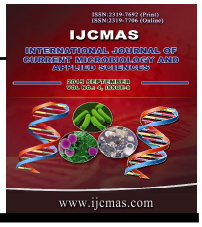
International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 4 Number 9 (2015) pp. 909-915**
http://www.ijcmas.com



Original Research Article

Prevalence of Intestinal Parasites in Medical Diagnostic Laboratories, Zahedan University of Medical Sciences-Iran

Ebrahimzadeh Adel[1]*, Vahedi Abdolbaset[2] and Salimi Khorashad Alireza[3]

[1]Department of Medical Parasitology and Mycology and Membership of Zahedan Research Center of Infectious Disease and Tropical Medicine, Zahedan University of Medical Sciences, Zahedan, Iran
[2]Student Scientific Research Center, Zahedan University of Medical Sciences, Zahedan, Iran
[3]Department of Parasitology and Mycology, Faculty of Medicine, Zahedan University of Medical Sciences and Health Services, Zahedan, Iran
**Corresponding author*

Keywords

Prevalence, Intestinal Parasites, Staff, Clinical Laboratories, Zahedan University of Medical Sciences, Iran

A B S T R A C T

Parasitic infections are more prevalent in developing countries. This study evaluates the prevalence of intestinal parasites and its relation with the sex, duration of employment and education. This study was performed in 2014 on 100 persons from clinical laboratories in Zahedan University of Medical Sciences by convenience sampling. Three samples were collected every other day and were examined with direct smear, flotation and formalin-ether methods. These result inserted in SPSS.v17 software and were analyzed using of descriptive methods and chi-square test. The overall prevalence was 43%, *Entamoeba coli* and *Giardia lamblia*, with a frequency of 32% and 16%, respectively, had the highest prevalence and *Enterobius vermicularis* and *Hymenolepis nana* had the lowest prevalence of 4% and 5%, respectively. The prevalence in men and women was 50% and 37%, and there was a significant correlation between gender and the prevalence of *Entamoeba coli* (P-value = 0.023). There was no significant correlation between the prevalence of parasitic infections by gender, duration of employment and education but due to overall prevalence found in this population, the need for educational programs and further researches be felt.

Introduction

All around the world parasitic intestinal infections have been known as serious hygienic problems, and because it is more prevalent in developing countries, in such countries possesses a higher importance (Bhandari *et al.*, 2011; Lindo *et al.*, 1998).

The prevalence of parasitic intestinal disease has a direct relation with the level of hygiene and socioeconomic status of any region. Even in different districts of a country this prevalence is not identical and based on the weather condition, public

health and food habits is variant (Guyatt and Bundy, 1991).

It is estimated that there are approximately 340 parasite species capable of infecting humans, with the majority of the 3 billion people currently infected residing in developing regions of the world. Intestinal protozoan parasites remain the most commonly encountered parasitic diseases and continue to cause significant morbidity and mortality (Stark *et al.*, 2009). Diarrhea is a common clinical symptom of associated with these parasites (Lindo *et al.*, 1998).

Estimates have shown that as much as 60% of people around the world were infected with gut parasites, which may play a role in morbidity due to intestinal infections. The commonest parasitic infections reported globally and their prevalence are *Ascaris lumbricoides* 20%, hookworm (*Ancylostoma duodenoma* and *Necator americanus*) 18%, *Trichuris trichuira* 10%, and *Entamoeba histolytica* 10%. About *Giardia lamblia*, depending on the geographic location of the population and type of directly or indirectly transmission through contaminated hands, water, or food, reported prevalence rate vary from less than 1% to more than 50% (WHO, 1987).

Health care personnel, particularly research laboratories and clinical staff and health care workers providing patient care, are at the risk of many diseases such as parasitic diseases through accidental encounters which may or may not be recognized when they occur (Herwaldt, 2001) (Sewell, 1995).

The health condition of these persons from service personnel to lab officials is at a serious risk (Sewell, 1995). In addition to different types of parasitic infection (blood-tissue, oral or inhalation), toxicity by chemicals such as formalin and ether in the long term threaten the staff of parasitology departments (Hambleton and Dedonato, 1992).

Even expert in the field of parasitic disease may not be aware of clinical manifestations after infection transfer, methods of monitoring the infection after accidental exposure and whether to begin presumptive antimicrobial therapy before documentation of the infection (Herwaldt, 2001).

So, due to the possibility of infection transfer in different ways (WHO, 1987) and thus the probability of infection among the staff of laboratories and besides the possibility of transferring to others (Herwaldt, 2001) (Sewell, 1995), we performed this study to determine the prevalence of parasitic infection among the staff of medical diagnostic laboratories affiliated to the Zahedan University of Medical Sciences and then to investigate the possible correlations between prevalence and duration of employment, education and gender.

The result of this study can help the health care authorities to planning and performing the appropriate actions toward further education and improving the exciting condition to avoid future harmful effects.

Materials and Methods

This Cross Sectional study was conducted on 100 members from all 450 members of medical diagnostic laboratory staff affiliated to Zahedan University of Medical Sciences selected by convenient sampling method during Jan-April 2014. Before beginning the study the ethical approval was received from the Ethics Committee of Zahedan University of Medical Sciences.

Initially it was explained to each participant that their cooperation is completely voluntary and in case of disinclination they

could withdraw whenever they want. Participants were to be urban and just have the same job. all those who accepted the terms, entered the study(100 persons).

Then fecal samples in plastic containers were collected with data collection forms (be coded) including questions on gender, duration of employment and level of education, and sent to parasitology lab.

The samples immediately were examined by direct smear method and after being placed in refrigerator, were investigated by flotation and formalin-ether methods.

The direct stool smear is the easiest and simplest parasitological test requiring a minimum of stool and equipment. According to this method, physiological serum and lugol's solution is used to make a smear of the stool for examination under the microscope. Parasitic ova and larvae, trophozoites, and protozoan cysts can be easily detected in the stool smear.

Then specimen was processed by formalin-ether method. In this method, about 2 grams of the stool was emulsified in 8 ml of formalin, then was strained through two layers of wet gauze directly into a 15 ml conical centrifuge tube. Then, it was sieved through strainers, to which 3 ml of ether was added, and finally centrifuged. The sediments were examined for intestinal protozoa (Garsia, 2001), eggs and larvae of intestinal helminthes under a light microscope.

The results for each sample were recorded on data collection forms related to that sample and finally entered to SPSS version17 software and were analyzed by descriptive methods (frequency and percentage) and chi-square test.

P-value < 0.05 was considered to be statistically significant.

Results and Discussion

This study showed that the prevalence of intestinal parasites is different among the staff. Parasites observed in this study were *Entamoeba coli, Entamoeba histolytica, Giardia lamblia, Enterobius vermicularis, Hymenolepis nana, Blastocystis hominis, Chilomastix mesnili, Dientamoeba fragilis.*

According to table 1 highest prevalence is related to *Entamoeba coli*, Giardia and *Chilomastix mesnili*, respectively with 32%, 16%, and 15% (32, 16 and 15 positive samples) and the lowest prevalence is related to *Entrobius vermicularis* (Oxyuris) and *Hymenolepis nana* with 4% and 5%, respectively (4 and 5 positive samples).

Also the prevalence of *Entamoeba histolytica*, *Dientamoeba fragilis* and *Blastocystis hominis* was measured 8%, 8% and 7%, respectively (8, 8 and 7 positive samples) (Table 1). The overall prevalence (positive result for at least one intestinal parasite) was 43%, of which only 10% was infected with only one parasite. The frequency of multiple infection of 2, 3 and 4 parasites were measured respectively 16%, 15% and 2% (Table 2).

In this study 46 men and 54 women were participating (46%, 54%). The prevalence in men was 50% and in women 37%. Also there was no significant correlation in total between prevalence and gender (P-value = 0.192) but *Entamoeba coli* with 43.4% prevalence in men and 22.2% in women showed a significant correlation with gender (P-value = 0.023) (Table 3).

The persons in this study were grouped based on duration of employment, in three

groups less than 10 years (Group 1), 20-30 years (Group 2) and more than 20 years (Group 3). According to the result, prevalence in Group1, 2 and 3 were measured 35%, 61% and 50%, respectively.

Also there was a significant difference in the case of *Dientamoeba fragilis* (P-value = 0.040) but for other no significant difference was found (P-value = 0.102) (Table 4).

According the result, the prevalence based on education, respectively for Diploma, Associate degree and Bachelor's degree were measured 70%, 38% and 40%. The highest prevalence was in Diploma and the lowest in Associate degree. There was no significant relation between prevalence and education (P-value = 0.185) (Table 5).

The overall results of this study indicate 43% prevalence of parasitic infection among medical diagnostic laboratories staff which this is identical to the results of Rohani and Mohammadian's study with 51.9% overall prevalence (Rohani and Mohammadian, 1999) and also ARBABI and TALARI with prevalence over 40% (Arbabi and Talari, 2004). The highest prevalence belonged to *Entamoeba coli* with frequency of 32% and the lowest belonged to *Hymenolepis nana* with 40%. The results seem higher compared to other studies done in the society and not merely in labs, such as Sayyari and colleagues' study with 19-20% prevalence (Sayyari et al., 2005) or Nasiri and colleagues' study with 4.7% (Nasiri *et al.,* 2009), which This difference could be the result of lab personnel's more contact with different types of parasitic infections than other groups of people in society.

Since *Entamoeba coli* is a non-pathogenic protozoan and in normal state does not cause diarrhea (Gastrointestinal symptoms) (Hashmey *et al.,* 1997), so the high prevalence in this study (32%) is justifiable.

In relation to gender, based on this study the prevalence is higher in men than women (43.3%, 22.2%), which this result is correspondent with also ARBABI and TALARI's study (Arbabi and Talari, 2004). In various places including Nigeria (Agi, 1995), Mexico (Quihui *et al.,* 2006) and in Iran in different cities like Tabas (Saied, 1999), Kerman (Nasser and Jafar, 1997), Shahrekord (Koroosh, 1997), this study has been done, and these results are also identical while in some cities in Iran like Amol (Ali, 1999) or in some places other than Iran like Philippines (Kim, 2003) the prevalence was higher in women which can be the result of environmental factors such as women's farming.

A significant correlation between the prevalence of *Entamoeba coli* and gender was found (P-value=0.023) while for other parasites there was none. The rate of prevalence based on duration of employment in three groups of less than 10, 10-20 and more than 20 years was measured respectively 35%, 61%, and 50%. These results show that the lowest prevalence is in the first years of career (0 to 10) and then the late years of career (20 to 30) while the highest prevalence belongs to the middle years of career (10 to 20).

Lower prevalence in early years of career could be the result of more sensitivity of sanitation in this course and thus less unsafe contact with parasitic infection in work place.

On the other hand, based on the results of other studies previous and frequent contacts with parasites can reduce the prevalence and severity of infection by increasing the level of body immunity responses (Luong, 2011), which the results of our study, indicate a proportional decrease is correspondent to these result.

Table.1 Overall prevalence of parasites

Parasites Name	Frequency	%
Entamoeba coli	32	32
Entamoeba histolytica	8	8
Giardia lamblia	16	16
Enterobius vermicularis	4	4
Hymenolepis nana	5	5
Blastocystis hominis	7	7
Chilomastix mesnili	15	15
Dientamoeba fragilis	8	8
Total	43	43

Table.2 The Prevalence of multiple infections

Number of Parasites	Frequency (%)	Cumulative Percentage (%)
One parasite	10	10
Two parasites	16	26
Three parasites	15	41
Four parasites	2	43

Table.3 Prevalence based on Gender

Parasites Name	Males (n=46)		Female (n=54)		Chi-square Test (P-value)
	Frequency	%	Frequency	%	
E. coli	20	43.4	12	22.2	0.023
E. histolytica	3	6.5	5	9.2	0.723
G. lamblia	8	17.4	8	14.8	0.726
E. vermicularis	1	2.2	3	5.6	0.622
H. nana	3	6.5	2	3.7	0.659
B. hominis	3	6.5	4	7.4	1.000
C. mesnili	5	10.9	10	18.5	0.286
D. fragilis	4	8.7	4	7.4	1.000
Total	23	50	20	37	0.192

Table.4 Prevalence based on Duration of employment

Parasites Name	< 10 years (n=65)		20-30 years (n=21)		> 20 years(n=14)		Chi-square Test (P-value)
	Frequency(+)	%	Frequency(+)	%	Frequency(+)	%	
E. coli	16	24	12	57	4	28	0.206
E. histolytica	3	4	3	14	2	14	0.121
G. lamblia	7	10	6	28	3	21	0.121
E. vermicularis	2	3	1	4	1	7	0.468
H. nana	2	3	2	9	1	7	0.331
B. hominis	4	6	2	9	1	7	0.760
C. mesnili	10	15	3	14	2	14	0.893
D. fragilis	3	4	2	9	3	21	0.040
Total	23	35	13	61	7	50	0.102

Table.5 Prevalence based on Education.

Parasites Name	Diploma (n=10)		Associate degree (n=29)		Bachelor's degree (n=61)		Chi-square Test (P-value)
	Frequency(+)	%	Frequency(+)	%	Frequency(+)	%	
E. coli	6	60	6	21	20	33	0.07
E. histolytica	2	20	1	3	2	3	0.21
G. lamblia	3	30	3	10	10	16	0.298
E. vermicularis	1	10	2	7	1	2	0.184
H. nana	1	10	2	7	2	3	0.466
B. hominis	2	20	1	3	4	7	0.254
C. mesnili	2	20	4	14	9	15	0.834
D. fragilis	2	20	3	10	3	5	0.17
Total	7	70	11	38	25	40	0.185

Among the Diploma, Associate degree and Bachelor's degree the lowest prevalence belongs to associate degree (38%) and the highest was the diploma (70%), which there was no significant correlation regarding to the education.

In Conclusion, the results of this study have shown that the overall prevalence of intestinal parasites among the lab workers of Zahedan University of Medical Sciences is relatively high, however all these parasites are not pathogenic.

According to the results, it is recommended that we could reduce the rate of new infections by considering training programs from health care authorities aiming to improve awareness of personnel and staff about the correct manners of interacting with the environment and work place, and also more realization of clinical manifestations of infections and positive results of dealing with infectious diseases as soon as possible. Also periodic screening programs can be helpful for personnel's who are at risk.

Also we suggest that for further studies in this area, by allocating material or spiritual benefits for persons participating in the study which are examined, in addition to gaining more participation, we could reduce the chance of false samples from laboratory staff.

Acknowledgement

We would be thanked to efforts of Research and Cooperation Deputy of Student Research Center, Dr Mirimoghadam due to their lot of work to do in this regard.

References

Agi, PI., 1995. Pattern of infection of intestinal parasites in Sagbama community of the Niger Delta, Nigeria. West African journal of medicine. 14(1):39-42.

Ali, H., 1999. Prevalence of intestinal parasites in Amol city. Tehran, Iran Tehran University School of Health Sciences and Research Institute..

Arbabi, M., Talari, S,. 2004. Intestinal parasitic infections among students in Kashan Medical University. J Ilam Univ med Sci.;12:24-33.

Bhandari, N,. Kausaph, V,. Neupane, GP,. 2011. Intestinal parasitic infection among school age children. Journal of Nepal Health Research Council.;9(1):30-2.

Garsia, LS,. 2001. Diagnostic Medical Parasitology. 4th ed. Washington: American Society for Microbiology; pp. 14–8.;85(6):778-82.

Guyatt, HL,. Bundy, DA.. 1991. Estimating prevalence of community morbidity due to intestinal helminths: prevalence

of infection as an indicator of the prevalence of disease. Transactions of the Royal Society of Tropical Medicine and Hygiene. 1991;85(6):778-82.

Herwaldt, BL,. 2001. Laboratory-acquired parasitic infections from accidental exposures. Clinical microbiology reviews.;14(4):659-88,

Hashmey, R,. Genta, RM,. White Jr, AC,. 1997. Parasites and Diarrhea. I: Protozoans and Diarrhea. Journal of travel medicine.;4(1):17-31.

Hambleton, P,. Dedonato, G,. 1992. Protecting researchers from instrument biohazards. BioTechniques.;13(3):450-3.

Kim, BJ,. Ock, MS,. Chung, DI,. Yong. TS,. Lee, KJ,. 2003. The intestinal parasite infection status of inhabitants in the Roxas city, The Philippines. The Korean journal of parasitology.;41(2):113-5.

Koroosh, MN,. 1997. Prevalence of intestinal parasitic infestations in patients attending the Parasitology Laboratory in Shahrekord. Iran J Parasitol; 11: 131a.

Lindo, JF,. Dubon, JM,. Ager, AL,. de Gourville, EM,. Solo-Gabriele, H,. Klaskala, WI,. *et al*,. 1998. Intestinal parasitic infections in human immunodeficiency virus (HIV)-positive and HIV-negative individuals in San Pedro Sula, Honduras. The American journal of tropical medicine and hygiene.;58(4):431-5.

Luong, LT,. Vigliotti, BA,. Hudson, PJ,. 2011. Strong density-dependent competition and acquired immunity constrain parasite establishment: implications for parasite aggregation. International journal for parasitology.;41(5):505-11.

Nasiri V, Esmailnia K, Karim G, Nasir M, Akhavan O. (2009). Intestinal parasitic infections among inhabitants of Karaj City, Tehran province, Iran in 2006-2008. The Korean journal of parasitology.;47(3):265-8.

Nasser Z, Jafar M. (1997). Prevalence of intestinal parasites in the city of Kerman. Iran J Parasitol.;11:129a.

Quihui, L,. Valencia, ME,. Crompton, DW,. Phillips, S,. Hagan, P,. Morales G,. et al,. 2006. Role of the employment status and education of mothers in the prevalence of intestinal parasitic infections in Mexican rural schoolchildren. BMC public health.;6:225.

Saied, H,. 1999. Prevalence of intestinal parasites in Tabas city. Tehran, Tehran University School of Health Sciences and Research Institute..

Sayyari, AA,. Imanzadeh, F,. Bagheri Yazdi, SA,. Karami, H,. Yaghoobi, M,. 2005. Prevalence of intestinal parasitic infections in the Islamic Republic of Iran. Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-sihhiyah li-sharq al-mutawassit. 11(3):377-83.

Stark, D,. Barratt, J,. Van Hal, S,. Marriott, D,. Harkness, J,. Ellis, J,. 2009. Clinical significance of enteric protozoa in the immunosuppressed human population. Clinical microbiology reviews.;22(4):634-650.

Sewell, DL,. 1995. Laboratory-associated infections and biosafety. Clinical microbiology reviews.;8(3):389-405.

Rohani, S,. Mohammadian, F,. 1999. Prevalence of intestinal parasites in medical diagnostic laboratories staff, Shahid Beheshti University of Mediacal Sciences. Pajouhandeh (2001); 24: 361-365.

World Health Organization,. 1987. Prevention and control of intestinal parasitic infections: report of a WHO Expert Committee [meeting held in Geneva from 3 to 7 March 1986]. Geneva., WHO Technical Report Series749.