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Gastrointestinal parasites among inmates in Omdurman prison

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Abstract:

The results showed that 49% of inmates were harboring gastrointestinal parasites. The parasites detected were as follows: *Giardia lamblia* (16.3%), *Entamoeba histolitica* (17.4%), *Entamoeba coli* (5.3%), *Ascaris lumbricoides* (5.3%), *Schistosoma mansoni* (1%) and *Taenia spp* (11.7%). In males, the highest rate (16.6%) was detected among the 31 to over 40years age group, while in females it was high among the 21-30 years old group (20.6%).The highest rate (17.7%) was detected among those from southern Sudan and the lowest (9.3%) was observed among those from Somalia and Ethiopia. The highest detection rate (78.2%) was reported with the formal ether technique, while the lowest (14.9) was reported with the sodium chloride flotation technique.

Introduction:

The three factors that separate the underdeveloped world from developing world are access to dirty water, bad sanitation and bad nutrient. Gastrointestinal parasites (GIT) are associated with these factors [(1)].

Intestinal parasites are parasites that populate the gastrointestinal tract. The term is not merely a collective term [(2)], but it can include a group of diverse parasites that vary greatly in many aspects e.g. biology, pathology, epidemiology. Taxonomically, the intestinal parasites are composed of two major subgroups: Protozoa: It includes *Giardia lambilia*, *Entamoeba histolytica* ,*Balantidum coli* and *Cryptosporidium parvum*. Helminthes: The intestinal helminthes are represented by both flat worms and nematodes [(3)]. Intestinal nematodes constitute by far the most common parasitic infection in human [(4)]. It includes *Ascaris lumbericoides, Enterobious vermicularis, Strongyloides stercoralis* and *Trichuris trichiura*. In the other branch, it includes flat worms (Trematodes and Cestodes). They include *Hymenolepis nana*, *Taenia species* and *Fasiola hepatica*. They parasitize human, small intestine and are highly adapted to cause a minimum harm. The frequency of the infection is a general indication of local level of development of hygiene and sanitation.

Material and Methods:

Study area: The study was conducted in Omdurman prison which is located 4 kilometers far away from Khartoum center.

Study Population: The study was conducted on the inmates (male and females) of Omdurman prison.

Sample size: A total of 300 inmates (150 males and 150 females) were examined for the presence of gastrointestinal parasites. The inmates were categorized according to different age groups and different state of origins as follows:

Group 1: age between 10-20 years.

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Group 2: age between 20-30 years

Group 3: age over 40 years

Sampling collection: Each selected inmate was provided with a labeled container which is transparent, clean and with wide mouth for faecal sample collection. From each selected inmate, the labeled container was checked to ensure that the number of the container corresponds to the serial number on the individuals request form.

All those steps were done in order to ensure the quality control measures.

Methodology: The following techniques were used for detection of different parasitic infections: 1.Direct smear examination 2.Formal ether concentration technique 3.Saturated sodium chloride floatation technique 4.Saturated sugar floatation technique.

Results:

Out of the 300 inmates (150 males and 150 females) examined for the presence of gastrointestinal parasites, 147 were found to harbor parasites in their gastrointestinal tract. This constituted an overall prevalence rate of 49% (table 1).

Out of 150 male inmates, 73 were positive for parasites infection which constituted a 48.7% prevalence rate. In females, the prevalence rate was found to be 49.3% (table 2). This difference was found to be statistically insignificant (p value=0.91).

The result showed that the highest prevalence rate of gastrointestinal parasites (18%) was found among the 21-30 age group, while the lowest prevalence rate (1.3%) was reported among the 10-20 age group (table 3). This difference was found to be statistically insignificant (p value=0.20).

In males the highest prevalence rate (16.6%) was reported among the 31- 40 age groups, while the lowest prevalence rate (0%) was reported among the 10-20 age group (table 4). This difference was found to be statistically insignificant (P value=0.44).

In females, the highest prevalence rate (20.6%) was reported among the (21-30) age group, while the lowest prevalence rate (2.6%) was reported among the 10-20 age group (table 5). This difference was found to be statistically insignificant (P value=0.48).

The result revealed that the highest prevalence rate (17.7%) was reported among inmates from the southern region, while the lowest rate 9.3% was reported among others who represent those from Somalia and Ethiopia (table 6). This difference was found to be statistically insignificant (P value=0.41).

The parasites encountered during the study were *Entamoeba histolytica* with a prevalence rate of 14.7%,*Ascarislumbricoides* (5.3%), *Hymenolepis nana* (5.3%), *Entamoeba coli* (2.7%), *Giardia lambilia* (16.3%), *Taenia spp* (11.7%) and *Shistosoma mansoni* (10%) (table7). This difference was found to be statistically significant (P value= 0.04).

The results demonstrated that the highest detection rate (78.2%) was reported for the ether technique while the lowest detection rate (14.9%) was reported for saturated sodium chloride technique (table 8). This difference was found to be statistically significant (P value=0.01).

Table 1: The overall prevalence rate of gastrointestinal parasites among inmates in Omdurman prison

Number examined	Number positive	Prevalence
300	147	49%

Table 2: The prevalence of gastrointestinal parasites among inmates in Omdurman prison according to gender

Sex	Number examined	Number positive	prevalence	P-value
Males	150	73	48.7	
Females	150	74	49.3	0.91
Total	300	147	49	

Table 3: The prevalence of gastrointestinal parasites among inmates in Omdurman prison according to age groups

Age group	Number examined	Number positive	Prevalence	P-value
10 - 20	11	4	1.3%	
21- 30	94	54	18%	
31 - 40	103	49	16.3%	0.20
Over 40	92	40	13.3%	
Total	300	147	49%	

Table 4: The prevalence of gastrointestinal parasites among inmates in Omdurman prison according to age groups in males

Age group	Number examined	Number positive	Prevalence	P-value
10 - 20	1	0	0%	
21- 30	40	23	15.3%	
31 - 40	52	25	16.6%	0.44
Over 40	57	25	16.6	
Total	150	73	48.7%	

Table 5: The prevalence of gastrointestinal parasites among inmates in Omdurman prison according to age groups in females

Age group	Number examined	Number positive	Prevalence	P-value
10 - 20	10	4	2.6%	
21- 30	54	31	20.6%	
31 - 40	51	24	16%	0.48
Over 40	35	15	10%	
Total	150	49.3	4903%	

Table 6: The prevalence of gastrointestinal parasites among inmates in Omdurman prison according to states of origin

States of origin	Number examined	Number positive	Prevalence	P-value
South	108	53	17.7%	
West	81	36	12%	
North	64	30	10%	0.41
Others	47	28	9.3	
Total	300	147	49%	

Table 7: The prevalence of different gastrointestinal parasites encountered among inmates in Omdurman prison

Parasite	Number examined	Number positive	Prevalence	P-value
Entamoeba histolytica	300	44	14.7%	
Ascaris lumbricoides	300	16	5.3%	
Hymenolepis nana	300	16	5.3%	
Entramoeba coli	300	8	2.7%	0.04
Giardia lamblia	300	49	16.3%	
Taenia spp.	300	35	11.7%	
Schistosoma mansoni	300	3	1%	

Table 8: Detection rates of different techniques used for the diagnosis of gastrointestinal among inmates in Omdurman prison

Technique used	Number positive	Number detected	Detection rate	P-value
Wet smear	147	66	44.9%	
Ether technique	147	115	78.2%	0.01
Sodium chloride	147	22	14.9%	
Sugar technique	147	36	24.4%	

Discussion:

From the results, it is obvious that the overall prevalence rate of gastrointestinal parasites among inmates in Omdurman prison is extremely high (49%). This rate was found to be higher than the rate reported by Awole *et al* [(5)] in Ethiopia (34.4%). However, our rate was found to be lower than the rate reported by Develoux *et al* [(6)] in Juba (66 %).

The highest prevalence rate was reported among the age groups 21 – 30 and 31 – 40 years old. This was also true for both age groups in males and females. This finding was in agreement with Eman [(7)] who reported higher rates among the 11 -20 and 21 – 40 age groups in Elrenk district.

From the findings, parasites were mostly encountered in those who came from the southern region and were least encountered in those who came from Somalia and Ethiopia. Our finding for those who came from the south was in line with the finding reported by other workers who conducted similar studies in the south as Marnell *et al* [(1)] and Homeida [(8)] reported a 66% prevalence rate in Juba. In Somalia and Ethiopia, higher rates were reported (15.1% and 34.4% respectively) [(5, 9)], while the rate reported in our study was 9.3% for both.

The highest prevalence (16.3%) was reported for *G. lambilia* followed by exceptionally higher rate for *E. histolytica* and *Taenia spp* with small rates for the others. Similar prevalence rate of *G. lambilia* (16.3%) was reported by Develoix *et al* [(6)] in Niger. This rate was greater than the rate reported by Obiamiwe and Nmorise [(10)] in Nigeria (1.4 %).

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Our rate withy *E. histolytica* was higher than the rate reported by Obimiwe and Nmorise [10] in Niger (3.9%) and lower than the rate reported by Devaloux *et al* [6] in Niger also (29.3%). In this study, *Taenia spp* were found in 11.7% of the population examined. This rate was greater than the reported by Prescika [11] (3.2%). For *Ascaris* and *Shistosoma*, the rate was low (5.3% and 1% respectively). These low rates might be attributed to the different origins of the inmates. *Ascaris* was prevalent in those individuals most probably coming from the south and *S. mansoni* is endemic in certain irrigated areas of Sudan. Higher rates of those two parasites are expected in individuals who are residing in endemic areas. Other parasites reported in this study have no limited area i.e. common in all parts of the Sudan.

As far as the detection rates for the 4 techniques used, it was obvious that the highest detection rate (78.2%) was reported for the ether technique and the lowest rate (14.0%) was reported for sodium chloride technique, while the wet smear and sugar technique showed rates of 44.9% and 24.4% respectively.

Our result for the ether technique was in agreement with Eissa [12] who reported 90% detection rate. However, the detection rate reported in our study was greater than the detection rate reported by Eman [7] (44%). The study revealed that the detection rate for the wet preparation was almost similar to the detection rate reported by Eman [7] (41.4%). Sodium chloride technique was very less efficient in our study compared with Eissa [12] who reported detection rate of 47% while ours was 14.9%.

The detection rate for the sugar floatation technique (24.4%) was lower than the detection rate obtained by Duria [13] (58.6%).

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