The Association of Intestinal Parasites with Serum Zinc Level among primary school Children in Iraq

Shatha Q.Jawad, Ahmed J.Al-Bayatti, Nagam Q. Jawad,

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Abstract

Objective: Zinc is an active element in the body and behaves as a co-factor for many enzymes, so the aim of this study was to investigate the association between intestinal parasites and serum zinc level in children in Iraq, and the effect of parasitic infections on the nutrition, growth, and physiology of host is still poorly understood.

Subject & Methods: Stool samples was taken from 40 primary school children in al –sabaa –abkar in Baghdad city (zam zam school children) 20 of them was boys and 20 was girls, testing for intestinal parasitic infection from the period form 10/2008 to 5/2009, then blood samples was taken from each child for measured serum zinc level by atomic absorption spectrophotometer.

Results Conclusion: 17 patients presented more than one species of intestinal parasites, 9 of them was boys and 8 was girls, No significant deferences was recorded between them. Giardia lamblia was fond in6 (15%) child, Entamoeba histolytica found in 5(12.5%) and Entamoeba Coli was found in 2(5%). But Enterobous vermicularis, Blastocystis hominis was found in 3(75%), 1(2.5%) respectively.

The mean of serum zinc level of parasitic infected children was lower (71.06) than that of control (91.61) also the weight and height, there was significant differences between infected and free parasitic children with serum zinc level.

Free children was higher (31.89kg) (109.78cm) than that of parasitic infected children (28..24kg) (100.59cm)respectively ,but there was no significant difference between them.
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We need further investigation in bigger groups for elucidate the role of zinc and –or other Biochemicals in the serum of parasitic infected children in Iraq, for determine the main factors influencing the occurrence of infection, promotion of environmental sanitation for the affected areas

Introduction

Intestinal parasites are a major public health problem ,in 2002,WHO,estimated the number of people infected by digestive tract parasites at3.5 bilion and the number of people made ill by them at450 million

Intestinal protozoa, the third –greatest parasitic disease responsible for the death in the world after malaria & schistosomiasis, and the world wide prevalence among children under 10 years of age

These infections (the majority being children)are regarded as serious public health problem, they can cause iron deficiency anemia, growth retardation in children and other physical and mental health problems. Low levels of education, poor hygiene, poor drinking water, over crowded conditions, and poor sanitation increase the prevalence of giardiasis

Zinc deficiency is another increasing public health problem, In 2004 its global prevalence was estimated at31% ranging from 4% to 73% across developing countries the association between zinc deficiency and infection has scarcely been investigated. Although the association of G.intestinalis with malnutrition and malabsorption of micronutrients such as vitamin A) is well recognized.

In 1993, giardiasis was reported as a first-time risk factor for zinc malabsorption in children, their other authors reported this risk however, the link remains controversial.

Material & Methods

Stool samples (0.5-1.5g) of 40 primary school children in the third year,20 of them were boys and 20 of them were girls ,were collected in labeled plastic containers without preservatives and immediately(less than 2 hr.) examined on microscope, to check the consistency and point out the presence of blood,mucus,or adult helminth parasites, at the period from October 2008 to May 2009.

We performed the modified formalin-ethyl acetate sedimentation technique for all specimens to demonstrate the presence of worm eggs and larvae and protozoan trophozoites and cysts. Also height and weight were measured for all children.
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2 ml sample of venous blood was taken from each child using glass tubes, within 2 hr., blood samples were transported to the laboratory and centrifuged at 1100g for 10 min. serum was separated, labeled stored at -70c for waiting the zinc determination by atomic absorption spectrophotometer.

The statistical analysis was performed to study the association or the relationship between intestinal parasites infection and sex, and the intestinal parasites infection (chi test), and the serum zinc level between the infected group and free parasite children t-test (10).

Results

17 of 40 child was presented more than one species of intestinal parasites either single or mixed infections, 9 of them was boys and 8 was girls. No significant deference (P > 0.05) was recorded between the boys and girls with intestinal parasites infection (Table 1).

As shown in (table -2) for the prevalence of intestinal parasites, *Giardia lamblia* was found in 6 (15%) child, *Entamoeba histolytica* was found in 5(12.5%) patient, and *Entamoeba Coli* in 2 (5%) patient. But *Enterobious vermicularis* and *Blastocyst hominis* was found in 3 (75%), 1(2.5%) respectively.

The mean of serum zinc level were higher in the parasitic-free children 91.61 than in the parasitic-infected group (71.06) also the height and weight was higher (109.78cm)(31.89kg) in parasitic free children than that in intestinal infected children (100.59cm)(28.24kg) respectively, but the study showed no differences in the means of serum zinc levels and the mean of weight and height between the intestinal parasitic infected children and parasite-free children.

**Table 1: prevalence of intestinal parasites among primary school children in Sabaa Abkar- Baghdad city from 10/2008 to 5/2009.**

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. Examined children</th>
<th>No. Infected children</th>
<th>Prevalence rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>20</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>Female</td>
<td>20</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>17</td>
<td>42.5</td>
</tr>
</tbody>
</table>

**Table 2: sex related prevalence of intestinal parasitic among primary school children**

<table>
<thead>
<tr>
<th>Parasite species</th>
<th>No. Infected children</th>
<th>Prevalence rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Giardia Lamblia</em></td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td><em>Blastocystis hominis</em></td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td><em>Entamoeba histolytica</em></td>
<td>5</td>
<td>12.5</td>
</tr>
<tr>
<td><em>Entamoeba coli</em></td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

مجلة شهرية كلي العدد السبعون 2011
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<table>
<thead>
<tr>
<th>Enterobius Vermicularis</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>17</td>
</tr>
</tbody>
</table>

X²=2.98  P=0.0224  P<0.05 (Significant)

Table 3: Zn and weight & height levels in parasitic infected children and control group of children.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Parasitic infected children Mean ± SD</th>
<th>Control group children free man Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>age (yr)</td>
<td>8.59/0.30</td>
<td>8.57/0.31</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>28.24/2.12</td>
<td>31.89/2.63</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>100.59/9.33</td>
<td>109.78/10.86</td>
</tr>
<tr>
<td>Serum zinc Level</td>
<td>71.06/21.6</td>
<td>91.61/26.89</td>
</tr>
</tbody>
</table>

Discussion

The study aims to evaluate the spread of intestinal parasites in children, particularly the school children. The study showed the presence of intestinal parasites about, this percentage regarded rather high among the school children, and there was no difference between boys and girls with the infection, which have nearly the same rate. Intestinal parasites represents a relevant clinical problem especially in developing Countries, where they are responsible for morbidity and mortality in adults or children, and the epidemiological data are available for these areas (11).

It is believed that the spread of the intestinal parasites has great relation to the financial and educational level of the families particularly in regions suffering from trouble. Intestinal parasitic infection may cause damage in the intestinal mucosa, such as inflammation, ulceration, and pathological changes in the villi of epithelial cells in the acute period of infection, and during the chronic period of the pathology, the epithelial cell damage and intestinal abscesses have also been reported (12).

There is no practical and reliable study in Iraq showing the real causes of the wide
spread of the intestinal parasites, or the way of treatment of the causes, besides there is no study showing the effect of these parasites or the relationship between these Parasites and the elements of blood serum (chemicals), as a matter of fact no study showed the effect on the health or the growth of the body (13). To prove that, the study showed a low level of zinc in children having these parasites in comparison with children who do not have the intestinal parasites and in children malnutrition contributes to an increase in the risk of enteroparasite infections which are causally associated with a chain of events involving anorexia, (14).

There are limited studies in human concerning zinc level with the parasite infection in Adult or in children but most of the studies are epidemiological, as studies on parasitic infection of children focused on nutritional and growth status, the results of these studies are contradictory about the effect of parasitic infection on the growth status of children, some authors found that these infections are related to the growth retardation while others reported no relationship, Kurpad et al, reported that the intestinal infection with parasites increases the requirement for lysine and this may be one factor responsible for the higher lysine requirement observed in persons with chronic under nutrition (15).

We showed that one type of the intestinal parasites may be a risk factor for zinc deficiency in school children under poor socioeconomic and environmental condition that accepted with many studies (16). This attempt needs wider study on a larger number of school pupils and more specific and practical study to discover the real causes which affect the growth of children.

Reference
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15. Kurpad, A V.; Regan, J.; Young, M M; Nazareth, D.; Nagaraj, S.; Gnanon, J.; Young, V Intestinal parasite increase dietary lysine
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الخلاصة

الهدف: تهدف الدراسة إلى تقدير ودراسة تأثير انتشار الطفيميات المعوية وعلاقتها بانزيمات المصل خاصة الزنك لتأثيره على صحة الأطفال، ولهذة الدراسة لا توجد معلومات في العراق.

طريقة العمل: تم فحص براز 40 طفل من 20 ذكر و 20 أنثى بعد اخذ كافة الاختصارات في مدرسة زمزم الابتدائية في منطقة السبع ابكار ببغداد الرصافة.

النتائج والمناقشة: ظهرت الإصابة الطفيلية في 17 مريض، سواء كانت مفردة أو مشتركة كان منهن 9 ذكر و 8 أنثى ولم يظهر أي فرق معنوي في الإصابة بين الذكور والإناث. ظهرت الجيريات المعوية في 6 (15%) مريض، وأمية الزحار في 5 (12.5%) مريض، أما أمية القولون كانت في 2 (5%) من المريضين.

لكن الدودة الدبورية والكيسية الأريمية البشرية كانت في 3 (75%) و1 (2.5%) على التوالي. بلغ معدل وزن وارتفاع الأطفال الذين لم تكون لديهم أصلاط طفيليية 31.89كم و97.81سم بينما بلغ 28.24كم و100.59سم في الأطفال المصابين.

كان معدل مستوى الزنك في مصل الأطفال الذين لم تكون لديهم إصابة طفيلية 91.61 وهو أعلى من مستوى 71.06 في الأطفال الذين كان لديهم أي نوع من الطفيليات المعوية، بينما لم يظهر فرق معنوي بين المرض الذين كان لديهم أصوات طفيليية والأطفال الذين لم تكون لديهم أي أصابة.

التوصيات: النتائج دلت على وجود نسبة عالية للاصابة بطفليات الأمعاء بين أطفال المدارس.

تحتاج الدراسة إلى دراسات أخرى أوسع لتشمل مدارس أكثر ومناطق متفرقة لمعرفة الأسباب ومفعولها، إذ أعدت هذه الدراسة لتكون تمهيدية لدراسات مستقبلية فم الضروري معرفة مستوى العناصر في المصل لدراسة تأثيرها على صحة الفرد وخاصة الأطفال في العراق.