Prevalence of intestinal helminths among undergraduate students of Obafemi Awolowo University Ile Ife, Southwestern, Nigeria

Salawu Saheed Adekola1*, Ojo Olawale Mayowa1 and Awosolu Oluwaseun Bunmi2

1Department of Zoology, Obafemi Awolowo University, Ile Ife Osun State, Nigeria.
2Department of Biology, Federal University of Technology, Akure, Ondo State, Nigeria.

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A cross section study of the prevalence and knowledge of intestinal helminths was investigated among the newly admitted undergraduate students of Obafemi Awolowo University, Ile Ife, Osun State, Nigeria between April and June 2016. Faecal samples from 767 subjects comprising 406 males and 361 females were collected and processed using modified kato-katz method. Eggs of four helminths, Ascaris lumbricoides, Trichuris trichiura, hookworms and Taenia spp. were observed with prevalence of 22.03 7.30, 5.08 and 1.43% respectively. 240 (31.3%) of the subjects haboured at least one parasitic infection and the prevalence of infection was higher among the male (31.52%) than the female (31.02%) although the difference in the rates between the two sexes was not statistically significant (P˃0.05). The trend in the infection rate was observed to be both age and sex dependent. The lowest age group (16-20 years) recorded the lowest prevalence (26.88%) and the prevalence of infection increased with increase in age till it peaked at 26-30 years (42.85%) and dropped at the age 31-35 years (33.33%). The results of the questionnaire revealed that majority of students that were infected with the helminths have poor knowledge about causes, transmission, prevention and treatment of intestinal helminths which make it difficult to avoid exposure to the parasite.

Key words: Intestinal helminths, prevalence, Ascaris lumbricoides, University students, Nigeria.

INTRODUCTION

Intestinal helminths especially Ascaris lumbricoides, Trichuris trichiura and hookworms (Ancylostoma deodenale and Necartor americanus) has been reportedly rank among the commonest and most persistent human intestinal helminths in both male and female of all age groups globally (Mbuh et al., 2011). About 2 billion people have been reported to be infected with intestinal helminths globally, majority been children from the developing countries especially in sub-Saharan Africa of which ascariasis account for approximately 1.6
billion while trichuriasis and hookworm infection account for about 800 million (de Silva et al., 2003). High prevalence of intestinal helminths reported in developing countries are due to some peculiar factors which include poverty, overcrowding, lack of sanitation (Ojurongbe, 2013), poor nutrition, (WHO, 2002), impoverished health services, poor environmental and personal hygiene (Naish et al., 2004). Morbidities associated with these helminths infections include malnutrition, impaired intellectual performance (Ojurongbe et al., 2014), anaemia, dysentery and abdominal complication (Salawu and Ughele, 2015). Studies on these pathogens in many developing countries had shown that children (≤18 years) are mostly vulnerable and approximately 90% of these children are either in elementary or secondary schools (Salawu and Ughele, 2015). A child is defined as an individual under the age of 18 years (UNCRC, 1990; Salawu and Ughele, 2015). Consequently, mostly newly admitted students in tertiary institution in Nigeria fall under this category with the mindset of the general public that they are matured enough to take good care of themselves hygienically (Ojurongbe et al., 2010). However, studies have shown that environments, location, school attended, feeding and behavioral habits, and upbringing are among the factors predisposing these children to intestinal helminthiasis. Also, numerous studies on intestinal helminthiasis have been carried out over the years in different parts of the country mostly among rural dweller (Akinseye et al., 2017) and school-age children in elementary schools (Aniwada et al., 2016; Adefioye et al., 2013; Ojurongbe et al., 2014; Salawu and Ugbele, 2015) with little studies on tertiary students (Ojurongbe et al., 2010; Dada and Ekundayo, 2015; Isibor et al., 2013; Afolabi et al., 2016). However, information about the newly admitted students who are the one bridging the gap between the secondary and the tertiary students on the prevalence and knowledge of intestinal helminthiasis is yet to be documented especially in Obafemi Awolowo University Ile Ife, hence this study.

MATERIALS AND METHODS

The study was carried out at Obafemi Awolowo University Ile Ife, Nigeria. The population of the subjects consisted mainly newly admitted undergraduate students. The purpose of the study was explained to the subjects and documented consents were obtained from all participants. The participants were assured of confidentiality. The survey was carried out generally among the students irrespective of their faculty or department.

Consent and ethical issues

Ethical clearance for the study was issued by the ethical committee of the Obafemi Awolowo University Health Centre, Ile Ife, where the questionnaire administration and sample collection took place.

Questionnaire administration

A well-structured and pre-tested questionnaire was administered to collect socio-demographic information on each student and their responses were recorded by ticking the appropriate boxes provided. The socio-demographic information contained in the questionnaire include students' bio-data, other important information on transmission, control and knowledge about soil transmitted helminths.

Collection of stool samples

All participating students were supplied with a clean pre-labelled, wide-mouthed screwed capped plastic universal bottle, a sheet of paper and a wooden spatula each. The students were instructed to pass their faeces on the sheet of paper provided and to use the wooden spatula to transfer about 5 g of early morning faeces to the bottle and ensured the bottle was tightly screwed. The samples were taken to the Parasitology Laboratory, Department of Zoology, Obafemi Awolowo University where they were fixed immediately by adding adequate 10% formalin and mixed thoroughly with a wooden applicator stick and examined for helminth ova by a simple thick smear technique using a 41.7mg Kato-Katz technique (WHO, 1994).

Statistical analysis

All statistical analyses were performed using SPSS for windows version 21.0. Differences in prevalence of each parasite infection among subgroup were determined by chi-square. Statistical difference was assigned at P ≤ 0.05.

RESULTS

A total of 767 students comprising 406 (52.93%) males and 361 (47.06%) females were screened for intestinal helminths infection in this study. The eggs of intestinal helminths observed in the faecal samples were those of Ascaris lumbricoides, hookworms, Trichuris trichiura, and Taenia spp. with the overall prevalences of 22.03, 7.30, 5.08 and 1.43% respectively.

The population and STH’s infected distribution of participating students within different faculties in Obafemi Awolowo University, Ile Ife is shown in Table 1. The prevalence of each intestinal helminth egg observed in the analyzed faecal sample infection among students is shown in Table 2 while Table 3 shows the age-gender distribution of intestinal helminths among the students in the study area.

In total, 240 (31.29%) students haboured at least one parasitic infection (Table 1). Prevalence of intestinal helminths was recorded in all the faculties with varying prevalence but higher prevalence were recorded among students in non-science based faculties (Social sciences, 40.29%) while lower prevalences were recorded among students with science based faculties (H/sciences 21.74%).
Table 1. Population and STH’s distribution of participating students within different faculties of Obafemi Awolowo University, Ile Ife.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Faculty</th>
<th>Number Examined</th>
<th>Number infected</th>
<th>%infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Administration</td>
<td>105</td>
<td>31</td>
<td>29.52</td>
</tr>
<tr>
<td>2</td>
<td>Agriculture</td>
<td>55</td>
<td>17</td>
<td>30.91</td>
</tr>
<tr>
<td>3</td>
<td>Art</td>
<td>209</td>
<td>64</td>
<td>30.62</td>
</tr>
<tr>
<td>4</td>
<td>Health Science</td>
<td>46</td>
<td>10</td>
<td>21.74</td>
</tr>
<tr>
<td>5</td>
<td>Education</td>
<td>44</td>
<td>16</td>
<td>36.36</td>
</tr>
<tr>
<td>6</td>
<td>Environmental design and management</td>
<td>79</td>
<td>26</td>
<td>32.91</td>
</tr>
<tr>
<td>7</td>
<td>Law</td>
<td>39</td>
<td>11</td>
<td>28.21</td>
</tr>
<tr>
<td>8</td>
<td>Science</td>
<td>65</td>
<td>17</td>
<td>26.15</td>
</tr>
<tr>
<td>9</td>
<td>Social Sciences</td>
<td>67</td>
<td>27</td>
<td>40.29</td>
</tr>
<tr>
<td>10</td>
<td>Technology</td>
<td>58</td>
<td>21</td>
<td>36.21</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>767</td>
<td>240</td>
<td>31.29</td>
</tr>
</tbody>
</table>

Table 2. Prevalence of soil-transmitted helminths among students examined within different faculties of Obafemi Awolowo University Ile Ife.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Faculty</th>
<th>Number examined</th>
<th>% +ve for helminth eggs</th>
<th>A. lumbricoides</th>
<th>Hookworms</th>
<th>T. trichiura</th>
<th>Taenia spp.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>n(%)</td>
<td>n(%)</td>
<td>n(%)</td>
<td>n(%)</td>
</tr>
<tr>
<td>1</td>
<td>Admin</td>
<td>105</td>
<td></td>
<td>20(19.05)</td>
<td>6(5.72)</td>
<td>8(7.62)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>2</td>
<td>Agric</td>
<td>55</td>
<td></td>
<td>14 (25.45)</td>
<td>3(5.45)</td>
<td>2(3.64)</td>
<td>1(1.82)</td>
</tr>
<tr>
<td>3</td>
<td>Art</td>
<td>209</td>
<td></td>
<td>43 (20.57)</td>
<td>16 (7.65)</td>
<td>10(4.78)</td>
<td>4(1.91)</td>
</tr>
<tr>
<td>4</td>
<td>H/science</td>
<td>46</td>
<td></td>
<td>10 (21.74)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>5</td>
<td>Education</td>
<td>44</td>
<td></td>
<td>11(25.00)</td>
<td>4(9.09)</td>
<td>1(2.27)</td>
<td>2(4.54)</td>
</tr>
<tr>
<td>6</td>
<td>EDM</td>
<td>79</td>
<td></td>
<td>18(22.78)</td>
<td>7(8.66)</td>
<td>2(2.53)</td>
<td>2(2.53)</td>
</tr>
<tr>
<td>7</td>
<td>Law</td>
<td>39</td>
<td></td>
<td>9 (23.07)</td>
<td>2(5.13)</td>
<td>1(2.56)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>8</td>
<td>Science</td>
<td>65</td>
<td></td>
<td>12 (18.46)</td>
<td>6(9.23)</td>
<td>6(9.23)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>9</td>
<td>Social Science</td>
<td>67</td>
<td></td>
<td>18 (26.86)</td>
<td>8 (11.94)</td>
<td>5(7.46)</td>
<td>1(1.49)</td>
</tr>
<tr>
<td>10</td>
<td>Tech</td>
<td>58</td>
<td></td>
<td>14(24.14)</td>
<td>4(6.89)</td>
<td>4(6.89)</td>
<td>1(1.72)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>767</td>
<td></td>
<td>169(22.03)</td>
<td>56(7.30)</td>
<td>39(5.08)</td>
<td>11(1.43)</td>
</tr>
<tr>
<td>p value</td>
<td></td>
<td></td>
<td></td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
<td>p&lt;0.05</td>
</tr>
</tbody>
</table>

Table 3. Prevalence of soil transmitted helminths (STH) with respect to age group and sex of students in the study area.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N E</td>
<td>No (%) infected</td>
<td>N E</td>
</tr>
<tr>
<td>16-20</td>
<td>185</td>
<td>44(23.78)</td>
<td>239</td>
</tr>
<tr>
<td>21-25</td>
<td>173</td>
<td>67(38.72)</td>
<td>109</td>
</tr>
<tr>
<td>26-30</td>
<td>38</td>
<td>15(39.47)</td>
<td>11</td>
</tr>
<tr>
<td>31-35</td>
<td>10</td>
<td>2(50.00)</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>406</td>
<td>128(31.52)</td>
<td>361</td>
</tr>
</tbody>
</table>

NE=Number examined.
Generally, high prevalence of infection was recorded among male students (31.52%) than female students (31.02%) although with no significant difference (p > 0.05). The trend in the prevalence values of the four observed parasites were both age and gender dependent. In all age groups within both sexes, increase in prevalence of infections was observed as the age increases (Table 3). Approximately, 27% of the younger age category (16-20 years) was found to be infected and the rate increased though the succeeding age groups reached the maximum of 42.85% among the older age group (26-30 years) but declined to 33.33% among the oldest 31-35 years. There was no significant difference in prevalence of infection within age group (p > 0.05).

Considering the infection among the sexes within each age group, females had more infection rates than the males except at age group 21-25 years where otherwise.

Based on the questionnaire survey, all the students that took part in this study submitted their faecal samples and also completed the questionnaires. Table 4 shows that majority of the students lack knowledge about the causes, transmission, prevention and treatment of intestinal helminthiasis. Based on the knowledge of intestinal helminths among the students, approximately 80% of the respondents have not heard about intestinal helminths before while about 83% have no idea about the causes of intestinal helminthiasis. About 85% of the respondents do not have an idea about the transmission while majority also do not know about the prevention and treatment of intestinal helminthiasis. Also, comparing the rate of infection among the respondents, the results of this study shows that the respondents that do not have any knowledge about causes, transmission, prevention and treatment of intestinal helminths are heavily infected (Table 4).

**DISCUSSION**

The occurrences of intestinal helminthiasis due to *A. lumbricoides*, hookworms and *Trichuris trichiura* have been reported in tertiary students by various authors from
various parts of the country and it has been observed that
the prevalences and intensities of these infections ranges
depend on the location and the methodology employed in
the study (Nwaneri et al., 2013). In this study, the most
prevalence among the intestinal helminths is A. lumbricoides (22.03%) followed by hookworms (7.30%) and Trichuris trichiura (5.08%); this result is consistent
with the reports of some authors who reported that
intestinal helminthiasis among school children in Nigeria is very common and caused due to the triad of roundworm, hookworms and whipworms (Taiwo and Agbolade, 2000; Asaolu et al., 2002; Adeoye et al., 2007; Salawu and Ugbele, 2015).

In this study, an overall prevalence of 31.49% was
recorded among the newly admitted undergraduate
students of Obafemi Awolowo University Ile Ife Nigeria. This results in line with 20.6% reported from tertiary
students in Ede Osun State (Ojurongbe et al., 2010),
40.5% prevalence reported among students in FUTA
(North gate area) Akure, Ondo State (Dada and Aruwa,
2015) and 21.1% in Ilorin (Babatunde et al., 2003) but
contradicts overall prevalence of 13.3% reported among
students in FUTA Akure (Afolabi et al., 2016) and 11.1% in Benin city (Wagbastoma and Aisien, 2005). The high
overall prevalence of infection recorded in this study shows that intestinal helminthiasis is not limited to children and rural dweller but also tertiary students in urban centers and the high prevalence recorded could be
attributed to the poor sanitation and eating habit, poor personal and environmental hygiene practices among the
students in their various hall of residence.

In this study, the trend of infection among the students were both age and gender dependent. Prevalence of
infection increase as the age of student increases. Students in age group 16-30 years were mostly infected while the older age group 31 years above was least infected. This agree with the submission of both Adanyi et al. (2011) and Salawu and Ughele (2015) who stated that as a child get older, the child tends to be more
cautious and mindful of hygienic practices by minding
what they eat and may not always get involved in playing in dirty environment, also they tend to spend more of their leisure time indoors.

A non-significantly high prevalence of infection was
recorded among males compared to the females among
the students studied. The results agrees with those of
Ojurongbe et al. (2010); Aniwada et al. (2016) and Dada
and Aruwa (2015) but contradicts the reports of Afolabi et
al. (2016) and Adefiyo et al. (2011) who reported otherwise. The prevalence of infection recorded among males might be due to the fact that male students are very playful and active outdoor, tend to less careful about
what they eat than their female counterparts (Ojurongbe
et al., 2010).

The result from the questionnaire shows clearly that
majority of tertiary students have inadequate or poor
knowledge about intestinal helminthiasis and some other
parasitic pathogens in their environment. Adequate
knowledge about the causes, transmission, prevention
and treatment will make it possible to avoid practices that
might exposed them to infection. Also, it is imperative for
government, stakeholder in health sector and healthcare
provider to embark on awareness and sensitization
program on the need for the newly admitted university
students to know about soil transmitted infections and
diseases.

In conclusion, there is a need for the control measures
which include deworming programs couple with inclusion of compulsory health education courses for all tertiary
students so as to bring about reduction in the prevalence
and ensures adequate control by the authority concerned.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENT

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