Incidence of intestinal and urinary parasites among prison inmates.

Accepted 19th April, 2013

ABSTRACT

The prevalence of intestinal and urinary parasites in Maiduguri prisons was investigated; stool and urine samples were collected from the inmates and examined microscopically for parasites' ova, cyst and larvae. 201 (198 male and 3 female) inmates were examined. Of the 66 (32.84%) parasites detected, male inmates had the highest prevalence (32.84%) while the female had none (0.00%). The most parasites detected were helminths (22.89%). The highest occurrence of the parasites are Entameoba coli (9.95%), followed by Hookworm (6.47%), Entameoba histolytica (4.48%), H. nana and Schistosoma haematobium had (3.48%) each, Taenia spp. had the least percentage of occurrences (0.05%). This research recorded high percentage of infection in the new prison (14.14%) out of the 101 inmates examined, while maximum prison had 18.00% out of the 100 inmates examined. The distribution of parasites based on the duration of imprisonment of inmates revealed that infection was high at the early stage of imprisonment (2-10 month). Therefore the living condition and habit of the prisoners prior to getting imprisoned could be responsible for the high rate of infection in the early months of imprisonment.

Key words: Intestinal and urinary parasites, prevalence, inmates, hygiene.

INTRODUCTION

Parasite is an organism that resides on or within another organism, the host, in other to find the environment and nutrients required for its own growth and production (Ochei and Kolhatkar, 2000). Intestinal (stool) and urinary (urine) parasites are distributed worldwide, particularly in the tropical and sub tropical areas (Morenikeyi, 2009). 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 for fertilizer (Eneanya and Njom, 2003). In Sub Sahara Africa (SSA), the prevalence of soil transmitted helminth (STH) (example; Ascaris spp, hookworm, and Trichuris trichura) is believed to have remained relatively constant, whereas it has declined and diminished in some developing world other than SSA and today between one quarter and one third of SSA population is affected by one or more STH infections (Hotez and Kamath, 2009).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) (WHO, 2002; Hotez et al., 2006), whereas urinary schistosomiasis being a major deliberating 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 (WHO, 2007). Infections are greater among populations...
who are heavily exposed in low income countries, in 720 million clinical cases an estimate of 135,000 deaths attribute to clinical complications annually (Van Eijk et al., 2009; Smith et al., 2011). Several studies in Nigeria have shown that prison inmates are infected with intestinal parasites and other form of illness (Anderson and Mary, 1976; Bello et al., 1992; Yakubu and Bello, 1986; Amuga et al., 2006). The above review had undoubtedly established the existence of different intestinal parasites among inmates of many prisons in Nigeria. However, similar study among Maiduguri inmate was carried out 18 years ago, revealed that 77 (64.20%) out of 120 inmates were infected (Kalu, 1994) and needed to be reassessed. Hence, the present work was undertaken to determine the present situation of intestinal and urinary parasites distribution among inmates of Maiduguri prisons.

MATERIALS AND METHOD

Study area and group

Maiduguri is the capital of Borno state, North-eastern Nigeria; it is the largest town in the north eastern area of Nigeria (11° 50N and 13° 09E), it has a population of 1, 97,497 by 2007 bordered by the republic of Niger to the north, Chad republic to the north - east and Cameroon to the east (Milestone, 1999).

The study population examined comprised 201 inmates (198 male and 3 female), age duration in prison 0 to 160 months (approximately 13 years). About 85% of the inmates were youths, they are fed from the prison’s kitchen except on special occasions when some of their relatives or some Non Governmental Organizations feed them (Okolie, 2009).

Sample collection

Prior to the collection of samples, official consent was secured from the State Prison Controller. The inmates were informed on the purpose of the study (that is, research) that could translate to health benefits, and they were assured of the safety and confidentiality of the results. They were told on how to collect the samples and avoid contamination with urine. Two containers with wide mouth and tight cover, well labeled; name, sex, age and date (Barnabas et al., 2011) was given to the inmates for the collection of urine and stool samples in each container. Samples were collected carefully as instructed (Paulo, 1979; Abdul, 2003). The Samples were collected not later than 10am in clean containers; it was immediately transferred to the Endemic Diseases Laboratory of the University of Maiduguri Teaching Hospital for examination accordingly.

Laboratory procedure

All the stool and urine samples were investigated for possible parasites using direct examination (normal saline and lugol’s iodine, for stool) methods (Cheesbrough, 2006). Small portion of the stool sample was picked from the mid of the stool using sterile applicator sticks and emulsified with a drop of physiological saline (0.85%) on a clean grease free slide covered with cover slide and first examined unstained (Fleck and Moody, 1992), in the same vein, an iodine stain was prepared and examined under 10x and 40x objectives (Nock and Tanko, 2000). About 1g of the stool was crushed in about 4 ml of formal saline in a baker and then sieved to remove coarse materials, it was then centrifuged at 3000 rpm for 1 min and the supernatant discarded leaving the sediment, it was repeated ones to obtain clear supernatant, the sediment was examined for possible parasites (Inabio et al., 2000; Embert, 1989; Cheesbrough, 2006). Whenever there was delayed in the examination of the stool samples, 10% formalin will be added to preserve the contents (Francis et al., 2003; Ochei and Kolhatar, 2000).

Identification of ova, larvae, cysts and trophozoites of parasites

The characteristics used in the identification of eggs, larvae, cyst and trophozoites includes motility, shapes, sizes, and thickness of shell, special structure of the shell; mammillated covering, operculum, knob, spine, flagella and development stages of egg content (Dietrich et al., 1992). In the case of amoeba, cysts are identified by the numbers and position of nuclei presence and distribution of peripheral chromatin size and position of karyosome and presence of cytoplasm inclusion such as crematoidal bodies or glycogen are important for the identification of amoebic cysts (Cali et al., 1993). The trophozoites moves in the physiological saline mount of fresh material and the presence of cytoplasm inclusion such as erythrocytes in trophozoites and chromotoid bodies in cysts and are observed (Bruckner, 1992).

RESULTS

Total population of 201 was studied for both prisons result
Table 1. Occurrence of stool parasites in new prison.

<table>
<thead>
<tr>
<th>Prison name</th>
<th>Number of inmate</th>
<th>Parasite</th>
<th>Number of occurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New prison</td>
<td>101</td>
<td>S. Stercoralis</td>
<td>3 (3.03)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E. coli</td>
<td>14 (14.14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hookworm</td>
<td>9 (9.09)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A. lumbricoides</td>
<td>3 (3.03)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E. histolytica</td>
<td>7 (7.07)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H. nana</td>
<td>4 (4.04)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Taenia spp</td>
<td>1 (1.01)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7</strong></td>
<td></td>
<td><strong>41 (41.41)</strong></td>
</tr>
</tbody>
</table>

Table 2. Occurrence of stool parasites in maximum prison.

<table>
<thead>
<tr>
<th>Prison name</th>
<th>Number of inmate</th>
<th>Parasite</th>
<th>Number of occurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>H. worm</td>
<td>4 (4.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E. coli</td>
<td>6 (6.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H. nana</td>
<td>3 (3.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E. histolytica</td>
<td>2 (2.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A. lumbricoides</td>
<td>3 (3.00)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5</strong></td>
<td></td>
<td><strong>18 (18.00)</strong></td>
</tr>
</tbody>
</table>

Table 3. Distribution of urinary parasites encountered according to prison.

<table>
<thead>
<tr>
<th>Name of prison</th>
<th>Number of inmate</th>
<th>Parasite</th>
<th>Number of occurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New prison</td>
<td>101</td>
<td>S. haematobium</td>
<td>3 (2.97)</td>
</tr>
<tr>
<td>Maximum prison</td>
<td>100</td>
<td>S. haematobium</td>
<td>4 (4.00)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>201</strong></td>
<td></td>
<td><strong>7 (3.48)</strong></td>
</tr>
</tbody>
</table>

the overall prevalence of 66 (32.84%). The incidence was 66 (33.33%) and 0 (0.00%) for 198 males and 3 females respectively being recorded higher on the males than the females, which is statistically significant.

101 (41.41%) incidence of stool parasites were determined as shown in table 1, while (table 2) pointed out the occurrence of stool parasites (18.00%) among the inmates of Maiduguri maximum prison. The distribution of urinary parasites of the new and maximum prisons was 2.97 and 4.00% respectively (Table 3). *Schistosoma haematobium* was the only parasite seen in the urine samples.

Infection was more prevalence in the period of 2 – 10 (months) with the highest number of parasitic occurrence (30), followed by 11 – 20 (months) and 21-30 (months) with the number of occurrence (8) and (7) respectively. No infection was detected between the period of 91 -120 (months), and (1) number of occurrence was encountered between 121-130 months of imprisonment shown in (Figure 1).

Among the protozoan infection, *E. coli* (9.95%) was recorded higher. Helminth infection recorded Hookworm as the highest prevalence (6.47%). *S. haematobium* (3.48%) was the only urinary parasite encountered in the urine samples. *Taenia spp* was the least (1.01%) parasite encountered.

**DISCUSSION**

The research in both urinary and stool parasites among the inmates of Maiduguri showed the prevalence rate of 32.84%. The prevalence rate of helminth infection (22.89%) was higher than that of protozoan infection (9.95%), this agrees with the work of Morenikeji et al. (2009), who reported helminth as the highest occurrence
(59.80%). This research does not agree with the work of Okolie (2009), who reported the prevalence of protozoan infection (44.6%) higher and helminth infection (32.40%) lower.

Factors predisposing to infections include poor sanitation, inadequate water supply, unhealthy cultural practice and lack of education. Eating of raw or undercooked vegetables or unwashed fruits among the inmates might also be regarded as a probable source of parasitic infection among the inmates. Person to person transfer of these parasites among the inmates constitute another likely source of infection.

Infection was more prevalent between 2 – 10 months. Out of the 201 inmates examined; E. coli recorded the highest incidence which was significant. No infection detected between 91 – 120 months. This was probably due to exposure to infection rather than the duration in prison. The living condition of the prisoners prior to getting imprisoned could be responsible for the observed high prevalence rate seen in 2-10 month.

It is advocated that monthly health talk to inmates and prison staff be instituted; protection and adequate cooking of food and quality of water given to inmates; provision of improved latrines, beddings, and social welfare facilities be provided.

REFERENCES


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