Intestinal helminthiasis among inmates of Jos prison, Plateau State, Nigeria

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Prison inmates are among the high risk population for dangerous helminthes infections and other contagious diseases. This study was undertaken to determine the prevalence of intestinal helminthiasis among prison inmates in Jos, Plateau State, Nigeria. Fresh stool samples from 300 inmates in Jos central prison were screened for helminthes infections using Formal-ether concentration and Kato-Katz techniques. Of the 300 inmates examined, 27(9.00%) were infected with at least one of the four species of intestinal helminthes isolated: Ascaris lumbricoides (1.91%), Ancylostoma duodenale (2.21%), Schistosoma mansoni (4.18%) and Strongyloides stercoralis (0.33%). Helminthes infection was highest among inmates within age group <20 (16.10%). The prevalence of helminthes infection with respect to various prison units showed that inmates serving jail terms were most parasitized (14.00%). In relation to gender, male had the prevalence of 9.25% while no female inmate was infected with intestinal helminthes. There was no statistical relationship between the prevalence of intestinal helminthiasis (P>0.05) with respect to age groups and the various prison units. Efforts to promote hygienic practices and health education were highly recommended.

Key words: Intestinal helminthes, prevalence, inmates, hygiene.

INTRODUCTION

Prisoners carry a much burden of illness than other member of the society (Ishaleku and Mamman, 2014). They harbor diseases that are determined both by the environment from which they come and by the prison in which they live. Most health professionals find it difficult to work in a prison set up, due to under nutrition, lack of concern, inadequate facilities and expertise, which deteriorates the health of inmates. Weishburgh (1992) observed that there are problems of severe drugs abuse, alcoholism, trauma, homicide, suicide, HIV/AIDS, malaria, STDs, TB, skin and helminthes infections etc among prisoners.

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are at greater risk of morbidity than others, and who are more vulnerable to the harmful effects of chronic infections (Hotez et al., 2006; Brooker and Bundy, 2008)

The health and socio-economic implication associated with intestinal helminthes are enormous especially in rural communities of the developing countries where malnutrition and other factors complicate the impart of the infection (Ogbe and Odudu, 1990). However, because many parasitic infections especially those of helminthes origin are usually asymptomatic, they are often neglected until serious complications or chronic clinical features appear. Contrary to the success story of significant changes in prevalence of intestinal infections in many European, North American and Asian countries, Ulukanligil and Adnan Seyrek (2003) and WHO (2004) attributed increased burden of disease to poverty, poor environmental hygiene, urbanization, population growth and impoverished health services combined, in the developing countries.

There is paucity of published data on intestinal helminthiasis amongst prison inmates in Nigeria. Thus, this study was aim at determining the prevalence of intestinal helminthes infections, among the inmates of Jos central prison, Jos, Plateau State, Nigeria. The finding from this study would provide baseline information on the burden of intestinal helminthiasis of this vulnerable group of individuals. It will also encourage appropriate health authorities to embark on interventional health programmes against intestinal helminthiasis among prison inmates in Nigeria.

MATERIALS AND METHODS

Study area
This study was carried out in Jos central prison. This prison is located in Jos, the capital city of Plateau State, Nigeria. Jos is an old tin mining city with an upland stretching approximately 104 km from North to South, characterized by impressive ridges and isolated rocky hills separated by extensive plain. Jos is linked by road, rail and air to the rest of the country. It has an average daily temperature of 22°C, humidity of 60% and an average rainfall of 1400 mm (Udo, 1970). The inhabitants are mostly civil servants, businessmen, traders, farmers and casual laborers.

Study population
Three hundred (300) inmates that presented themselves for medical treatment at Jos prison clinic were used for this study.
This comprised of 110 awaiting trial (AT), 100 serving jail terms (SJT), 50 serving life terms (SLT), and 40 condemned prisoners (CP) ages ranging from less than 20 to above 60 participated in the study.

Sample collection
Following an official consent secured from the prison officers and the inmates and assurance of confidentiality of results, the inmates were told on how to collect stool samples without contaminating it with urine. Cleaned, dried and leak-proof labeled specimen containers were given to the inmates for stool samples. Demographic information such as age, sex and unit of each inmate were obtained orally.

Preparation and microscopic examination of parasites
Formal-ether concentration and Kato-Katz techniques for faecal specimens were used for microscopic identification of helminthes eggs as described by Cheesbrough (2000) and Arora and Arora (2005).

The data were analyzed using percentages and chi-square (χ²) test to compare the rate of infections.

RESULTS
Of the 300 inmates screened, 292(97.33%) were males and 8(2.67%) females. The overall prevalence obtained from this study was 9.00%. Prevalence of Helminthes infections with respect to age groups were < 20 (16.10%), 21- 30 (9.10%), 31- 40 (10.29%), 41- 50 (3.70%), 51- 60 (0.00%) and 61> (0.00%) respectively (Table 1). The prevalence of helminthes infections with respect to the various units of the prison: AWT (Awaiting trial), JT (Jail term), LT (Life term) and CD (Condemned) were 6.36%, 14.00%, 4.00% and 10.00% respectively (Table 2). In relation to gender, male inmates had the prevalence of 9.25% while their female counterpart had the prevalence of 0.00% (Table 3).

DISCUSSION
The prevalence of intestinal helminthes as recorded from this study was 9.00%. The results of this present investigation showed clearly that intestinal helminthes infections among prison inmates in Jos prison assumed the level of public health importance. This finding is in consonance with the Okolie (2009), Nwaneri and Omuemu (2012) and Colman et al. (2013) who reported higher prevalence of 32.40, 20.70 and 22.80% respectively. Nigeria is a country where more than 80.0% of the population lives below one dollar per day, there is no doubt that the finding observed in this study is a reflection of the poor socioeconomic circumstances within the country, which inadvertently affected prison inmates.

Factors predisposing to infections include poor sanitation, inadequate water supply, unhealthy cultural practice and lack of education. Eating of raw or
Table 1. Prevalence of helminthiasis in Jos prison inmates with respect to age groups.

<table>
<thead>
<tr>
<th>Age group</th>
<th>No. Examined</th>
<th>Ascaris lumbricoides</th>
<th>Ancylostoma duodenale</th>
<th>Schistosoma mansoni</th>
<th>Strongyloides stercoralis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>56</td>
<td>1(1.80)</td>
<td>1(1.80)</td>
<td>7(12.5)</td>
<td>0(0.00)</td>
<td>9(16.10)</td>
</tr>
<tr>
<td>21–30</td>
<td>110</td>
<td>2(2.48)</td>
<td>3(3.31)</td>
<td>5(4.55)</td>
<td>0(0.00)</td>
<td>10(9.10)</td>
</tr>
<tr>
<td>31–40</td>
<td>68</td>
<td>2(2.94)</td>
<td>2(2.94)</td>
<td>2(2.94)</td>
<td>1(1.50)</td>
<td>7(10.29)</td>
</tr>
<tr>
<td>41–50</td>
<td>27</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>1(3.70)</td>
<td>0(0.00)</td>
<td>1(3.70)</td>
</tr>
<tr>
<td>51–60</td>
<td>25</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>61+</td>
<td>14</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>5(1.91)</td>
<td>6(2.21)</td>
<td>15(4.18)</td>
<td>1(0.33)</td>
<td>27(9.00)</td>
</tr>
</tbody>
</table>

χ² = 9.62, P > 0.05.

Table 2. Prevalence of helminthiasis among inmates in Jos prison with respect to prison units.

<table>
<thead>
<tr>
<th>Unit</th>
<th>No. Examined</th>
<th>S. mansoni</th>
<th>A. lumbricoides</th>
<th>A. duodenale</th>
<th>S. stercoralis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWT</td>
<td>110</td>
<td>5(4.50)</td>
<td>1(0.91)</td>
<td>1(0.91)</td>
<td>0(0.00)</td>
<td>7(6.36)</td>
</tr>
<tr>
<td>JT</td>
<td>100</td>
<td>7(7.00)</td>
<td>2(2.00)</td>
<td>4(4.00)</td>
<td>1(1.00)</td>
<td>14(14.00)</td>
</tr>
<tr>
<td>LT</td>
<td>50</td>
<td>0(0.00)</td>
<td>1(2.00)</td>
<td>1(2.00)</td>
<td>0(0.00)</td>
<td>2(4.00)</td>
</tr>
<tr>
<td>CD</td>
<td>40</td>
<td>1(2.50)</td>
<td>2(5.00)</td>
<td>1(2.50)</td>
<td>0(0.00)</td>
<td>4(10.00)</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>13(4.30)</td>
<td>6(2.00)</td>
<td>7(2.30)</td>
<td>1(0.30)</td>
<td>27(9.00)</td>
</tr>
</tbody>
</table>

χ² = 9.62, P > 0.05

Table 3. Prevalence of helminthiasis among inmates in relation to gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. Examined</th>
<th>No. Positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>292</td>
<td>27(9.25)</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>27(9.00)</td>
</tr>
</tbody>
</table>

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 (Colman et al., 2013). The living condition of the prisoners prior to getting imprisoned could be responsible for the observed high prevalencerecorded.

Out of the 300 inmates examined; Schistosoma mansoni recorded the highest prevalence which was significant. The detection of S. mansoni in stool samples examined even at low prevalence is a serious concern for health hazard free environment and poses a risk to public health.

The significantly higher A. duodenale prevalence than A. lumbricoides was similar to a previous report from eastern Nigeria (Ohaegbula, 1996; Hassan et al., 2013). Abu-Madi et al. (2008) reported that Ancylostoma duodenale occurs more frequently in mild and humid conditions as the free-living larval stages are unlikely to survive under extremes of temperature and desiccation typical of a tropical dry season as found in study area. The prevailing physical conditions at the time of the present investigation must have favoured A. duodenale transmission more than A. lumbricoides transmission. The reported varieties of routes by which A. lumbricoides can be acquired and capacity of embryonated eggs to survive under adverse environmental conditions were obviously influenced by the rains which predispose higher A. duodenale transmission (Hotez et al., 2007). This could also be attributed to the fact that most of the subjects do not wear shoes/foot-wears thus could have been exposed to these helminthes. The major and common portal of entry of some helminthes is the skin of the foot (Wagbatsoma and Aimiuwu, 2008).

With respect to the age groups of the inmates examined, those belonging to age groups < 20, 21-30, 31-40 had the higher prevalence of 16.10, 9.10 and 10.29% respectively. These age groups are the most active and highly infected groups in the prison. They were constantly taken out for manual/hard labour on farms, homes, schools, construction sites etc which predisposes
them to helminthes infections. This is in agreement with the work of Okolie (2009), who reported high helminthes infections among young adults’ inmates in Owerri prison.

Based on the various prison units, inmates serving jail terms (JT) have the highest infection rate of 14.00%. This could be because inmates in this unit are regarded as the mobile and working inmates. They are often taken out for manual/hard labour which predisposes them to helminthes infections. Low intensity of helminthes infection was recorded among inmates in life term unit. This could probably be due to their constant confinement which curtail them from been exposed to parasitic organisms.

Male inmates were reported to have higher prevalence of helminthes infection than their female counterpart; who had none. This may be due to the fact that male inmates are freer than females; which leisure hours are strictly controlled and restricted. Also, female inmates have better personal hygiene practices.

Conclusion

Chronic intestinal helminthes infections and moderate to heavy worm intensity in a vulnerable population (such as observed in this study) will not only jeopardize their health, but will also render them susceptible to other diseases. Regular public health enlightenment campaign 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


Ulukanligil M, Adnan Seyrek A (2003). Demographic and parasitic infection status of school children and sanitary conditions of schools in Sanliurfa, Turkey. BMC Public
