

## Epidemiologic study of intestinal parasitic infections in Ahvaz, southwest Iran in 2010-2015

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### ABSTRACT

Infection by intestinal parasites is worldwide and affects the health of humans and especially growing children. This epidemiologic study aimed to investigate intestinal parasites in patients referred to the central laboratory of Golestan hospital in Ahvaz during 2010-2015. In this retrospective study, stool samples were collected from 12155 patients and tested by the direct method, using normal saline and Lugol's solution staining with the lens of 10x and 40x and Merthiolate-Iodine-Formaldehyde Concentration(MIFC), Formaldehyde-Ether sedimentation method and modified Acid-fast staining techniques. Of the 12155 patients, 9869 (81.2) were male and 2286 (18.8%) were female. 1455 (12%) cases were infected with intestinal parasites. From the positive cases, 1441 cases (99.03%) had a protozoan infection and 14 cases (0.97%) had a helminthic infection. In addition, the rate of infection by intestinal parasites in male and female was 1191 (81.9%) and 264 (18.1%) cases, respectively. The majority of pathogenic protozoa infections were *Giardia lamblia* and *Entamoebahistoltytica/dispar*, and very rare cases of *Hymenolepis nana* and *Strongyloidesstercoralis* were detected. The results revealed that the worm infections in this area have been considerably reduced but infection with parasites, the transmission of which takes place directly, is still common.

**Keywords:** epidemiology, intestinal diseases, parasitic, parasitic diseases, parasitic intestinal diseases.

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### Introduction

There is an infection by intestinal parasites more or less in all parts of the world which affects the health of human specially growing children acutely and chronically (1). The infection with protozoa and worms origin can be the causes of death of children in some parts of the world (2). Various surveys have shown that parasitic

infections by disturbing in public health cause mal-absorption, diarrhea, stopped growth and reduced efficiency of the people (3, 4). In Iran, also parasitic infections are of special importance and are considered as a health problem in the community (5). The prevalence of parasitic infections depends on factors such as the use of drinkable water, drainage of wells, construction of

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sewage treatment systems, extensive health and education programs, the impact of the media in promoting the health, access to health centers, and so on. In recent years, some parasitic infections found in Iran have either decreased dramatically or have been controlled. Health promotion and health tips in urban and some rural areas considerably reduced the prevalence of infection level in these areas. Problems related to parasitic disease in any area have their own specific characteristics. According to different ecological, social, economic and cultural characteristics, parasitic infections in different parts of Iran have a different prevalence (6).

Ahvaz County, the capital of Khuzestan Province is situated in southwest Iran. The Golestan hospital is one of the largest and most important academic medical centers in Southwest Iran, and many patients are referred to this health center. This study focused on the intestinal parasites infections in patients referring to the central laboratory of the Golestan hospital during 2010-2015.

### **Materials and Methods**

Ahvaz is the center of Khuzestan province in southwest Iran. In 2016 the Ahvaz population was 1.302 million. The weather of Ahvaz is dry and tropical with long and hot summers and mild, short winters (7-9).

This retrospective study was accomplished at the central laboratory of Golestan hospital in Ahvaz Between 2010 and 2015. The stool samples of 12155 patients were tested. All samples are assessed in terms of their physical form, existence of worm proglottid or possible adult worms and then were tested by the direct method, using normal saline and Lugol's solution staining with lens of 10x and 40x for all samples and Merthiolate-Iodine-Formaldehyde Concentration (MIFC) and Formaldehyde-Ether sedimentation method and modified Acid-fast staining techniques for some of the samples which needed more testing (10, 11). Guide for Diagnosis of Intestinal Parasitosis was used as an identification

reference (12). The results were analyzed using Statistical Program for Social Sciences (SPSS 14) and chi-squared test (13).

### **Results**

Out of the 12155 referred patients, 9869 (81.2%) were male and 2286 (18.8%) were female. 1455 (12%) cases were infected with the intestinal parasites. 1441 (99.03%) of the positive cases were infected with protozoa and 14 (0.97%) cases with helminthes. The rate of infection with intestinal parasites in male and female were 1191 (81.9%) and 264 (18.1%), respectively. Results of the Chi-square test, revealed that there was a significant relationship between the incidence of parasitic infection and seasons ( $P=0.001<0.05$ ), but there was no significant relationship between the rate of infection in males and females ( $P=0.487>0.05$ ). A significant relation between *Giardia lamblia* and *Blastocystishominis* was observed on the basis of parasite and sex and not for other parasites.

The gender based frequency of infection with intestinal parasites in all patients and the distribution of each parasite in the total positive cases, as well as the significant difference between the rate of each parasite and gender is shown in Table 1.

### **Discussion**

Parasites are transmitted through multiple ways, including polluted water, food, soil or direct contact with infected people with healthy subjects among the human societies. Depending on economic, cultural and geographical conditions and in different times, the prevalence rate of parasitic infections is different (5, 14).

In this study, the prevalence of infection by intestinal parasites was 12%, of which 81.9% was related to the male patients and 18.1% was related to female subjects. Of the total cases that were reported as positive, 1441 cases (99.03%) were infected with protozoa and 14 cases (0.97%) with helminthes.

**Table 1.** Gender-base frequency of infection with intestinal parasites in patients referred to Golestan hospital laboratory

Parasites	Gender		Total	% In positive cases	% In whole tested patients	Significance on the basis of parasite and gender p-value
	Male	Female				
<i>Entamoebahistolytica/ dispar</i>	84	14	98	6.74	0.81	0.305
<i>Entamoeba coli</i>	127	29	156	10.72	1.28	0.879
<i>Giardia lamblia</i>	384	69	453	31.13	3.73	0.049
<i>Blastocystishominis</i>	475	132	607	41.72	4.99	0.003
<i>Chilomastixmesnili</i>	9	0	9	0.62	0.07	0.157
<i>Iodamoebabutschlii</i>	20	2	22	1.51	0.18	0.403
<i>Endolimax nana</i>	1	0	1	0.07	0.01	1
<i>Trichomonashominis</i>	13	1	14	0.96	0.12	0.486
<i>Strongyloidesstercoralis</i>	5	2	7	0.48	0.06	0.617
<i>Hymenolepis nana</i>	6	0	6	0.41	0.05	0.599
<i>Ascarislumbricoides</i>	1	0	1	0.07	0.01	1
Mix infection	66	15	81	5.57	0.69	0.928
Total	1191	264	1455	100	12	-

Results of the study showed that the parasitic infection in males was more than females. Statistical analysis on this issue by Chi-square test showed that there was no significant relationship between the level of infection and gender ( $P=0.487>0.05$ ). The cause of this apparent difference might be due to more lab visits by males. As the data indicate, 81.2% of patients referred to the laboratory were male.

Of the total positive cases, 31.1% were infected by *Giardia lamblia* and 19% were infected by amoebae. These parasites have a direct transfer cycle and can easily communicate from infected people to healthy individuals, as well as through contaminated food and water. On the other hand, amoeba and *Giardia* cysts are resistant to unfavorable environmental factors (15-17). So the *Giardia* cyst can be infective for more than three months in water at 8°C and more than two weeks in tap water. The cysts are also resistant to the Chlorinate water and coldness (18, 19). For this reason, *Giardiasis* is considered as a major problem in the production of drinking water from surface waters (20). With respect to the above mentioned points and climatic conditions of the area, the higher prevalence of the parasite and Amoeba compared to other parasites was not far from expectation.

Parasitic infection in fall was higher than other seasons in Ahvaz, and it was the least in winter. The distribution of positive cases of parasitic contaminations in spring, summer, fall and winter was 23.1, 26.5, 30.6 and 19.8%, respectively. Statistical analysis of the results with the help of the Chi-square test also shows there is a significant correlation between the incidence of parasitic infections and seasons of the year ( $P=0.001<0.05$ ). Based on the health documentation, high incidence of intestinal parasitic diseases in the summer and fall seasons is consistent with the process of the diarrheal disease in Khuzestan Province. According to association of intestinal diarrheal disease outbreaks with parasitic diseases, there is a need for more attention to diagnosis, treatment, and prevention of parasitic diseases.

According to the obtained information, it was revealed that the frequency of contamination to *Entamoebahistolytica* has dramatically dropped in recent years. Due to the activities done in order to increase attention to this infection and its prevention, the results indicate that the infection has been controlled. The situation is different for the *Giardia lamblia* parasite. Although the prevalence of this infection in recent years has been reduced compared to the past years, it has

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not been fully controlled, which entails more measures to be taken. The maximum number of the observed cases of two parasites in this area was in the fall that in accordance with the general pattern of the amount of parasites in the seasons of the year.

The reviews of annual changes in the report of the *Blastocystishominis* parasite show that the rate of reporting of this parasite has been higher in recent years. Although all process has been done to control and prevent parasitic pathogens, the parasite is moving from pathogenic toward nonpathogenic. The maximum number of observed cases of this parasite has been also in the fall.

The observed cases of intestinal worms infection has been very low and rare and has also reduced in recent years and observations have been sporadic. A reason for this decrease can be the increased level of health care and people's information and lack of watering vegetables and farms and orchards with human and urban sewage. In addition, increased veterinary supervisions and the supply of healthy meat have also been very effective in this issue.

In a study of parasitic intestinal infection in the county of Dezful located in the North of Ahvaz, the amount of infection by *Giardia* and amoeba in the total population under study has been 3.2% and 2.3%, respectively that is consistent with the study (21). Since Ahvaz and Dezful counties are located in the same province and because they are very similar in terms of environmental and climate conditions, this similarity in the occurrence of parasitic contamination is also predictable and justified. In another assessment that was performed on residents in the Karaj County from 2006 to 2008, the prevalence of *Giardia lamblia* in the society turned out to be 3.8% (22) that was consistent with the results of this assessment.

In an epidemiological study on the parasitic infection that has been carried out in different regions of Iran, it was shown that the rates of parasitic infections in three hospitals in Tehran, Varamin County, Hamedan County, urban and

rural areas of Islamshahr County, urban and rural areas of Fereydunkenar County, rural areas of Mazandaran Province, rural areas of Kuhdasht County, and rural areas of Bandar Abbas County have been 21.2%, 14%, 29.9%, 52.2%, 27.45%, 25%, 32.5%, and 48.8% (23-30), respectively. A comparison between the results of all these studies with the current study indicates that parasitic contamination in this area compared to most regions of Iran is lower. In addition, in a study of 45128 stool specimens collected from rural and urban communities around Iran, the results indicated that there was the prevalence of parasitic infections in the whole country and 19.3% of samples have been identified to be positive for intestinal parasites (31). Comparison between the results of the aboved-mentioned study with the results of this study indicates the difference in the rate of parasitic contamination of the area compared to the average parasitic contamination in the country. However, some other studies show that the rate of infection by intestinal parasites has been lower than Ahvaz. The rates of parasitic infections in Dezful, in patients referred to specific clinic of Urmia University of Medical Sciences, in a medical diagnosis laboratory in Shahre Rey, and in rural and urban areas of Qaem Shahr county, have been 6.2% (21), 10.1%, 10.6%, and 8.4% (32-34), respectively.

In all these studies, the most protozoa contamination belongs to *Giardia* that is in agreement with the result of our study. Since the diagnosis method of *Enterobiusvermicularis*, which is relatively common, especially in children, is the Scotch tape method (Graham's Test) (35), and this worm and its eggs are rarely seen in stool specimens (36, 37), for this reason, in this study also no case of infection with this parasite has been observed. In a study in Urmia, where in addition to sanitary testing the Scotch tape method has been also used, the prevalence of intestinal parasitic infections was 42.2% and the reported rate of infection with *Enterobius* was equal to 10.6% (38). Moreover, in another study

of mentally disabled children, the prevalence of intestinal parasitic infections was 20.4% and the amount of infection with *Enterobius* was 31.1% (39). However, in other studies that were conducted in Dezful (21) and Jahrom (40) just with stool examination, the rate of intestinal parasitic infections was 6.2% and 13.6%, respectively and just 4 (0.04%) and 2 (0.4%) cases have been shown to be related to *Enterobiusvermicularis*. This indicates that the stool testing has not much value to diagnose this parasite, and Scotch tape method (Graham's Test) is more valuable.

In other studies in the countries around Iran and west Asia the rate of intestinal parasitic infections in Makkah in Saudi Arabia 6.2% (41), Sharjah in United Arab Emirates 7.7<sup>(42)</sup>, Qatar 8.6% (43) were lower than this study and in Lebanon 14% (44), Kuwait 28% (45), Izmir in Turkey 25.6% (46), Jenin Governorate in Palestine 32-41.5% (47), Sana'a City in Yemen 40.3% (48) these rates were higher. Review of these studies also showed the dispersion of the protozoan and worms parasite.

## Conclusions

The results show that helminthic infection has been dramatically reduced in this region but other parasitic agents like intestinal flagellated protozoans and amoebic infections, the transmission of which is direct, are widespread. Protozoas in which the cyst could pass through the filters to the tap water and be infective for a while, the prevalence rate is high and could be controlled by reforming drinking water systems.

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## Conflict of Interest

Hereby the authors declare that there is no conflict of interest.

## References

1. Bundy DA, Golden MH. The impact of host nutrition on gastrointestinal helminth populations. *Parasitology* 1987; 95(03): 623-35.
2. Beharman R, Kilegmen R, Nelson W. Nelson Textbook of pediatrics. 14 ed. London: W.B. Saunders company; 1992.
3. WHO. Prevention and control of intestinal parasitic infection. Technical Reports Series, No 749. Geneva: 1987.
4. Musaiger A. Intestinal parasitic infections among school children in Bahrain. *Journal of tropical pediatrics* 1989; 35(1): 45-6.
5. Mahmoud A, Mandell J, Bennett J, Dolin R. Introduction to helminth infection in: Principles and Practice of infection diseases. 5 ed. New York: Churchill livingstone; 2000.
6. Bundy D, Hall A, Medley G, Savioli L. Evaluating measures to control intestinal parasitic infections. *World Health Statistics Quarterly Rapport Trimestriel de Statistiques Sanitaires Mondiales* 1991; 45(2-3): 168-79.
7. Interior Ministry of the Islamic Republic of Iran [cited 2016]. Available from: <http://www.moi.ir/Portal/Home/>.
8. I.R.OF IRAN Meteorological Organization [cited 2016]. Available from: <http://www.irimo.ir/eng/index.php>
9. Statistical Centre of Iran [cited 2017]. Available from: <http://www.amar.org.ir/>
10. Casemore D, Armstrong M, Sands R. Laboratory diagnosis of cryptosporidiosis. *Journal of Clinical Pathology* 1985; 38(12): 1337-41.
11. Ridley D, Hawgood B. The value of formol-ether concentration of faecal cysts and ova. *Journal of Clinical Pathology* 1956; 9(1): 74.
12. Ash LR, Orihel TC. Parasites: a guide to laboratory procedures and identification: American Society of Clinical Pathologists Press 1987.
13. Coakes SJ, Steed L. SPSS: Analysis without anguish using SPSS version 14.0 for Windows: John Wiley & Sons, Inc. 2009.
14. Harrisons. Principles of internal medicine, Protozoa and helminthic infections. New York: MC Grow-Hill, 2001; 1185-236 p.
15. Myrhndy S, Nikaein M. Wastewater Microbiology. First edition ed. Tehran: Tehran University of Medical Sciences 2004; 142-1 and 202-196 p.
16. Gholamy M, Mohammadi H. Water and

## 20 Intestinal parasites infection in Ahvaz

- wastewater microbiology. Second ed. Tehran: Hayyan Publishing, 1999.
17. Hjartbar M. Food poisoning in humans. First ed. Tehran: Department of job Safety and Health, 2002.
  18. Urmazdy H. Medical parasitology. 4 ed. Tehran: Tehran Jahad daneshgahy, 1993.
  19. John DT, Petri WA, Markell EK, Voge M. Markell and Voge's medical parasitology: Elsevier Health Sciences 2006; 50-60 p.
  20. Mazoua S, Chauveheid E. Aerobic spore-forming bacteria for assessing quality of drinking water produced from surface water. *Water Research* 2005; 39(20): 5186-98.
  21. Maniei M, Maraghi S, Mazhab jafari K. Study the frequency of intestinal parasitic infection in patients referred to central laboratory of great dezfoul hospital in 2010 and 2011. *Jundishapur J Healt Sci.* 2012; 4(2): 31-8.
  22. Nasiri V, Esmailnia K, Karim G, Nasir M, Akhavan O. Intestinal parasitic infections among inhabitants of Karaj City, Tehran province, Iran in 2006-2008. *The Korean Journal of Parasitology* 2009; 47(3): 265-8.
  23. Akhlaghi L, Shamseddin J, Meamar A, Razmjou E, Oormazdi H. Frequency of intestinal parasites in Tehran. *Iranian Journal of Parasitology* 2009; 4(2): 44-7.
  24. Tabatabae F, Uoosefi R, Ghafari Far F. Study the epidemiology of intestinal parasites in Varamin (2008-2009). Seventh National and the Second Regional Congress of Parasitology and Parasitic Diseases 2010 Oct. 19-21; Tehran, Iran.
  25. Vaziny H, Khyabanchyan A. Prevalence of intestinal parasites in patients referred to the best hospital in Hamedan city in 2009. Seventh National and the Second Regional Congress of Parasitology and Parasitic Diseases 2010 Oct. 19-21; Tehran, Iran.
  26. Askari G, Nategh Pour M, Rezaeian M. Determination of intestinal parasites among residents Eslamshahr city. *School of Hygiene and Public Health Research Institute* 2003; 67, 1:74(3).
  27. Razaviuoon T, Masoud J. Intestinal parasitic infections in urban and rural areas Fereydunkenar Mazandaran. *School of Hygiene and Public Health Research Institute.* Spring 2002; 1(1): 39-49.
  28. Kia E, Hosseini M, Nilforoushan M, Meamar A, Rezaeian M. Study of intestinal protozoan parasites in rural inhabitants of Mazandaran province, Northern Iran. *Iranian Journal of Parasitology* 2008; 3(1): 21-5.
  29. Badparva E, Fallahi S, Birjaiidi S, Pournia S, Kayedi M. Prevalence of intestinal parasites in the rural regions of Kouhdnsht, Lorestan Province, Iran. *Asian Journal of Biological Sciences* 2009; 2(4): 105-11.
  30. Kuzehkanani AB, Rezaei S, Babaei Z, Niyati M, Hashemi S, Rezaeian M. Enteric protozoan parasites in rural areas of bandar-abbas, southern Iran: comparison of past and present situation. *Iranian Journal of Public Health* 2011; 40(1): 80.
  31. 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.
  32. Hazrati Tappeh K, Mostaghim M, Abbasian F, Fereidoni J, Hasanzadeh S. A study on frequency of the intestinal parasite infections in patients referring to Ghods Clinic of Urmia Medical Sciences University during 78-81. *Journal of Urmia Nursing and Midwifery Faculty* 2004; 2(1).
  33. Arani AS, Alaghebandan R, Akhlaghi L, Shahi M, Lari AR. Prevalence of intestinal parasites in a population in south of Tehran, Iran. *Revista do Instituto de Medicina Tropical de São Paulo* 2008; 50(3): 145-9.
  34. Ranjbar-Bahadori Sh, Dastorian AR, Heidari B. Prevalence of intestinal parasites in Ghaemshahr in 2004. *Medical Sciences Journal of Islamic Azad University, Tehran Medical Branch* 2005; 15(3): 151-5.
  35. Graham CF. A device for the diagnosis of Enterobius infection. *The American Journal of Tropical Medicine and Hygiene* 1941; 1(1): 159-61.
  36. Saebi E. *Textbook of Clinical Parasitology.* 2th ed. Tehran: Aeig, 2009.
  37. Arfaa F. *Medical Helminthology.* 7 ed. Tehran: Dibaj 2010.
  38. Khosrow HT, Habib M, Shahla K, Baratali R, Afshin B. Prevalence of intestinal parasitic infections among primary school attending students in Barandooz-Chay rural region of Urmia, West Azerbaijan province, Iran in 2008. *African Journal of Microbiology Research* 2011; 5(7): 788-91.
  39. 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. *Iranian journal of parasitology.* 2010; 5(2): 60.
  40. Davami M, Rouhi R, Sadeghi A. The prevalence of intestinal parasitic infections among 7-15 year old children in Jahrom, Iran, during 2006-7. *Jahrom Medical Journal* 2008; 6(6): 49-55.
  41. Zagloul DA, Khodari YA, Gazzaz ZJ, Dhafar KO, Shaker HA, Farooq MU. Prevalence of Intestinal Parasites among Patients of Al-Noor Specialist Hospital, Makkah, Saudi Arabia. *Oman Medical Journal* 2011; 26(3): 182.
  42. Dash N, Al-Zarouni M, Anwar K, Panigrahi D.

- Prevalence of intestinal parasitic infections in Sharjah, United Arab Emirates. *Human Parasitic Diseases* 2010; 2:21.
43. Abu-Madi MA, Behnke JM, Doiphode SH. Intestinal parasitic infections among long-term-residents and settled immigrants in Qatar in the period 2005 to 2011. *The American Journal of Tropical Medicine and Hygiene*. 2013; 88(6): 1185-95.
  44. Araj G, Musharrafieh U, Haydar A, Ghawi A, Itani R, Saliba R. Trends and prevalence of intestinal parasites at a tertiary care center in Lebanon over a decade. *Le Journal Medical Libanais the Lebanesemedical Journal* 2010; 59(3): 143-8.
  45. Al-Nakkas EM, Al-Mutar MS, Shweiki HM, Sharma PN, Rihan S. Parasitic infections in Kuwait: A study based on Primary Care Centers. *Middle East Journal of Family Medicine* 2004; 3(3).
  46. Dagci H, Kurt Ö, Demirel M, Östan I, Azizi NR, Mandiracioglu A, et al. The prevalence of intestinal parasites in the province of Izmir, Turkey. *Parasitology Research* 2008; 103(4): 839-45.
  47. Bdir S, Adwan G. Prevalence of intestinal parasitic infections in Jenin Governorate, Palestine: a 10-year retrospective study. *Asian Pacific Journal of Tropical Medicine* 2010; 3(9): 745-7.
  48. Alyousefi NA, Mahdy M, Mahmud R, Lim Y. Factors associated with high prevalence of intestinal protozoan infections among patients in Sana'a City, Yemen. *PLoSOne* 2011; 6(7): e22044.