DETERMINATION OF PREVALENCE RATE OF ENTAMOEBA HISTOLYTICA AMONG CHILDREN DIAGNOSED WITH ACUTE DIARRHEA IN KANO, NIGERIA

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ABSTRACT

Objective: The study was aimed to determine the prevalence of Entamoeba histolytica among children diagnosed with acute diarrhea in Kura General Hospital Kano, from February to August 2017.

Methods: A total of 236 stools samples were collected from children within the age group of 0–5 years diagnosed with acute diarrhea attending the hospital. The stool samples were examined for E. histolytica cysts and trophozoites using direct wet preparation and formol-ether concentration techniques.

Results: The result showed that 23 samples which accounted for 9.75% of the samples were found to be positive for the parasite. Highest incidence of the parasite was found among children within the age category of 4–5 years. The results also indicated that males (56.5%) were more infected than females (43.5%). However, there is no statistical difference in the rate of infection among the sex and age group of the patients at p<0.05.

Conclusion: Maintenance of personal hygiene and improved sanitation of the environment will indeed prevent contamination of food and water sources.

Keywords: Entamoeba histolytica, Acute diarrhea, Children, Prevalence.

INTRODUCTION

More than 50% of the world populations areinfested with helminthes and protozoans [1]. Most people are asymptomatic to these infections but certain intestinal parasites may cause diarrhea and other related diseases [2]. Amoebiasis is a medical condition due to infection by protozoan parasite called Entamoeba histolytica. The organism is considered as the invasive type due to its intestinal tissue dissolving carnivorous potential, thus of medical importance [3]. Intestinal amoebiasis due to E. histolytica was ranked third among parasitic protozoan infection leading to death after malaria and schistosomiasis [4]. Transmission of the infection includes unsanitary habits, contamination of food and water by human feces already infected with the parasite as well as direct fecal-oral contact [5]. About 10% of infected individuals show clinical symptoms, which occur with invasive amoebiasis which though over 48 million people annually. Majority of symptomatic patients are presented with amoebic colitis while the rest manifested with extra-intestinal disease, most commonly as liver abscess [6]. The incidence and prevalence of amoebiasis vary in different part of the world [7]. The prevalence is increased in such a way that the newborn is now being reported with the infection [8].

The prevalence of infection caused by E. histolytica is very low in industrialized countries (about 1%) and high in tropical countries (about 50–80%) [9]. Clinical presentation of the intestinal infection may include abdominal discomfort, weakness, malaise, and constipation that may alternate with diarrhea, dysentery with the passage of exudates, blood and mucus, as well as colicky abdominal pain [10]. Systemic sign of infection includes fever, rigors, and polymorpho nuclear leukocytes while liver abscess results from infection through the intra-hepatic portal vessels [11]. E. histolytica infection is found in over 50% of the patients with acute diarrhea [12-14]. A study conducted in Egypt showed that 57.1% of the general patients with acute diarrheas were positive for the presence of E. histolytica [15]. On the other hand, similar study conducted in Saudi Arabia demonstrated that E. histolytica was found to be responsible for only 2.2% of acute diarrheas among children below 5 years of age [16]. The study was aimed to determine the prevalence of E. histolytica among children diagnosed with acute diarrhea in Kura General Hospital Kano.

METHODS

Ethical clearance

The ethical approval for the study with reference number MOH/fof/797/T/1/52 was obtained from Kano State Ministry of Health through Health Service Management Board Kano based on the consent of Kura General Hospital ethical committee.

Study area

Kura local area council is geographically located in the southern part of the state along Kano – Zaria road with a distance of about 35 km from the state capital. It is located at Latitude 11° 46’17” N and Longitude 8° 25’ 49” E. It covers an area of about 206 km² of land and population of about 144,601 according to 2006 census [17]. Kura Local Government shares common boundaries with Dawakin-kudu (East), Bunkure (South), Garun-Mallam (West), and Madobi Local Government (North) [17]. Kura is a rural communities inhabited by people whose predominant occupation is farming.

Samples collection and examination of E. histolytica

A total of 236 stools samples were collected from children (125 males and 111 females) within the age group of 0–5 years diagnosed with acute diarrhea attending Kura General Hospital Kano Hospital from February to August 2017 in clean, dry, and leak proof sterile bottle. The stool samples were examined for E. histolytica cysts and trophozoites using direct wet preparation and formol-ether concentration techniques.
preparation and Formol Ether concentration technique as described by Tanyukel and Petri. [18].

RESULTS

Age and sex distribution of the participants

The age and sex distribution of the participants is presented in Table 1. The distribution showed that the number of male patients (125) is higher than that of the female (111). Patients of age category 4–5 years have the highest frequency with total of 51 subjects, followed by age category 2–3 years (50 subjects) and 3–4 years (49 subjects) while least subject was found among patients of less than a year (39 subjects).

Prevalence of E. histolytica

The prevalence of E. histolytica with respect to age and sex is presented in Tables 2 and 3. The result showed that age category 4–5 years has the highest prevalence with total of eight subjects which accounted for 3.39%, followed by 2–3 years and 3–4 years 5 subjects each (2.12%), 1–2 years 3 subjects (1.27%), and lowest frequency was found among patients of less than a year (0.85%). With respect to sex, higher incidence was found among males with total of 13 subjects which accounted for 5.51% while female has ten positive samples (4.24%). The result is not statistically significant at p<0.05.

DISCUSSION

The prevalence rate of E. histolytica among children age between 0 and 5 years in this study was found to be 9.75%. Several studies on determination of the prevalence of E. histolytica were conducted worldwide [19-22]. The result of this study is in conformity with the result of Nyenke et al. [23] on prevalence of intestinal amoebiasis in infant and junior school children in Degema General Hospital and environs who found percentage prevalence of 11%. This result also justifies the study of Memon et al. [24] who found the percentage of intestinal Amoebiasis in Children as 8.47%. The prevalence of 9.75% in this study is within the prevalence range of 5–15% of all protozoan infection as a causative agent of acute diarrhea as estimated by the World Health Organization. The result of prevalence rate of E. histolytica in the present study is higher than the reported prevalence of 4.2–6.5% of E. histolytica infection in Bangladeshi children with diarrhea and also that of a Mexican study that found 8.4% of the samples to be seropositive for E. histolytica [25]. In Jordan, 8% of the reported acute gastroenteritis cases are because of E. histolytica [13]. However, the result of this study is lower than a similar study from Colombia who reported E. histolytica to be responsible for 10% acute diarrhea in children [26]. On the other hand, finding of this study was contrary to that of McIver et al. [27] in Australia whose study did not find E. histolytica among children diagnosed with acute diarrhea. Several factors were responsible for the prevalence of E. histolytica in the present study, such factors include; poor drainage system, low standard of personal hygiene, and unhygienic method of sewage disposal.

Among the age categories in this study the children within age bracket of 4–5 years were highly infected, 8 (3.39%). Higher prevalence among children in this group can be as result uncontrolled wandering around the street and other activities such as swimming. Low prevalence rate among subjects category of <1 year may be attributed to their innate resistance due to production of secretory immunoglobulin A that can minimize the adhesion between E. histolytica trophozoites epithelial cells, hence reducing new infection [28]. Findings from this study revealed that male children were more infected (5.51%) than the female ones (4.24%). However, the difference is not statistically significant (p<0.05). This is possible due to the reason that both gender are living in the same community and generally engaged in similar activities such as farming and hence exposed to similar hazard continually.

CONCLUSION

Based on the findings of this study, it is found that the percentage prevalence of E. histolytica among children diagnosed with acute diarrhea is 9.75%. According to the study, more males are infected than the female but the result is not significant. Subjects of age category 4–5 years were found to be more infected. Factors such as unhygienic method of sewage disposal, poor drainage system as well as low level of personal hygiene contributed immensely to the distribution and proliferation of E. histolytica. It is recommended that creating the awareness for personal hygiene, proper sewage disposal and environmental sanitation should be encouraged.

ACKNOWLEDGMENT

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AUTHORS’ CONTRIBUTION

All the authors have contributed equally in the research.

CONFLICTS OF INTEREST

All authors declared that no conflicts of interest exist.

FUNDING

None.

REFERENCES


Table 1: Age and sex distribution of the participants

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Male (n)</th>
<th>Female (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>1–2</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>2–3</td>
<td>28</td>
<td>22</td>
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<td>3–4</td>
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<td>24</td>
</tr>
<tr>
<td>4–5</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>111</td>
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</table>

*Chi-square value is 3.1776. The result is statistically not significant at p<0.05. E. histolytica: Entamoeba histolytica

Table 2: Prevalence of E. histolytica based on age

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>No. of samples (n)</th>
<th>Positive samples (n)</th>
<th>Prevalence (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>39</td>
<td>2</td>
<td>0.85</td>
<td>0.528557*</td>
</tr>
<tr>
<td>1–2</td>
<td>47</td>
<td>3</td>
<td>1.27</td>
<td></td>
</tr>
<tr>
<td>2–3</td>
<td>50</td>
<td>5</td>
<td>2.12</td>
<td></td>
</tr>
<tr>
<td>3–4</td>
<td>49</td>
<td>5</td>
<td>2.12</td>
<td></td>
</tr>
<tr>
<td>4–5</td>
<td>51</td>
<td>8</td>
<td>3.39</td>
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</tr>
<tr>
<td>Total</td>
<td>236</td>
<td>23</td>
<td>9.75</td>
<td></td>
</tr>
</tbody>
</table>

*Chi-square value is 1.3776. The result is statistically not significant at p<0.05. E. histolytica: Entamoeba histolytica

Table 3: Prevalence of E. histolytica based on sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of samples (n)</th>
<th>Positive samples (%)</th>
<th>Prevalence (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>125</td>
<td>13 (56.5)</td>
<td>5.51</td>
<td>0.616589*</td>
</tr>
<tr>
<td>Females</td>
<td>111</td>
<td>10 (43.5)</td>
<td>4.24</td>
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<tr>
<td>Total</td>
<td>236</td>
<td>23 (100)</td>
<td>9.75</td>
<td></td>
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</tbody>
</table>

*Chi-square value is 0.2507. The result is statistically not significant at p<0.05. E. histolytica: Entamoeba histolytica