation Centers, Soleimani et al. examined 97 stool samples from male participants (mean age: 35 years) and found that 5 (5.15%) had intestinal parasitic infections. *B. hominis* and *E. coli* were equally prevalent (2.06% each), followed by *T. trichiura* (1.30%) [3].

Soosaraie et al. (2014), in a study of 196 stool samples from rehabilitation centers in Golestan Province, reported an overall prevalence of 12.3% (24 individuals). *G. lamblia* was the most prevalent (3.1%), followed by *B. hominis* (2.40%) and *Chilomastix mesnili* (0.50%). Notably, the prevalence of infection was significantly higher in individuals with mental disability (75%) compared to those with physical disability (21%) [25].

Sharif's 2016 study in Sari city rehabilitation centers (362 stool samples) showed an overall prevalence of 26.2% (95 individuals). *G.lamblia* (8%), E. coli (5.5%), and *B. hominis* (3.3%) were the most common; helminths were the least prevalent. A positive association was observed between age and infection risk [7].

In Isfahan, Jafari et al. (2016) examined 652 samples and detected parasitic infections in 67 individuals (10.27%). *B. hominis* was the most frequent (7.36%), followed by *E. nana* (1.99%) and *G. lamblia* (1.38%) [6]. Hazrati Tappeh et al. (2016) examined 225 individuals with mental disability in Urmia and reported an overall prevalence of 20.4% [26].

In our study, the overall prevalence of intestinal parasitic infections was 4.8% (8/167), with *E. coli* (n = 3), *E. nana* (n = 1), *G. lamblia* (n = 1), *T. trichiura* (n = 1), *E. trophozoite* (n = 1), and *S. stercoralis* (n = 1). Although the prevalence was higher in women than in men, the difference was not statistically significant.

In contrast, a recent study in Medellín, Colombia, reported a markedly higher prevalence of intestinal protozoan infections particularly *Blastocystis spp.* using combined microscopic and molecular diagnostics.

This disparity may be explained by: (1) differences in the studied population young children in daycare centers versus adults in rehabilitation centers; (2) higher exposure risk due to close contact and hygiene challenges; (3) greater methodological sensitivity of molecular methods (e.g., PCR), which detect subclinical and low-intensity infections missed by microscopy; and (4) environmental and infrastructural factors, including sanitation quality and institutional health surveillance systems.

The present study revealed a low overall prevalence of intestinal parasitic infections (4.8%) among residents of welfare centers in Babol and Amol substantially lower than rates commonly reported in developing countries (30–50%) [1, 8, 13, 14].

This difference likely stems from multiple protective factors: (1) continuous medical oversight, routine health monitoring, and periodic antiparasitic screening in these centers; (2) improved sanitation, safe water supply, and standardized food handling; and (3) methodological variations including population composition (e.g., adults in institutional care vs. school-aged children or community dwellers in prior studies) and diagnostic approaches. Notably, infection prevalence was higher among women and individuals aged >41 years, though not significantly, suggesting that structured institutional care may attenuate conventional risk factors. These findings align with prior Iranian studies in rehabilitation centers [3, 6, 25] and underscore the efficacy of sustained hygiene protocols and organized healthcare delivery in reducing parasitic burden among institutionalized populations.

This study has several limitations. First, the cross-sectional design precludes causal inference. Second, the relatively small sample size may have limited statistical power to detect significant associations in subgroup analyses. Third, reliance on microscopy alone without confirmation by molecular methods (e.g., PCR) likely underestimates the true prevalence of certain parasites, particularly those with low intestinal burden or intermittent shedding. Finally, key contextual variables including detailed hygiene practices, environmental sanitation conditions, and individual deworming history were not systematically collected, limiting the ability to fully explore potential risk factors.

Conclusion

Given the public health importance of intestinal parasitic infections, close monitoring of at-risk individuals for early symptom detection is essential. Timely diagnosis and treatment can mitigate complications and improve quality of life. Although no significant association was found between infection prevalence and age or sex, a higher prevalence was observed in women and individuals over 41 years. These findings suggest that targeted interventions leveraging study results to facilitate rapid diagnosis and early treatment can help prevent infection transmission within the community. Future research should expand to additional centers with larger sample sizes to enhance generalizability. Notably, the prevalence (4.8%) in this study was markedly lower than that reported in several other studies. This difference may be attributed to several factors: first, the welfare centers included in this study due to their proximity to healthcare facilities benefit from regular medical supervision, periodic health screenings, and timely antiparasitic treatment, all of which likely reduce transmission. Second, improved sanitation infrastructure, access to safe drinking water, and supervised food preparation may limit exposure to infectious parasite stages. Additionally, differences in study populations (institutionalized vs. community- or school-based), diagnostic methodologies, and sample sizes may contribute to the observed disparity. Collectively, these results highlight the effectiveness of organized healthcare delivery and hygiene practices in institutional settings. Sustained surveillance and continued implementation of preventive measures are recommended to maintain low transmission rates in this high-risk population.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author's contribution

Conceptualization: A.T., H.SH.; Methodology: M.S., H.GH.; Sampling: M.S.; Statistical analysis and investigation: H.GH., M.S.; Writing – original draft preparation: M.S.; Writing - review and editing: A.T., M.S., H.GH, and H.SH.

Conflicts of interest

All authors have no relevant financial interests to be declared

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Ethical Statement

The study protocol was approved by the Research Ethics Committee of Babol University of Medical Sciences (approval code: IR.MUBABOL.HIR.REC.1397.263). Participant information was kept strictly confidential and not shared with anyone.

References

1. Fentahun AA, Asrat A, Bitew A, Mulat S. Intestinal parasitic infections and associated factors among mentally disabled and non-disabled primary school students, Bahir Dar, Amhara regional state, Ethiopia, 2018: a comparative cross-sectional study. BMC Infect Dis. 2019;19(1): 1-12.
2. Sitotaw B, Mekuriaw H, Damtie D. Prevalence of intestinal parasitic infections and associated risk factors among Jawi primary school children, Jawi town, north-west Ethiopia. BMC Infect Dis. 2019;19(1): 1-10.
3. Soleymani E, Davoodi L, Azami D. The prevalence of intestinal parasitic infections among the mentally retarded patients in Lamook Rehabilitation Center of Qaemshahr, Mazandaran province, 2015. Tabari Biomed Stu Res J. 2016;2(1): 1-5.
4. Espinosa Aranzales AF, Radon K, Froeschl G, Pinzon Rondon AM, Delius M. Prevalence and risk factors for intestinal parasitic infections in pregnant women residing in three districts of Bogotá, Colombia. BMC public health. 2018;18(1): 1-15.
5. Ignacio CF, Silva MECd, Handam NB, Alencar MdFL, Sotero-Martins A, Barata MMdL, et al. Socioenvironmental conditions and intestinal parasitic infections in Brazilian urban slums: a cross-sectional study. Rev Inst Med Trop Sao Paulo. 2017;59(e56): 1-10.
6. Jafari R, Sharifi F, Bagherpour B, Safari M. Prevalence of intestinal parasites in Isfahan city, central Iran, 2014. J Parasit Dis. 2016;40(3): 679-82.
7. Sharif M, Daryani A, Asgarian F, Nasrolahei M. Intestinal parasitic infections among intellectual disability children in rehabilitation centers of northern Iran. Res Dev Disabil. 2010;31(4): 924-28.
8. Langbang D, Dhodapkar R, Parija SC, Premarajan K, Rajkumari N. Prevalence of intestinal parasites among rural and urban population in Puducherry, South India-A community-based study. J Family Med Prim Care. 2019;8(5): 1607.
9. Dessie A, Gebrehiwot TG, Kiros B, Wami SD, Chercos DH. Intestinal parasitic infections and determinant factors among school-age children in Ethiopia: a cross-sectional study. BMC Res Notes. 2019;12(1): 1-6.
10. Gadisa E, Jote K. Prevalence and factors associated with intestinal parasitic infection among under-five children in and around Haro Dumal Town, Bale Zone, Ethiopia. BMC Pediatr. 2019;19(1): 1-8.
11. Hailegebriel T. Prevalence of intestinal parasitic infections and associated risk factors among students at Dona Berber primary school, Bahir Dar, Ethiopia. BMC Infect Dis. 2017;17(1): 1-8.
12. Hemmati N, Razmjou E, Hashemi-Hafshejani S, Motevalian A, Akhlaghi L, Meamar AR. Prevalence and risk factors of human intestinal parasites in Roudehen, Tehran province, Iran. Iran J Parasitol. 2017;12(3): 364.
13. Menjetta T, Simion T, Anjulo W, Ayele K, Haile M, Tafesse T, et al. Prevalence of intestinal parasitic infections in Hawassa University students' clinic, Southern Ethiopia: a 10-year retrospective study. BMC Res Notes. 2019;12(1): 1-5.
14. Tigabu A, Taye S, Aynalem M, Adane K. Prevalence and associated factors of intestinal parasitic infections among patients attending Shahura Health Center, Northwest Ethiopia. BMC Res Notes. 2019;12(1): 1-8.
15. Zenu S, Alemayehu E, Woldemichael K. Prevalence of intestinal parasitic infections and associated factors among street children in Jimma town; south West Ethiopia in 2019: a cross sectional study. BMC public health. 2019;19(1): 1-10.
16. Sayyari A, Imanzadeh F, Bagheri Yazdi S, Karami H, Yaghoobi M. Prevalence of intestinal parasitic infections in the Islamic Republic of Iran. East Mediterr Health J. 2005;11(3): 377-83.
17. Arani AS, Alaghehbandan R, Akhlaghi L, Shahi M, Lari AR. Prevalence of intestinal parasites in a population in south of Tehran, Iran. Rev Inst Med Trop Sao Paulo. 2008;50(3): 145-49.
18. M Mohamed M, I Ahmed A, T Salah E. Frequency of intestinal parasitic infections among displaced children in Kassala Town. Khartoum medical journal. 2012;2(1):
19. Nasiri V, Esmailnia K, Karim G, Nasir M, Akhavan O. Intestinal parasitic infections among inhabitants of Karaj City, Tehran province, Iran in 2006-2008. Korean J Parasitol. 2009;47(3): 265.
20. Akinbo FO, Okaka CE, Omoregie R. Prevalence of intestinal parasitic infections among HIV patients in Benin City, Nigeria. Libyan J Med. 2010;5(1): 5506.

21. Dash N, Al-Zarouni M, Anwar K, Panigrahi D. Prevalence of intestinal parasitic infections in Sharjah, United Arab Emirates. Hum Parasit Dis. 2010;2(1): 21-25.
22. Lifson AR, Thai D, O'Fallon A, Mills WA, Hang K. Prevalence of tuberculosis, hepatitis B virus, and intestinal parasitic infections among refugees to Minnesota. Public Health Rep. 2016;117(1): 69-77.
23. Ngrenngarmlert W, Lamom C, Pasuralertsakul S, Yaicharoen R, Wongjindanon N, Sripochang S, et al. Intestinal parasitic infections among school children in Thailand. Trop Biomed. 2007;24(2): 83-8.
24. Okyay P, Ertug S, Gultekin B, Onen O, Beser E. Intestinal parasites prevalence and related factors in school children, a western city sample-Turkey. BMC public health. 2004;4(1): 1-6.
25. Soosaraie M, Pagheh A, Gholami S. Prevalence of intestinal parasitic infections in rehabilitation centers in Golestan province, Iran. Med Lab J. 2014;8(1): 42-47.
26. Tappeh KH, Mohammadzadeh H, Rahim RN, Barazesh A, Khashaveh S, Taherkhani H. Prevalence of intestinal parasitic infections among mentally disabled children and adults of Urmia, Iran. Iran J Parasitol. 2010;5(2): 60.