Impact of Enterobiasis on some physical & hematological indices among children in Iraq-Babylon Province

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A B S T R A C T

Enterobiasis is a public health problem which is most common in children particularly in the temperate and tropical regions. The disease is caused by a pinworm parasite, Enterobius vermicularis, which is commonly infect children rather than adults. This study aims to clarify the impact of Enterobiasis on some physical and hematological indices among children in Iraq-Babylon province. During the period from the 1st of April to the last of September, total of (56) children were diagnosed to have Enterobiasis by using direct microscopic examination for the observation the helminth’s eggs in the stool. PCV and Hb were measured to all participants by hematocrit. WBC count was achieved to determine the leukocytosis associated with Enterobiasis. The weight was measured to all children and applied on the growth chart for measuring weight for age centile. Statistical analysis showed that there was no statistical difference between the mean of age of the patients (5.58±2.76 years) and controls (4.9±2.9 years) (t=12.26, df = 55) and About (51.8%) of affected children were preschool and the majority of these cases (69.6%) were females. There was a significant difference in the growth parameters between the cases and controls (p<0.001); more than 80% of the cases were below 50 centile on the growth chart. There was a significant decreasing in the mean of PCV of the cases (34.35±3.62) when compared with control group (39.41±2.17) (p<0.001), also the mean of Hb for cases (11.08±1.21) was significantly decreased when compared with that of the controls (12.83±0.74). The study revealed that 45 (80%) of the affected children had eosinophilia when differential WBC was achieved.

Original Research Article

Keywords
Enterobiasis; Enterobius vermicularis; hematocrit; PCV and Hb. Eosinophilia helminth’s eggs

Introduction

Enterobiasis

Enterobius vermicularis (pinworm) is the causative agent of enterobiasis, it is a parasite which is more common in children worldwide, particularly in the temperate and tropical regions. It is estimated that 200 million people are
infected annually. This worm is commonly found in crowded institutions such as day-care centers, schools, hospitals and orphanages (Gülnaz C. and Nizami D, 2006).

*Enterobius vermicularis* is an important helminthic infection among children in rural areas of developing countries. Enterobiasis is frequently asymptomatic. The most typical symptom is perianal pruritus, especially at night, which may lead to excoriations and bacterial super infection (Finn, 1996), (Grencis RK and Cooper ES, 1996).

A high prevalence of enterobiasis can be detected in children with low socioeconomic status, and this infection affects the general health as well as the intelligence of the infected children (Avolio *et al*., 1998), (Bahader *et al*., 1995).

Pin worm infection is commonly spread in day care centers and elementary schools (Kang *et al*., 2006) The principle mode of transmission of worm is direct contact between infected and uninfected persons (Burkhart, 2005), and it infection usually occurs via ingestion of infectious egg by anus to mouth transfer by finger (Lohiya *et al*., 2000) However the transfer can also occur by touching contaminated surfaces such as clothing, bed linen and bathroom fixtures followed by ingestion or even through inhalation or aerosolized eggs from the aforementioned surface (Saiman *et al*., 2001) as such pin worm infections are spread among young children with the habits of nail biting or poor hygiene and infected children can easily spread the infection to other family members through the mechanisms which mention above (Song *et al*., 2003). Adult pin worm that live in the intestines feed off of nutrients ingested by the human, they reproduce sexually and after they mate, the male dies, then females proceeds to crawl down the intestinal tract and out the anus where the sky lays her eggs in the perianal skin, this may cause itching around the anus disturbed sleep, irritability and impetigo of scratched skin (Katz and Taylor, 2001).

Loss of weight sometimes nausea and vomiting rarely ectopic infections in the pelvic area or appendix and urinary tract occur (Zaharionet *et al*., 2007), (Sarmast, 2005).

Pin worm disease is treated with antiparasitic medication such as pyrantelpamoate, mebendazole or albendazole and the prescription is usually taken by everyone in the house hold also treated is often times repeated two weeks to make sure the disease remains gone, nitrooxanide was very well for treatment of parasite infection (Diaz *et al*., 2003). The present deals to clarify the impact of enterobiasis on some physical and hematological indices among children in Babylon governorate.

**Materials and Methods**

A total of 56 children who were infested by Enterobiasis with an equal number of apparently healthy children were enrolled in a case control study in Babylon province. Data compiled for each participant included demographic information (age and sex the samples of stool examined by direct examination coprological examination was performed by using direct microscopic examination (Urquhart *et al*., 2001) A small amount of fecal sample was mixed with saline solution (0.9%) in a petri dish. Few drops of it were placed on glass slide, covered with cover glass. Helminth’s eggs were
observed under (10x10 and 10x40) microscope. Eggs were identified on the basis of morphology (Yamaguti, 1975). It was observed that stool was infested with thread like worms could be seen with naked eye, identified as E. vermicularis along with number of eggs (Soulsby, 1982). The weight was measured by using a standardized weighting scale and then applied on the growth chart for measuring weight for age centile. PCV, Hb and differential WBC count were estimated to all participants following the procedure of (Dacie et al., 2002).

Statistical analysis

Statistical analysis was done using SPSS program version 17 for windows 7 with statistical significance (p) value of <0.05. The participants included in this work were chosen by Simple Random Sampling Method. The results were analyzed using “Independent Samples t-test” and the “X2-test.

Results and Discussion

The Age

The overall mean age of the participants was (5.2447 ± 2.89 years. There was no statistical difference between the mean of age of the patients (5.58± 2.76 years) and controls (4.9± 2.9 years) (t=12.26, df= 55). About (51.8%) of affected children were preschool as shown in table (1). This difference may be due to the fact that the small children engage more in frequent hand to mouth activity that facilitates infection transition. It was in contrast to the study of (Maulood et al., 1995) who showed that the infection rate was greater in school children (11.6%), in comparison to smaller ones; (Kim et al.,2003) showed that the infection rate in school children was 19.9% while in Kindergartens was 13.6%.

Table 1 Age distribution of children affected by Enterobiasis

<table>
<thead>
<tr>
<th>Age group(years)</th>
<th>Frequency</th>
<th>Percent(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6</td>
<td>29</td>
<td>51.8</td>
</tr>
<tr>
<td>6-13</td>
<td>27</td>
<td>48.2</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The sex

The majority of cases (69.6%) were females as shown in figure (1) and table (2)

Table 2 Sex distribution of the cases

<table>
<thead>
<tr>
<th>Sex</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
<td>30.4</td>
</tr>
<tr>
<td>Female</td>
<td>39</td>
<td>69.6</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The high rate of infection between the female is likely to be connected with their daily housework, contact with bed sheet and cloth for infected person(s) of family.

This agrees with the study is in agreement with (Lee et al., 1999) obtained a total rate 35.3% (38.7% of female and 31% of males) and (Kim et al., 2003) who obtained a total rate 12.65% (12.7% of female and 12.6% of males). but in contrast to the study of (Mohammad A., 2011).
Figure 1: Sex distribution of cases and controls

Figure 2: Distribution of cases and controls on growth chart

Figure 3: Difference in means of PCV of cases & Control
The weight for age

There was a significant difference in the growth parameters between the cases and controls (p<0.001); more than 80% of the cases were below 50 centile on the growth chart as shown in figure (2).

This result was in agreement with the study of (Kadhim, 2007) who found a significant relation between enterobiasis and both weight and height deficiency of children, and study of (Ali Çeliksözet et al., 2010) who stated that weight for age and height for age were found to be lower in the infected children than the non-infected group (t: 9.07 p<0.05, t:10.95 p<0.05 respectively).

The study also shows a significant effect of increased duration of disease on weight for age parameter (p<0.05).

This may be due to the effect of the parasite on the integrity of the gut due to the irritation of the mucosal lining leading to malabsorption, decreased appetite, dyspepsia, abdominal discomfort (Nicki et al., 2010)

Hematological indices of cases and controls

Packed Cell Volume and Hemoglobin Concentration

There was a significant decreasing in the mean of PCV of the cases (34.35±3.62) when compared with control group (39.41±2.17)(p<0.001) , also the mean of Hb for cases (11.08±1.21) was significantly decreased when compared with that of the controls (12.83±0.74) as shown in figure (3). Hemoglobin concentration was affected by enterobiasis, this result was in agreement with studies in Diyala (Kadhim, 2007), Kalar (Mohammad and Omer, 2011) and in Erbil (Hama, 2007) who found there was a significant relation between enterobiasis and hemoglobin deficiency.

Also the study shows a significant relationship between increased duration of infestation and lowered hematocrit (p<0.001). This result may be due iron deficiency in the lumen of the gut and impaired the synthesis of hemoglobin and subsequently the synthesis of red blood cells. It had been found that the adult parasites produced hemolysin that could consume the RBCs and lead to anemia and reduced levels of hemoglobin and PCV.

Differential White Blood Cell Count

The study reveals a significant correlation in the white blood cells count and presence of enterobiasis, 45 (80%) of the affected children have eosinophilia, this is associated with parasitic infection. The immune response to parasitic worm infections is predominantly Th2, consistent with the presence of IL-5, important in promoting recruitment of eosinophils that play a key role in the elimination of parasites. (Levinson, 2010).

References


Bahader SM, Ali GS, Shaalan AH, Khalil HM, Khalil NM. Effects of Enterobius


Saiman, L; Aaronson, J; Gomez-duarte, C; Gabrie P.S; Alonso, m; Maloney, S. and Schutte, J. 2001. Prevalence of