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Evaluation of certain important biochemical parameters in school-age children infected with *Enterobius vermicularis*

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Abstract---The current study is objective to estimate some biochemical tests in children who infected with *E. vermicularis*. The current study was performed among children aged 1-9 years in Kirkuk city, Iraq. 90 children were used in current experiment at March to September 2021. The outcomes of this study demonstrated that the s.ferritin levels significantly lower in infected children compared with control group. Also, the results demonstrated that vitamin D3 levels significantly lower in infected children compared with control group. The vitamin B12 levels also show significantly reduces in infected children compared with control group. Its concluded that *E. vermicularis* infection lead to significant ($P<0.05$) in levels of vitamins and ferritin.

Keywords---children's, Kirkuk, ferritin, vitamin D3, vitamin B12.

Introduction

E. vermicularis is one of most common parasitic infections universal (Lee et al., 2011; Moosazadeha et al., 2017), and considered as factors causing malnutrition conditions and growth retardation problems among children less than 15 year (Kucik et al., 2004). The spread of *E. vermicularis* infection is associated to public health (Li et al., 2015). The transmission of Infection happens via direct contact (Park et al., 2005). *E. vermicularis* is known as the causative agent of enterobiasis. The disease is more widespread in temperate areas and is assist by various factors like overcrowding in children schools and the family groupings (Goldmann & Wilson 1997). Enterobiasis is less prevalence in tropical areas because eggs of

these worms is frequently destructed and damaged in hot weathers when compared with the cool areas (Jayaram 2000), enterobiasis is more occurrences in children compare to adults and it's particularly spread where several small children sleep in same bed (Robertd & Janovy 1996). Most of *E. vermicularis* infections are known as asymptomatic. Otherwise, the most common symptoms of enterobiasis include perianal regionirritation, itching and vaginal pruritus women (Cook 1994; Burkhart & Burkhart 2005). In severe *E. vermicularis* infections, the symptoms lead to more complications include weight loss, abdominal pain, and vomiting, insomnia and appendicitis disease (Shoup 2001; et al., Dudlova 2018; Hammood et al., 2019). *E. vermicularis* possess a very simple life cycle; it is transmitted through hand-oral route, the inhalation phenomenon, or reinfection by *E. vermicularis* (Pezzani et al., 2004; Chen et al., 2018). So, the current study is objective to estimate some biochemical tests in children who infected with *E. vermicularis*.

Materials & methods

Sample

The current study was performed among children aged 1-9 years in Kirkuk city, Iraq. 90 children were used in current experiment at March to September 2021. 60 children were suffering diarrhea, vomiting and abdominal pain and 30 children with good healthy as control group.

***E. vermicularis* investigation**

The microscopic examination was used in current experiment to detect the worm in feces of children who suffering diarrhea, vomiting and abdominal pain.

Biochemical tests

About 2ml of blood were collected from all children to estimate some parameters. The levels of serum ferritin were estimate by using vidas machine, through vidas biomerieux france. The levels of vitamin D3 were measured by using USA-Monobined kit. While, the levels of vitamin B12 were measured by using gamma counter system.

Statistical analysis

The data of this study were administration by Excel program through Chi-square test. A P value less than 0.05 was considered significant differences by using Minitab statistic program.

Results

Serum ferritin

The outcomes of this study demonstrated that the s.ferrtin levels (3.19 ± 0.42) significantly lower in infected children compared with control group (5.85 ± 0.26) as shown in figure (1).

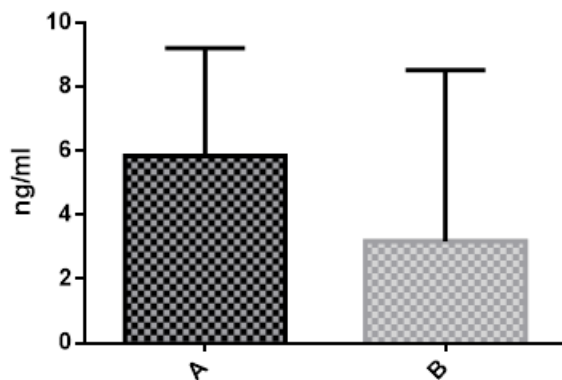


Figure (1): S. ferritin levels in studied groups
A: Control B: Infected children

Vitamin D3

The outcomes of this study demonstrated that Vit. D3 levels (8.46 ± 1.53) significantly lower in infected children compared with control group (17.25 ± 3.61), figure (2).

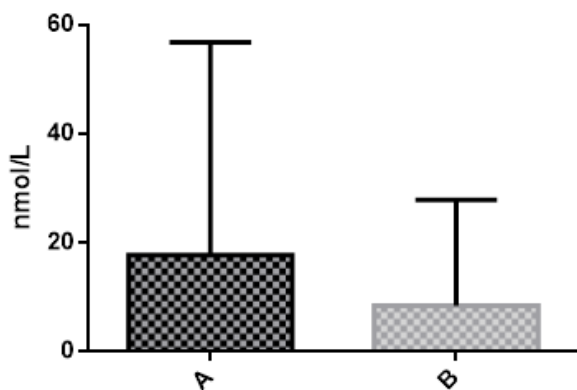


Figure (2): Vit. D3 levels in studied groups
A: Control B: Infected children

Vitamin B12

The outcomes of this study demonstrated that Vit. B12 levels (429.5 ± 31.75) significantly lower in infected children compared with control group (614.01 ± 55.2), figure (3).

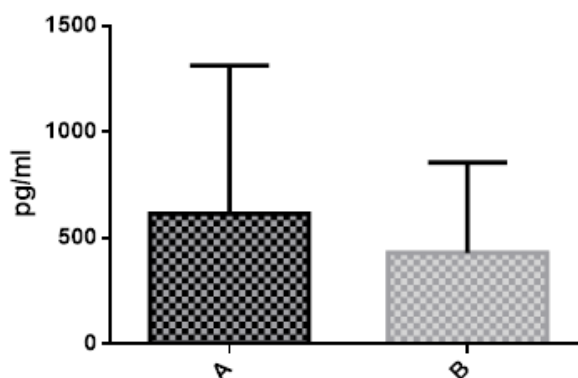


Figure (3): Vit. B12 levels in studied groups
A: Control B: Infected children

Discussion

The current study demonstrated that the levels of Ferritin and vitamins (D3 and B12) decreased in serum of children infected with *E. vermicularis* compared with healthy children. The reason for the low levels of vitamins and ferritin in the current study may be attributed to the infection of such parasites and intestinal worms is that these parasites use carbohydrates, fats, minerals, vitamins and other substances as nutrients to obtain energy (Hellard et al., 2000). The iron that remainder is stored and saved for later utilize in all human cells, but mostly is stored in cells of bone marrow, hepatocytes, and cells of spleen. These processes of stores are known as ferritin complexes, a low serum ferritin levels is the most sensitive test to estimate the iron deficiency, and however levels of ferritin can be increased by any chronic inflammation type (Ngui et al., 2012; Jafer & Jamal 2015). The results of current work are agree with study carried out by Cuevas (2005) who referred that the infection with *E. vermicularis* lead to significant changes in levels of some vitamins and minerals. On the other hand, Olivares et al., (2002) study the correlation between *E. vermicularis* infection and the levels of Vitamin B12 and folic acid in children with *E. vermicularis* infection, they found that levels of Vitamin B12 and folic acid significantly lower children infected with *E. vermicularis* compared with healthy children.

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Conflict of Interests

The authors of this paper declare that he has no financial or personal relationships with individuals or organizations that would unacceptably bias the content of this paper and therefore declare that there is no conflict of interests.

Source of Funding

The authors have no sources of funding, so it is self-funding research.

Ethical Approve

We declare that the study does not need ethical approval.

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