Incidence of intestinal parasitic infections among random samples at Al-Aziziyah hospital in Wasit province/Iraq

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Abstract:
The study is designed to identify intestinal parasitic infections examined at Al-Aziziyah Hospital in Wasit Governorate in Iraq. In this study, a total of (460) internal and external patients were monitored for intestinal parasitic infections. All stool samples were analyzed by the direct method (microscopic exam.) to discover the trophozoite stages and cyst stages for intestinal protozoan parasites. The most incidence parasites in different sex, area residence and different age groups. Out of (460) patient sample were infected with 217 at a percentage of (47.17%), 101(46.5%) were for males and 116 (53.5%) were for females. It was found that the numbers and percentages of a single (one type of parasite) and double (two type of parasite) infections were 207(95.4 %), 10 (4.6 %) respectively. Intestinal parasitic infections were found in (95.4 %) of the study population (17.9 % 1-5 age). E. histolytica was more common among the positive samples collected from intestinal parasitic species detected in this work. The prevalence of parasitic infection was significantly higher among younger age groups compared with older age groups. The age group 45 years had the highest incidence rate (17.9%) compared with other age groups (7.8%). The distribution of parasitic diseases between rural areas was 66.4% and urban areas was 33.6%. In conclusion, the incidence of intestinal parasitic infection among random sample demands improvement of health education with environmental sanitation and quality of water sources.

Key words: Al Aziziyah Hospital, Histopathology, Infection, Protozoa, Parasitic Infection.

Introduction:
The long suffering of intestinal parasitic infections represents a major health problem around the world. And the extent to which parasitic infections are linked to increase disease and death rates, especially among individuals suffering from malnutrition and immune depression. (1). Parasitic infection is a serious problem in the health of the citizen, causing malnutrition, iron deficiency and anemia, as well as delayed development of children and much of the weakness of physical and mental health. (2,3).

Intestinal parasitic infections are spread at the socio-economic levels, social norms, poor health and environmental conditions, hygiene, poor drinking water supply and climate factors. In poor countries, prevalence rates are between 30-60% compared to <2% in other countries (4,5). Intestinal parasites spread in Iraq vary from region to region depending on the degree of individual and community hygiene and environmental factors (6). The annual report of the Centers for Disease Control in Iraq (7) indicates that the level of infection with intestinal parasites (1.22%) of stool samples (1028640) have been examined from all regions of Iraq. The prevalence of infection was as follows: (Basrah 59.9%), (Sulaimani 26.28%), (Najaf 24.89%), (Dahuk 20.10%), (Nasiriyah 12.02%) and (Anbar 7.08%).

Intestinal parasitic worms cause parasitic infections, and protozoan parasites (8). There are four types of intestinal parasitic parasites, called geological worms, soil-borne parasites,
roundworms, and worm-like worms (ICUS) intestinal infections caused by intestinal worms and primary parasites (9). Four types of intestinal parasitic parasites, also known as geoelminths, helminths, terrestrial worms and Necator american ICUs (10), have the most common intestinal parasites: Giardia intestinalis and Entamoeba histolytica. Cryptosporidium infection is the infection caused by intestinal protozoan. Parasites are known as Giardia, amoebiasis, cyclosporins, and cryptosporidia, respectively, and are associated with diarrhea (11).

Intestinal protozoan and intestinal helminthes, weakness, itching, urticaria, dermatitis, amoebic amoebiasis, gastrointestinal ulcers, gastrointestinal ulcers, weakness of the intestines, Cervical inflammation, amoebic colitis, diarrhea, vaginitis, hemorrhoids and cystitis (12). The purpose of this randomized study is to determine the incidence of intestinal parasites among patients attending Al Azizia Hospital in Wasit Governorate, and by type of parasites and their relation to age, gender and housing. Health departments have used the results to improve environmental health throughout the regions, with a view to preventing the spread of intestinal parasitic infection in the Iraqi city of Aziziyyah.

Materials and Methods:
Sampling and examination
Samples were collected in sterile containers. The species were examined macroscopically to detect color, smell, consistency, mucus and blood.

Microscopy Examination
Drag slides were withdrawn for each sample.

Direct wet mountain with regular normal saline
Direct microscopy using saline and iodine was used to detect primary parasites (12).

Routing the lugulase-iodine solution swab
Direct iodine tripods have been prepared and used to explore the existence of protozoan trophozoites and cysts. The use of iodine in the mountains determines the internal structures of parasitic forms and is easy to identify. The iodine plates are prepared in the same way that saline plates expect a drop of iodine to be added to the mountains instead of saline

Statistical analysis
The Chi-square test was applied to verifying the correlation between the variables used (individual infection, sex, age) and intestinal parasitic infections. The SPSS used is version number (13). The natural data collected were used to analyze the questionnaire data and to determine whether the relationship between intestinal protozoa and intestinal variables was statistically significant when P was less than 0.05

Results and Discussion
Samples for 460 were analyzed from stool sample by direct microscopy, exam to discover the trophozoite stages and cyst stages for intestinal protozoan parasites. Table 1. Shows the prevalence of intestinal parasitic infection which was 217(47.2%) from the total number which was (460). There is no significant difference between positive and negative sample.

Table 1. Total number of samples examined the positive and negative samples.

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>Total percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>217</td>
<td>47.2%</td>
</tr>
<tr>
<td>Negative</td>
<td>243</td>
<td>52.8%</td>
</tr>
<tr>
<td>Total</td>
<td>460</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 1 records the results of the study with a total of infected 217 persons with a percentage of (47.17%) which represents 101(46.5%) for males and 116 (53.5%) for females. It was found that the percentages of single (one type of parasite) and double (two type of parasite) infections were 207(95.4 %), 10 (4.6 %) respectively agree with (14).

Table 2 presents the distribution of intestinal parasitic infection according to age/ year, which includes sex age groups. There is a significant difference in the current results between infection rates in the age group at the highest infection rate in the age group 1-5-23.9%, followed by age group11-20 years 23.4 % while the lowest percentage infection in the age group 31 - 40 , ≥ 41 years 9.7% as shows in Figure 1. The reason is that children in this age group did not know the conditions of hygiene, such as eating different foods from a variety of sources outside home which gives a greater chance of diarrhea. Moreover, the lack of parental interest in motivating their self-reliance in addition to the incomplete maturity of the immune system of children have a role in getting infected (15).
Figure 1. Distribution of Parasitic Infection in different age group/year.

From Table 2, it can be observed the overall gender, parasitic infections for 217 positive samples. The male infection percentages with *E.histolytica*, *B.hominis*, *G.lamblia* were (46.5, 34.6, and 5.5) respectively. While 4(1.8%) of patients suffered from double infection. The female infection percentages with *E.histolytica*, *B.hominis*, *G.lamblia* were (5.5, 40.1 and 6.5) respectively while (2.8%) of patients suffered from double infection.

The results of this work show there were no significant differences in p <0.05 in the prevalence of intestinal parasites by gender as demonstrated in Figure 2. The incidence of parasites in females was 53.5% which is the highest rate compared with males 46.5%. This shows similarly with a study by (16). Because males and females combined at different ages as shown in Figure 1, they were exposed to the chance of infection because they all lived under the same climate and conditions of disease as discussed in previous studies in (17).

Table 2. Division of parasitic infection according to gender.

<table>
<thead>
<tr>
<th>Parasitic infection</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E.histolytica</em></td>
<td>87</td>
<td>75</td>
<td>162</td>
<td>47.7%</td>
</tr>
<tr>
<td><em>B.hominis</em></td>
<td>14</td>
<td>12</td>
<td>26</td>
<td>12.0%</td>
</tr>
<tr>
<td><em>G.lamblia</em></td>
<td>9</td>
<td>10</td>
<td>19</td>
<td>8.8%</td>
</tr>
<tr>
<td>Double infection</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>4.6%</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>101</td>
<td>217</td>
<td>100%</td>
</tr>
</tbody>
</table>

No significant differences are shown in p <0.05 in the prevalence of intestinal parasites by gender.
Table 3 shows that the area of parasitic infection is much higher among the younger age groups than the older age groups, because the age group 5 years showed the highest rate of infection (23.0%) when compared with other age groups (9.2%). Table 4 shows that there are differences statistically significant in parasitic infection rates among rural areas, 66.4% and 33.6% among urban areas. The result in the present study is compatible with (18) who showed the highest percent of infection (55.04%) in (<10) years, age group in Baghdad city. This also agrees with (19) in Baghdad city, which scored an increased percent of infections (4-6) year.

### Table 3. Distribution of parasitic infection according to age groups/years

<table>
<thead>
<tr>
<th>Parasitic Infection</th>
<th>1-5 years</th>
<th>%</th>
<th>6-10 years</th>
<th>%</th>
<th>11-20 years</th>
<th>%</th>
<th>21-30 years</th>
<th>%</th>
<th>31-40 years</th>
<th>%</th>
<th>≥41</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single infection</td>
<td>50</td>
<td>23.0</td>
<td>27</td>
<td>12.4</td>
<td>50</td>
<td>23.0</td>
<td>39</td>
<td>18</td>
<td>21</td>
<td>9.7</td>
<td>20</td>
<td>9.2</td>
<td>207/95.4%</td>
</tr>
<tr>
<td>Double Infection</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>2.3</td>
<td>3</td>
<td>1.4</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>5</td>
<td>10/4.6%</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>23.0</td>
<td>32</td>
<td>14.7</td>
<td>53</td>
<td>24.4</td>
<td>40</td>
<td>18.4</td>
<td>21</td>
<td>9.7</td>
<td>21</td>
<td>9.7</td>
<td>217/100.0%</td>
</tr>
</tbody>
</table>

*No significant association between age and parasitic infection (P < 0.05).*

Distribution of intestinal parasitic infections according to area of residence is shown in Table 4, Figuer 3. Which manifests that the positive samples were 217, 144 (66.4%) for rural, 106(48.8%) with *E. histolytica*, 18(8.3%) with *B. hominis*, 14(6.5%) with *G.lamblia* and 6(2.8%) with double infection. 73(33.6%) for urban areas, 56(25.8%) with *E.histolytica*, 8(3.7%) with *B.hominis*, 5(2.3%) with *G.lamblia* and 4(1.8%) with double infection with significant differences (P<0.05).

The results showed that the incidence of intestinal parasites in rural areas was 66.4% higher than that of intestinal parasitic infection in urban areas (33.6%) with significant differences (P<0.05) in the spread of intestinal parasites. Prevalence rates for parasites were higher in rural than in urban areas due to food and water contamination, which is the most common in rural areas due to lack of good hygiene and healthy lifestyle.
Table 4. Distribution of parasitic infection according to area of residence

<table>
<thead>
<tr>
<th>Parasitic infection</th>
<th>Rural No</th>
<th>%</th>
<th>Urban No</th>
<th>%</th>
<th>Total No</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. histolytica</td>
<td>106</td>
<td>48.8</td>
<td>56</td>
<td>25.8</td>
<td>162</td>
<td>47.7</td>
</tr>
<tr>
<td>B. hominis</td>
<td>18</td>
<td>8.3</td>
<td>8</td>
<td>3.7</td>
<td>26</td>
<td>12.0</td>
</tr>
<tr>
<td>G. lamblia</td>
<td>14</td>
<td>6.5</td>
<td>5</td>
<td>2.3</td>
<td>19</td>
<td>8.8</td>
</tr>
<tr>
<td>Double infection</td>
<td>6</td>
<td>2.8</td>
<td>4</td>
<td>1.8</td>
<td>10</td>
<td>4.6</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>66.4</td>
<td>73</td>
<td>33.6</td>
<td>217</td>
<td>100.0</td>
</tr>
</tbody>
</table>

No significant differences (P<0.05).

Figure 3. Distribution of parasitic infections according to residence

Nevertheless, primary infection can be broadly associated with a simple life cycle completed in a single host, as well as a simple transmission of these intestinal parasites through oral stool, either directly from person to person or indirectly through eating or drinking, food and water contaminated stool. At the same time, carriers of these parasites that do not carry symptoms have a permanent risk of transmission in the community. Furthermore, some of these intestinal parasites normally inhabit the human intestine and become pathogenic due to least immune system (17, 18).

Types of intestinal parasitic infection distribution are presented in Table 5. Out of 217 positive samples, single infection was 207 (95.4%), which was the most common of other species and was dual infection 10 (4.6%) are shown in Figuer 4. There are high differences between the types of intestinal parasitic infection recorded as P<0.01. These results are equivalent with those recorded by (19, 20) in Baghdad and Mosul respectively which reported a higher ratio of total single infection than double and infections.

Table 5. Distribution of parasitic infections according to type of infection.

<table>
<thead>
<tr>
<th>Parasitic Infection</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Infection</td>
<td>207</td>
<td>95.4</td>
</tr>
<tr>
<td>Double Infection</td>
<td>10</td>
<td>4.6</td>
</tr>
<tr>
<td>Total</td>
<td>217</td>
<td>100</td>
</tr>
</tbody>
</table>

High differences (P<0.01).
In general, the incidence of intestinal parasites between studies can be explained on the basis of similarities or differences in the climatic conditions of the site and different ages of patients studied, nutritional status and immunity, health habits, health supplies and socio-economic conditions in the study area. Also, some sampling methods and different research methodologies, in addition to the different seasons of the study, include some non-pathological studies in the calculation of reported disease ratios or parasitism and neglect of other common infections, which may explain factors that may explain the causes of differences in rates of parasitic infection in different studies (21,22).

Also, the difference of parasitic infection rate could be due to the type of patients included. In this research, patients of a hospital with signs and symptoms of diarrhea were used only. Other studies used either subjects from general population (23,24).

**Conclusions:**

In this study, the high incidence of intestinal parasites in the rural areas of the city of Aziziyah is attributed to the low socio-economic status of families in the villages, indicating an increase in intestinal parasites. This hospital-generated manual may provide invaluable statistics needed to plan a meaningful public control program aimed at reducing infections and parasitic infections.

**Acknowledgments**

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**Authors' declaration:**

- Conflicts of Interest: None.
- We hereby confirm that all the Figures and Tables in the manuscript are mine ours. Besides, the Figures and images, which are not mine ours, have been given the permission for re-publication attached with the manuscript.
- The author has signed an animal welfare statement.
- Ethical Clearance: The project was approved by the local ethical committee in Middle Technical University.

**References**


انتشار الإصابات بالطفيليات المعوية في عينة عشوائية في مستشفى العزيزة في محافظة واسط/ العراق

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الخلاصة:
صممت هذه الدراسة لتقييم معدل الإصابة بأوالي الطفيليات المعوية في مستشفى العزيزة في محافظة واسط في العراق. في هذه الدراسة، جمعت عينات البراز (460) عينة من أشخاص في العيادات الخارجية والداخلية للعدوى الطفيلية المعوية. تم تحليل جميع عينات البراز من خلال الفحص المباشر (الفحص المجهري) لاكتشاف الأطوار الخضراء والأطوار المتكيسة لأوالي الطفيليات المعوية. اكتشفت حالات الإصابة بالطفيليات المعوية من مختلف الجنس، التواجد في المنطقة والظروف المحفزة المختلفة. من أصل (460) عينة، مرض أصيبوا بـ 217 حالة (47.17٪) للذكور و 116 (53.5٪) للإناث. تم العثور على أعداد ونسب الإصابات لعوامل الاصابة المنفردة (نوع واحد من الطفيليات) والاصابة المزدوجة (نوعان من الطفيليات) هو 207 (95.4٪)، 10 (4.6٪) على التوالي. كان الزحار الاميبي أكثر شيوعا بين العينات الإيجابية التي تم جمعها من الأنواع الطفيلية المعوية المكتشفة في هذه الدراسة. زيادة نسبة الإصابة بالطفيليات المعوية بشكل ملحوظ عند الأطفال كان أكثر من الأعمار الأقل من خمس سنوات تقريبا (23٪) مقارنة مع نسبة الإصابة لدى الأعمار أكبر (14.7٪) و (4.6٪) (%) و (18.4٪) و (4.6٪) (%) استنتاجات: إن حدوث العدوى الطفيلية المعوية بين عينة عشوائية يتطلب تحسين الثقافة الصحية في المجتمع وتنوع مصادر المياه.

الكلمات المفتاحية: مستشفى العزيزة، الزحار الاميبي، الإصابة، الأوالي، العدوى الطفيلية.