Original Article

Haemoglobin Level and Intestinal Parasites in Pregnant Women in Eziama, Imo State of Nigeria

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1. Introduction

Anemia is the commonest nutritional problem worldwide with its highest prevalence among young children and pregnant women. It is especially more common in developing countries because of poor nutrition and high prevalence of parasitic infestation [1]. Anemia was defined as haemoglobin (HB) of less than 11 g/dl, according to WHO criteria [2]. Any woman with haemoglobin (Hb) of 11 g/dl or more was considered normal. Haemoglobin between 9 g/dl to 10.9 g/dl was considered as mild anaemia, between 7 g/dl to 8.9 g/dl moderate and Hb less than 7 g/dl was severe anaemia [3].

Intestinal parasites are parasites that populate the gastrointestinal tract. In humans, they are often spread by poor hygiene related to faeces, contact with animals, or poorly cooked food containing parasites [4]. Parasites can get into the intestine through the mouth from uncooked or unwashed food, contaminated water or hands or by skin contact with larva infected soil or if they have mouth contact with the genital or rectal area of a sexual partner who is infected. When the organisms are swallowed, they move into the intestine, where they can reproduce and cause disease. Prevalence of anemia among pregnant women in developing countries averages 56% with a range of 35% to 100% among various regions of the world [3]. In the USA, less than 30% of pregnant women develop anaemia, whereas the prevalence rates in Africa, Asia and Latin America range from 35% to 75% [5]. Maternal deaths from anaemia range from 34 per 100,000 live births in Nigeria to as high as 194 per 100,000 live births in Pakistan [6].

Intestinal parasitic diseases and the tropical zones have remained like Siamese twin [7]. The effects of parasitic infections are particularly severe during pregnancy when the demand for protein and iron by the developing foetus puts an extra chain on the mothers blood need. Heavy parasitic infestations can cause premature birth, infant with low birth weight or stillbirth. It has been reported that iron-deficiency anaemia is commonly associated with hookworm infections [8]. In some people, intestinal parasites do not cause any symptoms or the symptoms may come and go. Common signs and symptoms include coughing, crampping, abdominal pain, bloating, flatulence and diarrhea. In more serious infections, sex loss, skin-itching, fever, nausea, vomiting or bloody stool may occur [9]. Eradication of parasitic infection in a community can be feasible with adequate sanitary disposal of faeces, thus keeping the prevalence and severity under control and significantly reduction of morbidity and mortality. Intestinal parasitic infections which are very common in Nigeria have become so important because of the high rates of morbidity and sometimes mortality among patients in Nigeria towns and villages [7,10]. An earlier survey on the prevalence of helminthic infection in the general populace in Enugu established a prevalence rate of 27.9% [11].

Eziama is a fairly small town from its northern point in Oboh hills to its southern-Most of Isu area. Eziama stretches from the western boundary of Abba across the Okgwe - Owerri highway to Ezumoha in the east - the northern border of hills and river Ezealakatem of Oboh to the southern border of Isu (Dim-na-Numa) and Anara autonomous communities. It measures about ten kilometers. Its greatest width from Abba boundary to the eastern neighbor of Ezumoha is almost same length. Eziama is a plain along which ran the federal highway to Enugu, Owerri, Orlu and Eziama-Abba-Owerri-Nkwoji mads. It is most fertile, hence very populated with about 30,000 inhabitants in 2004 [12].

The study was carried out to determine the haemoglobin concentration and the prevalence of intestinal helminthes in pregnant women attending antenatal clinic at Eziama.

2. Materials and Methods

2.1 Subjects

The survey was carried out on 281 pregnant women in Eziama Isiala Mbano LGA of Imo state attending antenatal clinic between January 2008 and June 2008. A questionnaire covering information’s such as names, age, occupation and environmental factors were given to each subject.

Dry clean leak proof plastic universal bottle was given to each subject for collection of their faecal sample. Also 2ml of blood was collected by venepuncture and dispensed into labeled EDTA anticoagulant bottles for the haemoglobin estimation.

2.2 Macroscopic Examination

Physical characteristic of the stool sample e.g. color, consistency (i.e. whether formed or semi formed unformed, or watery), presence of blood, mucus or pus and presence of adult worms were observed.
2.3 Direct Smear Examination
Saline and iodine preparations were used. A drop of fresh physiological saline was placed on one end of a clean grease free slide and a drop of iodine on the other end. Using an applicator stick a small quantity of the sample 2g(match stick head) was emulsified with both saline and iodine respectively until a smooth thin preparation was obtained. Each preparation was covered with a cover slip and examined microscopically using x10 and x40 objective. The iodine preparation was to assist in the identification of cysts found in the saline preparation Formal Ether Concentration Technique.

This method was carried out to concentrate parasite by centrifugal force. About 1g of faeces was emulsified in 4ml of 10% formal saline contained in a glass test tube and mixed by shaking. The emulsified faeces was sieved and collected in a beaker. The suspension was transferred to a centrifuge tube and 4ml of diethyl ether was added, covered, mixed for 1 minute and centrifuged immediately at 1,000rpm for 5 minutes. Applicator stick was used to loosen the layer of the faecal debris from the side of the tube and the supernatant discarded. The tube was tapped to resuspend a debris from the side of the tube and the supernatant discarded. The preparation was examined microscopically using x10 objective with the condenser closed to give a good contrast .then x40 used to examine small cysts and eggs and a small drop of iodine was run under the cover slip to assist in the identification of cysts.

Table 1: Mean haemoglobin level of the pregnant women at different age group

<table>
<thead>
<tr>
<th>Age group (Year)</th>
<th>Total number examined</th>
<th>Mean haemoglobin (g/dl)</th>
<th>Number Infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 22</td>
<td>41</td>
<td>11.2±0.1</td>
<td>15 (36.6)</td>
</tr>
<tr>
<td>23 - 27</td>
<td>61</td>
<td>10.4±0.1</td>
<td>20 (24.7)</td>
</tr>
<tr>
<td>28 - 32</td>
<td>70</td>
<td>10.2±0.1</td>
<td>16 (22.9)</td>
</tr>
<tr>
<td>33 - 37</td>
<td>60</td>
<td>9.6±0.1</td>
<td>21 (35.0)</td>
</tr>
<tr>
<td>38 - 42</td>
<td>29</td>
<td>9.5±0.1</td>
<td>11 (37.9)</td>
</tr>
<tr>
<td>Total</td>
<td>281</td>
<td>10.4±1.3</td>
<td></td>
</tr>
</tbody>
</table>

The prevalence of E. histolytical was 1 (2.0), 2 (3.3) and 7 (4.1) in pregnant women who drank Borehole, Well Water and Open Stream while pregnant women who drank Borehole, Well Water and Open Stream had G. lamblia had prevalence of 0 (0.0), 0(0.0), and 3 (1.8). The prevalence of A. Lumbricoides was 2 (4.0), 5 (8.2) and 24 (14.1) in pregnant women who drank Borehole, Well Water and Open Stream as shown in Table 3 below. The prevalence of E. histolytical was 1 (1.5) and 6 (5.3) in pregnant women who used Pit Latrine, Water Cistern and Bush Method respectively while pregnant women who used Pit Latrine , Water Cistern and Bush Method had hookworm prevalence of 5(5.1), 3 (4.3) and 21 (18.6). Also prevalence of T. trichuria was 3(3.1), 3 (4.3) and 4(3.5) in pregnant women who Pit Latrine, Water Cistern and Bush Method respectively while pregnant women who Pit Latrine , Water Cistern and Bush Method had G. lamblia prevalence of 2 (2.1), 1(1.5), and 0 (0.0) respectively. A. Lumbricoides prevalence of 7(7.1), 5 (7.2) and 19 (16.8) respectively was obtained in pregnant women who used Pit Latrine , Water Cistern and Bush Method as shown in Table 3 below.

Table 2: Mean HB of women with intestinal parasite (g/dl)

<table>
<thead>
<tr>
<th>Mean HB of women with intestinal parasite (g/dl)</th>
<th>Mean HB of women without intestinal parasite (g/dl)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7±1.8</td>
<td>10.4±1.3</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

The overall prevalence of E. histolytical, A. Lumbricoides, Hookworm Spp, T. trichuria and G. lamblia was 10(3.6), 31(11.0), 29(10.3), 10(3.6) and 3(1.1) respectively in pregnant women as shown in Table 4 below.

Table 3: Prevalence of intestinal parasites in pregnant women based on source of their drinking water and toilet facilities

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Water source</th>
<th>Bush Method N(%)(113)</th>
<th>Total N(%)(281)</th>
<th>Toilet Source</th>
<th>Water source</th>
<th>Total N(%)(281)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. histolytica</td>
<td>Pit Latrine N(%)(99)</td>
<td>Water Cistern N(%)(69)</td>
<td>1 (1.5)</td>
<td>6 (5.3)</td>
<td>10 (3.6)</td>
<td>10 (2.0)</td>
</tr>
<tr>
<td>A. Lumbricoides</td>
<td>2 (7.1)</td>
<td>5 (7.2)</td>
<td>19 (16.8)</td>
<td>31 (11.0)</td>
<td>2 (4.0)</td>
<td>5 (8.2)</td>
</tr>
<tr>
<td>Hookworm Spp</td>
<td>5 (5.1)</td>
<td>3 (4.3)</td>
<td>21 (18.6)</td>
<td>29 (10.3)</td>
<td>3 (6.0)</td>
<td>4 (6.6)</td>
</tr>
<tr>
<td>T. trichuria</td>
<td>3 (3.1)</td>
<td>3 (4.3)</td>
<td>4 (3.5)</td>
<td>10 (3.6)</td>
<td>2 (4.0)</td>
<td>3 (4.9)</td>
</tr>
<tr>
<td>G. lamblia</td>
<td>2 (2.1)</td>
<td>1 (1.5)</td>
<td>0 (0)</td>
<td>3 (1.1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

| Total | 20 (20.2) | 13 (18.4) | 50 (44.2) | 83 (29.5) | 8 (16.0) | 14 (23.0) | 61 (35.9) | 88 (29.5) |

Table 4: Prevalence of Intestinal Parasites in Pregnant Women

<table>
<thead>
<tr>
<th>Parasites</th>
<th>E. histolytica</th>
<th>A. Lumbricoides</th>
<th>Hookworm Spp</th>
<th>T. trichuria</th>
<th>G. lamblia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence N(%)</td>
<td>10 (3.6)</td>
<td>31 (11.0)</td>
<td>29(10.3)</td>
<td>10(3.6)</td>
<td>3(1.1)</td>
<td>83(29.6)</td>
</tr>
</tbody>
</table>

The prevalence of E. histolytical was 3 (2.7), 1 (2.4), 1(3.3) and 5(5.0) in pregnant women who are Traders, Housewives, Civil Servants and Farmers while pregnant women who are Traders, Housewives, Civil Servants and Farmers had hookworm prevalence of 6 (5.5), 4(9.8), 2(6.7)and 17(17.0). Also prevalence of T. trichuria was 3 (2.7), 2(4.9), 1(3.3) and 4(4.0) in pregnant women who are Traders, Housewives, Civil Servants and Farmers while pregnant women who are Traders, Housewives, Civil Servants and Farmers had G. lamblia had prevalence of 0 (0.0), 0(0.0), and 3 (3.0). The prevalence of A. Lumbricoides was 9(8.2), 3(7.0), 2(6.7) and 17(17.0) in pregnant women who are Traders, Housewives, Civil Servants and Farmers as shown in Table 5 below.
4. Discussion

The study showed that women with parasitic infestation were severely anaemic. The study also found a strong association between anaemia and helminthic infection, which is similar to the result of earlier studies by Murthy et al [14] and Singh et al [15]. It has been seen around the world that micronutrient deficiency, parasitic infestations and stunting are significantly related problems [16]. A similar study in Nepal found high prevalence of parasitic infection where the associated morbidities like anaemia and reduced resistance due to other nutritional disorders made the condition worse and helminthes infestation further aggravated anaemia.

The study showed that women with parasitic infestation were severely anaemic. The overall age group specific prevalence in the age group revealed increased infection rate among the “38 – 42” age group (37.9%) as in table 1 and this could also be the illiterate group. This transmission and most may not be attending ante-natal clinics from the onset of pregnancy. The low prevalence of the infection among the women in the 28 – 32 age groups (22.9%) as in table 1 could be due to exposure to health programmes/lectures usually organized in their ante-natal clinics.

This study showed total prevalence of intestinal parasitic infection of 29.6% as in Table 1 which is higher than the value of 27.9% reported by Uchenna et al [17] in Enugu State, Nigeria. Ascaris lumbricoides (11.0%) was the commonest of all the intestinal parasites found infecting pregnant women in this study as in Table 4. This is similar to the studies made by Chan [18] and Uchenna et al [17]. Heavy parasite burden may cause digestive and Nutritional disturbances, blockage of the guts and perforation of tissues. Infection is spread through eggs, which are swallowed as a result of ingestion of contaminated soil or contact between the mouth and various objects carrying the adherent eggs.

Hookworm was the second most common parasite Table 4. Similar report was made by Chan [18] which showed that Hookworm was the second highest intestinal parasite. Efioh and et al [19] also reported Hookworm infection in antenatal women. The value of Hookworm in this study is lower to that reported by Egwunyenga et al [20] who reported infection rate of 22.5% at Eku in Delta State of Nigeria and Nwosu et al [21] who reported 25.8% in Aba, Abia State Nigeria while it was higher than the value reported by Azomine et al, who reported a prevalence value of 8.17% in Enugu State, Nigeria. Hookworm infection occurs by skin penetration of the infective larve due to poor sanitary disposal of human faeces. Prevalence is high in agricultural communities where human faeces are used as fertilizers and also where people go about barefooted.

In this study Entamoeba histolytica with prevalence of 3.6% and Giardia lamblia (1.1%) were the protozoan parasite isolated. In this study E. histolytica had higher prevalence of 10(3.6%). Similar studies by Obiamwe and Nmorsi [22] reported a value of 3.9% while, Anosike et al [23] reported 5.5% respectively. The parasite may sometimes invade tissue resulting in intestinal or extra - intestinal disease. This parasite (E. histolytica) though low in prevalence was found in all the zones of the communities. Infections occurs through transmission of viable cysts by direct contact with contaminated food such as raw vegetables fertilized with human caeces and also through the intermediary of flyflies contaminated hands of human cyst carriers.

G. lamblia infection results as a result of ingestion of the viable cysts as a result of poor sanitary habits or contaminated food. G. lamblia may be harboured by animals but they play little or no part in the epidemiology of human infections. In this study T. trichuria had a prevalence rate of 3.6% as shown in Table 4. This result is lower compared with the reports of Anosike et al [23] who reported a value of 14% amongst post primary school children in Owerri, Imo State, Nigeria and Oyindo et al [24] who reported a value of 5.3% among the inhabitant of Amaechi - Ikodo community in Nkanu East Local Government Area of Enugu State.

T. trichuria popularly known as Whipworm because of the whip like from of the adult worm has a cosmopolitan distribution. It is however, prevalent in the warm humid tropics.

The high incidence recorded in this group of farmers (46.0%) and also in the group that uses bush as their toilet facility (44.2%) as shown in tables 3 and 5 respectively may be due to the fast most of the parasites are geo-helminthes. The value of the group of farmers and that of users of bush higher to that reported by Ulstein et al [25] who reported infection rate of 38.0% and 40.6% in Nepal. They are transmitted through the faecal-oral route via contact with infected soil through unwashed hand, fruits and vegetables and also as infective larvae penetrating human skin in a faecally polluted soil.

High prevalence recorded in the group that drinks open stream (39.9%) may be as a result of the water being contaminated by run-off from the infected environment.

5. Conclusion

Intestinal parasite infestation in pregnancy is significantly related with anaemia, hence all women coming to antenatal clinics, should be screened for intestinal helminths infestation. The antenatal care should include de-worming. Health education to prevent anaemia while Pregnant women diet should be fortified with folate and iron supplement.

References

Table 5: Prevalence of Intestinal Parasites In Pregnant Women based on their occupation

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Traders</th>
<th>Housewives</th>
<th>Civil Servants</th>
<th>Farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>No (%)</td>
<td>No (%)</td>
<td>No (%)</td>
<td>No (%)</td>
</tr>
<tr>
<td>E. histolytica</td>
<td>3(27)</td>
<td>11(24)</td>
<td>1(3.3)</td>
<td>7(5.0)</td>
<td>10(3.6)</td>
</tr>
<tr>
<td>A. lumbricoides</td>
<td>9(82)</td>
<td>3(70)</td>
<td>2(6.7)</td>
<td>17(17.0)</td>
<td>31(11.0)</td>
</tr>
<tr>
<td>Hookworm Spp</td>
<td>6(5.5)</td>
<td>4(9.8)</td>
<td>2(6.7)</td>
<td>17(17.0)</td>
<td>29(10.3)</td>
</tr>
<tr>
<td>T. trichuria</td>
<td>3(2.7)</td>
<td>2(4.9)</td>
<td>1(3.3)</td>
<td>4(4.0)</td>
<td>10(3.6)</td>
</tr>
<tr>
<td>G. lamblia</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>3(3.0)</td>
<td>3(1.1)</td>
</tr>
<tr>
<td>Total</td>
<td>21(19.1)</td>
<td>10(23.3)</td>
<td>6(20.0)</td>
<td>46(46.0)</td>
<td>83(29.5)</td>
</tr>
</tbody>
</table>


