JMSR
Journal of Medical and Scientific Research

ORIGINAL RESEARCH

Occurrence of intestinal and urinary parasites among Alkhalawi students, Sudan: A cross-sectional study

Nabig Alhag Gasoum Ali[1], Husameldin Abdalla Bakhit[2], Mohammed Baha Eldin Ahmed Saad[3], Monadel Mohammed Ahmed Zain Alabeden[3], Aisha Abbas Alsadig[4], Yousif Mohammed Yousif Ballal[5], and Alaaeldeen Balal Ahmed[1,2]*

[1]Faculty of Medical Laboratory Sciences, Omdurman Islamic University, Omdurman, Sudan
[2]Faculty of Medical Laboratory Sciences, White Nile University, White Nile State, Kosti City, Sudan
[3]Faculty of Medical Laboratory Sciences, Omdurman Ahlia University, Omdurman, Sudan
[4]Veterinary Research Administration, Soba, Sudan
[5]Faculty of Medical Laboratory Sciences, Managil University of Science and Technology, Managil, Sudan

Abstract

Background: Parasitic diseases were some of the leading causes of global mortality with higher burdens of prevalence in developing countries, especially regions of the world where the contaminated water and poor personal hygiene. The purpose of this study to determine the prevalence rate of intestinal and urinary parasites among Alkhalawi students in Rabak city, White Nile State, Sudan.

Materials and methods: In this study, 150 stool and 150 urine samples were collected from Alkhalawi students (all were males). The stool samples were processed by wet preparation, formal ether concentration technique and the urine samples were processed by the sedimentation technique.

Results: The results revealed that out of the 150 stool and 150 urine samples, 37 were found positive for intestinal and urinary parasites, this constituted an overall prevalence rate of 12.3%. The highest prevalence rate (28%) was reported among the 11-15 years age groups, while the lowest prevalence rate (0%) was reported among the 21-25 years age groups. The prevalence rate of different parasites was as follow: *Giardia lamblia* (11.3%), *Entamoeba histolytica* (8%), *Hymenolepis nana* (2.7%), *Schistosoma haematobium* (3.3%). The prevalence of intestinal parasites (21.3%) was higher than urinary parasites (3.3%). The study showed that 24% were infected with single infection and 0.6% were infected with mixed infection.

Conclusion: From the result we concluded the intestinal and urinary parasites are highly prevalent among the Alkhalawi students in Rabak city. *Giardia lamblia* is more likely to occur among the Alkhalawi students followed by *Entamoeba histolytica*. The highest infection rate was reported among the 11-15 years age groups. Formal ether concentration technique proved to be as efficient more than the wet preparation technique.

***Keywords*:** intestinal parasites; urinary parasites; prevalence rate; Alkhalawi students; Sudan

Corresponding author: Alaaeldeen Balal Ahmed, Omdurman Islamic University, Faculty of Medical Laboratory Sciences, P.O. Box: 382, Omdurman – Sudan, Mobile phone: +249909724585, Email: alaabelal2009tlc@gmail.com

Received 13 August 2020; *Revised* 17 September 2020; *Accepted* 24 September 2020; *Published* 30 September 2020

Citation: Ali NAG, Bakhit HA, Saad MBEA, Alabeden MMAZ, Alsadig AA, Ballal YMY, Ahmed AB. Occurrence of intestinal and urinary parasites among Alkhalawi students, Sudan: A cross-sectional study. J Med Sci Res. 2020; 8(4):166-169. DOI: http://dx.doi.org/10.17727/JMSR.2020/8-22

Introduction

Infection with intestinal parasites remains one of the most common health problems in the world mainly in tropical and subtropical countries [1]. Parasitic infection associated with poor hygiene and lack of sanitation is commonly observed in developing countries [2]. Intestinal and urinary parasites are distributed worldwide, particularly in the tropical and subtropical areas [3]. The prevalence of these parasites is promoted by several epidemiological factors such as poor sanitation, environmental degradation, ignorance, poor personal and community hygiene, climate condition and other socio-cultural practice such as the use of night soil as fertilizer [4]. The intestinal parasitic infections (e.g. helminths and pathogenic intestinal protozoa) are of public health importance, particularly in developing countries. For example, the global burden caused by soil transmitted helminthiasis is estimated at 39 million disability-adjusted life years (DALYs) [5]. Whereas urinary schistosomiasis being a major debilitated disease characterized by blood in the urine. In the worst cases, schistosomiasis will cause bladder cancer, caused by the parasite *Schistosoma haematobium*, about 38 million people are infected in 16 African countries [6]. Intestinal parasites spread rapidly in areas with poor sanitation and are the most common in tropical developing countries on the African, Asia and South American continents [7]. Intestinal parasites and urinary parasite infection are a common health problem especially among children and communities with poor hygiene and unsafe water supply. The infections with intestinal and urinary parasites are serious and may lead to death. The infections are directly related to the behavior of the infected person. Therefore, the purpose of this study to determine the prevalence rate of intestinal and urinary parasites among Alkhalawi students in Rabak city, White Nile State, Sudan.

Materials and methods

This was a cross-sectional study. The study was performed in four Islamic centers (Alkhalawi) in Rabak in the White Nile State. The study was conducted on male students in the Islamic centers (Alkhalawi) in Rabak city. The population was divided according to age groups as follow: Group A from 5 – 10, Group B from 11 – 15, Group C from 16 – 20, and Group D from 21– 25 years-old.

Ethics approval and consent to participate

Ethical approval of the study was given from AL-Neelain University, college of graduate studies and the informed consents were taken from the all study subjects after explaining the nature of the study.

Samples reception and processing

Sterile plastic containers were distributed which were labeled with the name and an assigned code to collect the samples; information and explanations were furnished to how they were to collect and transport the stool and urine samples to the collection sites. The collection and transportation guidelines followed pre-analytical standard operating procedures (SOPs). 150 stool and 150 urine samples were collected in this study according to the formula ($n=z^2pq\div d$).

Detection of intestinal parasites

Wet preparation and formal-ether concentration technique were used to detect and confirm the intestinal parasites.

Detection of urinary parasites

Urine sedimentation technique was used to detect the urinary parasites.

Inclusion criteria: The Alkhalawi students in Rabak city.

Exclusion criteria: Population other than the Alkhalawi students.

Statistic

Data collected were analyzed by using statistical package for the social sciences (SPSS) software. Statistical analysis was done using Chi-square to evaluate any association between parasitic infections. Observed differences in data were considered significant and noted in the text if $P < 0.05$. Data were presented in tables.

Results

Overall prevalence rate of intestinal and urinary parasites among the Alkhalawi students in Rabak city, White Nile State

The results showed that out of the 150 stool and 150 urine samples of the Alkhalawi students examined,

37 were found positive for gastrointestinal and urinary parasites. This constituted an overall prevalence rate of 12.3% (Table 1).

Table 1: Overall prevalence rate of intestinal and urinary parasites among the Alkhalawi students in Rabak city, White Nile State.

Number of examined subjects	*Number of positive subjects*	*Prevalence %*
300	37	12.3

Comparison between intestinal parasites infection among the study population

The study revealed that out of the 32 positive intestinal parasites cases, 31 were with a single infection and only one was with a mixed infection (*E.histolytica* and *G.lamblia*) constituting a prevalence rates of 20.6% and 0.6% respectively (Table 2). The difference in rates was found to be statistically significant at p=0.000.

Comparison between the prevalence rates of intestinal parasites using direct wet preparation and formal ether concentration technique

The prevalence of intestinal parasites by different parasitological techniques was as follows: 23% by direct wet preparation and 24.6% by formal ether (Table 2). The difference in rates was found to be statistically insignificant at p=0.892.

Table 2: Comparison between the prevalence rates of intestinal parasites according to the infection type and used technique.

Character		*Examined number*	*Positive samples*	*Percent %*
Infection	Single infection	150	31	20.6
	Mixed infection (E.histolytica + G.lamblia)	150	1	0.6
Technique	Direct wet preparation	150	35	23
	Concentration technique	150	37	24.6

The prevalence rate of urinary and intestinal parasites among the Alkhalawi students in Rabak city, White Nile State according to age groups

The results showed that 5-10, 11-15, 16-20 and 21-25-years age group revealed different rates (13%, 28%,18% and 0% respectively) (Table 3). The difference in rates was found to be statistically insignificant at p=0.207.

Different intestinal and urinary parasites detected among the Alkhalawi students in Rabak city, White Nile State

The prevalence of different parasites was as follows: *Giardia lamblia* (11.3%), *Entamoeba histolytica* (8%), *Hymenolepis nana* (2.7%) and *Schistosoma haematobium* (3.3%) (Table 3).

Table 3: The prevalence rate of urinary and intestinal parasites among the Alkhalawi students in Rabak city, White Nile State according to the age groups and detected parasite.

	Character	*Examined Number*	*Positive Samples*	*Percent %*
Age groups	A (5-10)	23	3	13
	B (11-15)	104	30	28
	C (16-20)	22	4	18
	D (21-25)	1	0	0
The parasite	Giardia lamblia	150	17	11.3
	Entamoeba histolytica	150	12	8
	Hymenolepis nana	150	4	2.7
	Schistosoma haematobium	150	5	3.3

Discussion

Unsafe water and poor sanitation and hygiene have been reported to rank third among the 20 leading risk factors for health burden in developing countries, including Sudan [8]. From the results, it was obvious that the overall prevalence of intestinal and urinary parasites among the Alkhalawi students in Rabak city, White Nile state was high (12.3%). This rate was found to be lower than the rate reported by Akinboye *et al* (2015) [9] in Nigeria (53.3%). In this study, the highest prevalence rate (28%) was reported among the 11-15 years age group. This rate does not agree with Abuobieda (2017) [10] who reported that the age group 6-8years was the most affected. The finding of this study indicated that the common intestinal and urinary parasites among the Alkhalawi students were: *Giardia lamblia* (11.3%), *Entamoeba histolytica* (8%), *Hymenolepis nana* (2.7%), *Schistosoma haematobium* (3.3%), while Colman *et al* (2013) [11] in Maiduguri reported that the most prevalent intestinal and urinary parasites were *Entamoeba coli* (9.95%), Hookworms (6.47%), *Entamoeba histolytica* (4.48%), *Hymenolepis nana* (3.48%), *Schistosoma haematobium* (3.48%) and *Taenia* spp (0.05%). As far as the detection rates for the two techniques used, it was obvious that the detection rate (24.6%) was reported for the formal ether concentration technique and 23% for the wet preparation, which indicates that both techniques have the same efficacy in detecting intestinal parasites. Our results, for the formal ether technique does not agree with Venkatesh (2016) [12], in Hyderabad who reported 66% detection rate.

Conclusion

From the result we can conclude that the intestinal and urinary parasites are highly prevalent among the Alkhalawi students in Rabak city. *Giardia lamblia* is more likely to occur among the Alkhalawi students in Rabak city followed by *Entamoeba histolytica*. The highest infection rate was reported among the 11-15 years age groups. Formal ether concentration technique proved to be as efficient more than the wet preparation technique. The Alkhalawi students are targeted to be informed and equipped with the needed information to avoid these infections.

Acknowledgements

The authors are very grateful to all the Alkhalawi students in Rabak city for their co-operation.

Conflicts of interest

Authors declare no conflicts of interest.

References

[1] Wakid MH. Improvement of Ritchie technique by identifying the food that can be consumed pre- analysis. J Appl Sci Res. 2009; 5(3):293–296.

[2] Wegayehu TT, Tsalla B, Seifu B, Teklu T. Prevalence of intestinal parasitic infections among highland and lowland dwellers in Gamo area, South Ethiopia. BMC Public Health. 2013; 13:151.

[3] Ochei OJ, Kolhatkar A. Laboratory techniques for intestinal parasites. Medical laboratory science theory and practical. 2000; 909–1044.

[4] Eneanya CI, Njom VS. Geohelminth contamination of some common fruits and vegetable in Enugu, South east Nigeria. The Niger J Parasitol. 2003; 24(1):123–128.

[5] WHO. Prevention and control of schistosomiasis and soil transmission helminthiasis: first report of the joint WHO expert committees. WHO Tech Rep Ser. 2002; 912:1–57.

[6] WHO. Schistosomiasis. World Health Organization division of control of tropical diseases January report series. 2007; pp.86.

[7] Haftu D, Deyessa N, Agedew E. Prevalence and determinant factors of intestinal factors of intestinal parasites among school children in Arba Minch Town, Southern Ethiopia. Am J Health Res. 2014; 2(5):247–254.

[8] World Health Organization. Emerging issues in water and infectious disease, 2003.

[9] Akinboye DO, Abdullah AR, Awodele O, Akintunde TI, Effedua HI, et al. Prevalence of intestinal and urinary parasites among food-handlers in Ilishan-Remo, Ogun State, Nigeria. Nigerian Journal of Parasitology 2015; 36(2):113–118.

[10] Abuobieda SMS. The prevalence rate of intestinal parasites among primary schools' children in Ombda locality, 2017.

[11] Colman S, Mangoro ZM, Isa L. Incidence of intestinal and urinary parasites among prison inmates. AJMR. 2013; 1(1):11–15.

[12] Venkatesh BS, Rao SR, Vivekan N, Shanker BM. A comparative study of concentration techniques for detection of intestinal parasitic infections–to evaluate the prevalence and to identify a better method of concentration technique at a Tribal Tertiary Care Hospital, 2016.