

PREVALENCE OF PARASITE EGGS AND CYSTS ON COMPUTER MOUSE, KEYBOARDS AND USERS OF INTERNET CAFÉS, IN SAMARU, ZARIA, NIGERIA

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Abstract

A study was carried out between May and July 2004 in Internet cafés in Samaru, Zaria, Nigeria to determine the prevalence of parasites eggs and cysts. Four hundred and fourteen samples (414) were obtained by obtaining swabs from computer accessories (keyboards and mouse) and the palms of users, using cotton buds wetted with normal saline into test tube each containing 20ml of normal saline. The samples were processed by centrifugation with the microscope. Parasites' cysts and eggs were Isolated 24(5.8%). *Ascaris* eggs was the highest, with 15(62.50%) while *Enterobius vermicularis* and *Entamoeba histolytica*, with 3(12.50 %) presented the same prevalences respectively, *Trichuris trichuira* and *Taenia* species 2(8.33%), 1(4.17%) respectively, recorded lower prevalence. There was no significant association between the prevalence of parasites eggs and cysts or café users before and after browsing. The preponderance of intestinal helminthes parasite in the study show that Internet cafés in Samaru are not free from parasite cysts and eggs contaminated due to poor sanitary habits or pollution in the environment. A preventive measure by way of education and cleanliness of the cafés is suggested.

Keywords: parasites, cyst, keyboard, helminthes, Taenia

Introduction

The Nigerian environment has been described as poor, based on personal, community and environmental hygiene (Akogun, 1989; Yusuf and Hussein, 1990). This poor state of hygiene is accounted for by the presence of immature stages of parasite (egg and cysts) in the soil (Mahdi and Ali, 1993), in the air (Lawande, 1983), on toilet door handles (Sanni, 1997), on water closet handles (Nock and Geneve, 2002), on beaks and legs of domestic chicken (Abuja, 1997) and on the sole of shoes (Tanko, 1999) demonstrating the indiscriminate nature of faecal disposal system. All these show the dynamic transmission network that exist in the Nigeria environment, through which parasite infect human and animal hosts; because once they are introduced into the soil, parasites eggs and cysts can be transported on contact with any subject. This accounted for the high prevalence and incidence of parasite infection in both humans and animals (Hopkins, 1992; Akogun and Badaki, 1998).

The Internet is progressively becoming an effective means of communication in

Nigeria, thus there is an upsurge of people visiting the internet cafes, some reasons to browse. During the use of the computer, the keyboard and mouse are used for input of commands with the fingers and palms of the hands, thus acting as points of contact between the Internet and its users. The Internet café is proposed, as a suitable model to test the role its plays in the transmission of parasite cysts and eggs in Zaria. The study was conducted to determine the potential of Internet cafés as a vehicle of helminthes parasite transmission with the following objective to: -

- determine the prevalence of eggs and cysts of helminthes in Internet cafés computer and accessories.
- determine the prevalence of helminthes eggs and cysts on internet users before and after using the cafés.

Materials and Methods

The Study Area

The study was conducted in Samaru (11° 09' N, 7° 39'E) in Zaria, Nigeria. Samaru is a cosmopolitan town where the Ahmadu Bello University is located. It has poor sanitation due

to poor personal and community hygiene; coupled with poor animal husbandry. Human and animal wastes litter around human habitation in the area (Dada and Bellino, 1979). Domestic animals kept by the people were in a free ranged system; amongst which are dogs, pigs, cows, cats, sheep and goats, that roam about unrestricted. The university environment is clean due to good sewage disposal methods, through the municipal sewage system from residential quarters. However, dogs, chickens and cats can be found roaming about unrestricted. Inhabitants of Samaru have high prevalence of intestinal parasite infections (Galadima and Olatunde, 1987; Kogi *et al.*, 1991; Abdullahi and Abdullazeez, 2000). There are six Internet cafés, four of which are located in the Samaru town and two in the university premises.

Collection of samples

A total of 414 samples were collected from four internet cafés and their users namely; SI.Com, Aso and Burkan (located in Samaru town), while Hephzibah is located within the university premises. A total of 214 samples were collected from computer accessories, which were keyboard and mouse, between 7:00 - 8:00am before the Internet was used on the day of collection. A total of 200 samples were obtained from consenting Internet users before and after browsing, with swabs. These were collected from the palm and the fingernails of both hands during browsing period between 8:00 - 22:00pm. Each swab was placed in a universal bottle containing 20ml of normal saline. The samples were labeled and kept in a cool box at 4°C, and transported to the laboratory for processing on the same day.

Treatment and examination of samples

Each sample collected was treated and examined for the presence of parasite cysts and eggs according to Neva and Brown (1994). Each sample was centrifuged at 2000rpm for 3minutes. The supernatant was discarded and the sediments re-suspended.

The sediment, along with small quantity of the supernatant was transferred to a clean microscope slide using a Pasteur pipette. A drop of Lugol Iodine was added and then mixed with the sediment on the slide. A clean

cover slip was placed on the mixture and examined under the microscope at X400 magnification and identification was done according to Jeffery and Leach (1975.)

Data Analysis

The data obtained was analyzed and the summaries obtained for cafés and Internet users (Table 1). The prevalence of the parasite cysts and eggs was obtained by mathematical calculation (Table 2 and 3) while Chi-square analysis was used to determine the degree of association between the prevalence of parasite cyst and eggs and the Internet cafés (Table 4) and prevalence of parasite cyst and eggs and users before and after Internet use (Table 5) while the analysis of variance (ANOVA) was used to determine significance between parasite cysts and egg prevalence and the cafés and between the species of parasite encountered (Table 6).

Results

The number of samples obtained during the study is presented in Table 1. Out of the total of 414 samples collected, 214 were obtained from Internet cafés computer keyboard and mouse while 200 samples were obtained from Internet users before and after browsing.

The result obtained (Table II) shows that of the 214 samples obtained from the computer accessories, 19(8.88%) were positive for parasite cysts and eggs. The highest number of 7(12.50 %) was recorded in Aso café, whereas Burkan and SI cyber cafés recorded the same result of 5(9.26 %), Hephzibah recorded the lowest 2(3.50%). However, statistically there was no significant difference in the prevalence of parasite cyst/egg between the cafés studied.

Out of the 100 samples obtained from the users before browsing, an overall prevalence of 3(3.00%) was observed (Table III). The details of distribution showed that that Aso, Burkan and Hephzibah cafés recorded prevalences with 1(4.38%), 1(4.17%) 1(3.57%) respectively, while SI was not positive for parasite cysts or eggs. No significant difference was observed between Internet users before browsing and prevalence. Similarly, of the 100 samples obtained from users after browsing, 2 (2.00%)

was the overall prevalence recorded from two cafés, Aso and SI, which proved positive with 1 (4.38%) and 1 (4.0%) respectively, while both Hephzibah and Burkan cafés were negative. Prevalence was not significantly associated with users of the Internet after browsing (Table 4).

The identity of the parasite cysts and eggs encountered during the study is presented in Table 5. Five parasite species were detected. These were *Ascaris* sp (62.50%), *Enterobius vermicularis* (12.50%), *Entamoeba histolytica* (12.50%), *Trichuris trichuira* (8.33%) and *Taenia* species (4.17%). with significant difference ($P < 0.05$) in the prevalence between

Ascaris, *Enterobius vermicularis*, *Entamoeba histolytica* *Trichuris trichuira* and *Taenia* species.

The results in Table 6 show the prevalence of the parasite cysts and eggs isolated from cafés. The result shows no significant difference between the prevalence of parasite cysts and egg and the type of cafés studied, whereas there was significant difference ($P < 0.05$) between *Ascaris*, *Enterobius vermicularis*, *Entamoeba histolytica* *Trichuris trichuira* and *Taenia* species isolated.

Table 1. Samples from Internet cafés and users during the study

Cafés	No. of samples	
	Computer Accessories	users before browsing
SI-Cyber	54	25
ASO	56	23
Hephzibah	56	28
Burkan	48	24
Total	214	100

Table 2. Parasite cysts and eggs from computer accessories in cafés

Cafés	Number examined	Number positive
SI-Cyber	54	5
ASO	56	7
Hephzibah	56	2
Burkan	48	5
Total	214	19

$\chi^2 = 0.05194$;
df = 3
not significant

Table 3. Parasite cysts and eggs from café users before browsing

Cafés	Number examined	Number positive	% positive
SI-Cyber	25	0	0.00
ASO	23	1	4.35
Hephzibah	28	1	3.57
Burkan	24	1	4.17
Total	100	3	3.00

$\chi^2 = 0.1292$; d f = 2 Not significant

Table 4. Parasite cysts and eggs from café users after browsing

Cafés	Number examined	Number positive	% positive
SI-Cyber	25	1	4.00
ASO	23	1	4.35
Hephzibah	28	0	0.00
Burkan	24	0	0.00
Total	100	2	2.00

$\chi^2 = 0.6216$ $df = 1$ $n = s$

Table 5. Identity of parasite encountered during the study

Parasite egg/cysts Isolated	Number Isolated	Percentage (%)
<i>Ascaris</i> spp	15	62.50
<i>Trichuris trichuira</i>	2	8.33
<i>Enterobius vermicularis</i>	3	12.50
<i>Entamoeba histolytica</i>	3	12.50
<i>Taenia</i> spp	1	4.17
Total	24	100.00

$\chi^2 = 0.000031713$, $df = 3$ $n = s$

Table 6. Parasite cysts and eggs recovered from cafés

Cafés	No. positive	No. of parasite (%)				
		<i>Ascaris</i> spp	<i>Trichuris trichuira</i>	<i>Enterobius vermicularis</i>	<i>Entamoeba histolytica</i>	<i>Taenia</i> spp
SI-Cyber	5 (27.78)	2(40.00)	1(20.00)	1(20.00)	1(20.00)	0(0.00)
ASO	6(33.33)	3(50.00)	1(16.61)	1(16.67)	2(33.33)	0(0.00)
Hephzibah	2(11.11)	1(50.00)	0(0.00)	1(50.00)	0(0.00)	0(0.00)
Burkan	5(27.78)	4(80.00)	0(0.00)	0(0.00)	0(0.00)	1(20.00)
Total	18	10(55.56)	2(11.11)	3(16.67)	3(16.67)	1(5.56)

Anova : - $F_{(rows)} = 0.15816$ ns $P > 0.05$
 $F_{(columns)} = 6.6449$ s $P < 0.05$

Discussion:

This study has shown that computer accessories (keyboard and mouse) commonly used for Internet browsing in Samaru, Zaria were contaminated parasite cysts and eggs, with a prevalent rate of (8.88%). The cafés were found to have similar prevalence rates for parasite cysts and eggs. These did not affect Internet users significantly, before or after browsing of the Internet. The identity of the parasite revealed that they were intestinal parasites with *Ascaris trichuira*, *Enterobius vermicularis*, *Entamoeba histolytica* or *Taenia* species. This study is being reported for the first time in Samaru, and corroborates similar reports by Nock and Genevieve, (2002) on water closet handles, amongst others. Both studies associate the prevalence of parasites' cysts and eggs to poor hygiene conditions which were common features of helminthes parasite, similar to those encountered in this study. The contamination of the cafés and users could be due to the moist nature of soil, which was observed during the period of investigation. Samaru had water shortage long time and the inhabitants of Samaru fetched water from various sources, which included wells, boreholes, streams and the university dams. This activity might have brought them in contact with water polluted with parasite cyst and eggs, due to poor sanitary conditions of the environment of Samaru, occasioned by indiscriminate disposal of faecal matter by animals that roam about the streets of Samaru and humans with poor sanitary habits. The similarities in prevalence of parasite cyst and eggs in different cafés and in users browsing before and after revealed in this study, suggested that cafés users are prone to contamination. Cafés are also reservoirs where parasite cysts and eggs can be

transmitted after browsing. The significant difference in the prevalence between parasite species confirms the abundance of parasite cysts and eggs in the Samaru environment, which might be responsible for various intestinal disorders, reported in various investigations (Galadima and Olatunde, 1987; Kogi *et al.*, 1991; Abdullahi and Abdullazeez, 2000).

The result of this study revealed that Internet cafés are not free of parasite cysts and eggs and thus could be foci of transmission, given the poor state of the environment. Preventive measures should be adopted particularly when the numbers of people visiting the cafés daily are considered.

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