Anemia and Enterobiasis among Iraqi children

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Abstract

The prevalence of Enterobiasis and Anemia were screened in this study in Baghdad from June 2008 till April 2010 , among sixty eight children(41 schools, kinder garden children and 45 orphan children) their age rang (2- 12) years , stool samples were examined for ova or adult worm of *Entrobius vrermicularis* and hemoglobin concentration was analyzed for each subject. The results indicated no association between hemoglobin concentration and infection with *E.vermicularis* as well as 17.77% of anemic subjects were infected with *E.vermicularis* while 39.02% of anemic subjects were non infected with this parasites , there was no significant relation($p<0.05$) between infection with *E.vermicularis* and the occurrence of anemia among children.

Key word : Enterobiasis , Anemia , Iraq

Introduction:

Enterobius vermicularis (Pin worm) is an intestinal nematode of humans and its principal mode of transmission is direct contact between infected and uninfected persons [1].Enterobiasis is particularly a group of infection, being most common in large families and in institutions, such as boarding schools, hospitals, mental homes and orphanages. Transmission may be termed contaminative, as the eggs are immediately infective, and normally takes place indoors; this in contrast to the soil transmitted geohelminthes , in which the egg or larvae continue development in the soil [2].Anemia, which can be mild to severe, acute or chronic, is commonly associated with parasitic infestations. It is, however, only one of the multitudes of complications associated with parasitic infestations [3].Anemia is considered a serious public health problem in middle east region, although updated population-based data are lacking. Similarly, data on prevalence and intensity of infection with intestinal parasites, which are considered one possible cause of anaemia, are available only from small, unrepresentative sample surveys [4]. The aim of the study was to screened the prevalence of anemia associated with *E. vermicularis* in kinder garden , school and orphan children with different level of appetite.

Materials and Methods

Subjects:

The current study was carried out in Baghdad / Iraq between June 2008- April 2010 to find the prevalence of enterobiasis and anemia depend on hemoglobin levels among school , kinder garden and orphan children with different levels of appetite. Eighty six children were included in this study :41(47.67%) schools, kinder garden children and 45 (52.32%) orphan children range from 2-12 years. Questionnaire about appetite was constructed and data on age, gender was gathered. Data collection was done in cooperation with children parents and children nurse for school children, kinder garden and orphan children respectively.

Stoll collection

Stool collection by digital (finger) rectal exam technique was done of collecting eggs or worms [5,6)], briefly: the position of the child body for this test may be asked to lie on the left side of his chest with right knee and right thigh drawn up and asked him to inhale slowly as insert a lubricated and gloved finger into his anus to collect a stool sample. The sample is placed on a microscopic slide and examined as soon as possible.

Blood Analysis:

Blood samples were drawn from the subjects by vein-puncture , the blood samples put in EDTA tubes for the determination of hemoglobin levels and which was determined by the cyanmethemoglobin method, using a spectrophotometer [7].

Statistical analysis

Experimental data were presented in terms of observed numbers and percentage frequencies, and then analysed by Statistical Package for Social Sciences (SPSS 10.01) using the ANOVA , LSD and Chi square , P value ≤ 0.05 was considered statistically significant.

Results and Discussion:-

According to the results of stool examination, appetite level and some other factors which included in the questionnaire, subjects were divided into the following groups:

Group 1: Orphan children with good appetite, infected with *Enterobius vermicularis* .

Group 2: Orphan children with normal appetite, infected with *Enterobius vermicularis*

Group 3: Orphan children with bad appetite, infected with *Enterobius vermicularis* .

Group 4: School or kinder garden (KG) children with good appetite, non infected with *Enterobius vermicularis* .

Group 5: School or kinder garden children with normal appetite, non infected with *Enterobius vermicularis* .

Group 6: School or kinder garden children with bad appetite, non infected with *Enterobius vermicularis* .The major characteristics of these groups are mentioned in Table (1)

Table (1): Major characteristic features of groups included in this study

Group	Number of subjects	Age (mean± SD) years	male	Female	Enterobiasis	orphan	KG or School	appetite
1	26	5.19±1.91	12	14	+	+	-	Good
2	13	4.84±1.99	8	5	+	+	-	Normal
3	6	4.33±1.36	3	3	+	+	-	Loss
4	20	6.9±2.80	8	12	-	-	+	Good
5	9	6.88±3.17	3	6	-	-	+	Normal
6	12	6.16±3.53	9	3	-	-	+	Loss

Hemoglobin results of these groups were illustrated in Table (2) , statistical analysis using ANOVA showed that there were significant differences in hemoglobin level between groups , as well as LSD analysis showed that group 6 was significantly differ from other groups , because it had the less hemoglobin level (9.8 ± 0.85) gm/dl when it compare with other groups Group 1 ,2 ,3 ,4 and 5 which showed the following levels of hemoglobin respectively: (11.67 ± 0.76) gm/dl , (11.46 ± 71) gm/dl , (11.58 ± 0.61) gm/dl , (11.75 ± 1.02) gm/dl and (11.21 ± 0.71) gm/dl (table 2). These results indicated no association between hemoglobin concentration and infection with *E.vermicularis* , and the low concentration of hemoglobin in group 6 may due to different factors such as other type of parasitic infection

[8] , individuality and bad nutrition [9] ,which associated with very bad appetite in group 6 , these results were similar to the results of (Le *et al* .,2007) [10] , who showed that some other nematodes such as *Ascaris* and hookworm were not significantly associated with hemoglobin concentrations while other showed that some nematods such as hook worm is very important as an etiology of iron deficiency [11] . on other hand a recent study showed that 14.3% of children were infected with *E. vermicularis* and *Giardia lamblia*, and 60% infected with *Strongyloides stercoralis* had low concentration of hemoglobin [12]. As well as a previous study in Spain reported a significantly lower level of serum iron in patients with and without giardiasis as a result of damage to the intestinal mucosa [13] , while pinworms have not been shown to cause disease in the gastro intestinal tract. However, they are often associated with pathological changes in the appendix, even though they do not induce such changes [14].

Table 2: hemoglobin concentration among study groups

Group	Hemoglobin concentration gm/dl (Mean ± SD)
1	(11.67 ± 0.76)
2	(11.46 ± 71)
3	(11.58 ± 0.61)
4	(11.75 ± 1.02)
5	(11.21 ± 0.71)
6	(9.8 ± 0.85)

The results showed that the percentage of anemic subjects (their hemoglobin concentration less than 11.00 g/dl as reported by WHO [15]) was 27.90%, this result was lower than the result of (Khalaf , 2008) [16] who showed that the percentage of anemia in Baghdad was 44.1% among children less than 2 years while other showed 12.9% among healthy adolescent [17], this differences may due to age differences and nutritional status.

The current results showed that 17.77% of anemic subjects were infected with *E.vermicularis* while 39.02% of anemic subjects were non infected with this parasites, so there was no significant relation ($p<0.05$) between infection with *E.vermicularis* and the occurrence of anemia among children. As well as high significant percentage (75%) of anemia were noticed in group 6(School or kinder garden children with bad appetite, non infected with *Enterobius vermicularis*) when it compare with other groups 1,2,3,4 and 5 that showed low percentages of anemia : 15.38% , 23.07 , 16.66% , 20% and 33.33% respectively. (table 4), these results also indicated that there was no relation between the prevalence of anemia and enterobiasis. This results were in agreement with (Tsuyuoka *et al*. ,1999) [3] who showed that there was no association between anemia and intestinal parasites , others showed that *Trichuris* infection was associated with a doubled risk of anemia, not mediated through iron deficiency , while chronic infection may play a role in anemia, but needs further investigation [10].Although parasitic infestation tends to increase the prevalence, level, and severity of anemia [18]. In other study significant association was shown between anemia and double parasitic infection, whereas no significant associations were identified between single parasitic infection in the study and low hemoglobin level except in *A. lumbricoides* and *G. lamblia* [12].

From the previous results we conclude that infection with *E. vermicularis* was not related with hemoglobin concentration and with the prevalence of anemia.

Table 3: Percentage of Anemic and non anemic subjects in relation with Enterobiasis

		Infected with *E.vermicularis* (Group 1,2,3)	Non infected with *E.vermicularis* (Group 4,5,6)	Total
Anemic subjects	Number	8	16	24
	(%)	17.77	39.02	27.90
Non-anemic subject	Number	37	25	62
	(%)	82.23	60.98	72.1
Total		45	41	86
Chi square (X2):4.814		Degree of freedom:1	p-value:0.02822495	

Table 4: Percentage of Anemic and non anemic subjects in different study groups

		Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Total
Anemic subjects	Number	4	3	1	4	3	9	24
	(%)	15.38	23.07	16.66	20	33.33	75	27.90
Non-anemic subject	Number	22	10	5	16	6	3	62
	(%)	84.17	76.93	83.34	80	66.67	25	72.1
Total		26	13	6	20	9	12	86
Chi square (X2):16.535			Degree of freedom:5		p-value:0.00547157			

References:-

1. Kang , S. ; Jeon ,H.K. ; Eom , K.S. and Parl , J.K.(2006). Egg positive rate of Enterobius vermicularis among preschool children in Cheongju , Chungcheongbul-do , Korea , Korean J.Parasitol.44(3):247-249.
2. Muller , R. And Wakelin , D. (2002). Worms and Human Disease 2ed edition , CAB international , UK. 310 pp.
3. Tsuyuoka , R. ; Bailey , J. W. ; Guimaraes , A.M. ; Gurgel , R. And Cuevas ,L.E.(1999). Anemia and intestinal parasitic infections in primary school students in Aracaju, Sergipe, Brazil.Cad. Saúde Pública, Rio de Janeiro, 15(2):413-421.
4. Curtale , F. ; Nabil, M. ; Elwakeel , A. and Shamy , M.(1998). Anaemia and Intestinal Parasitic Infections Among School Age Children in Behera Governorate, Egypt.J Trop Pediatr . 44 (6): 323-328.

5. Pin worm infection. Centres for Disease Control and Prevention.Avalible at:www.cdc.gov/NCIDOD/dpd/parasites/pinworm/factsht- pinworm.htm.Accessed October 24,2006.
6. Kuick C.J.; Martin, G.L; Sortor , B.V.(2004). Common intestinal parasites. Am.Fam.Physiscian. 69:1161-1168.
7. WHO (2003). Manual of Basic Techniques For A health Laboratory 2ed edition , Geneva , pp:398.
8. Botero-Garces , J. ; Garcia , G. ; Patino ,D. ;Acevedo , D. And Uribe , C.(2009). Giardia intestinalis and Nutritional Status in Children Practicipating The Complementry Nutrition Program , Antioquia ,Colombia , May to October 2006. Rev.Inst.Med.Trop.S,Paulo,51(3):155-162.
9. Sinha ,N. ; Deshmukh , P.R. and Garg , B.S.(2008). Epidemiological correlates of nutritional anemia among children (6-35 months) in rural Wardha, Central India. Indian J. Med. Sci. 62(2):45-54.
10. Le , H. ; Brouwer , I. ; Verhoef , H. ; Nguyen , K. And Kok, F.(2007). Anemia and intestinal parasitic infection in school children in rural Vietnam. Asia Pac.J.Clin.Nutr.16(4)716-723.
11. Stoltzfus , R.J. ; Dreyfuss ,M.L. ; Chwaya , H.M. and Albonico, M.(1997). Hookworm Controls as a Strategy to Prevent Iron Deficiency. Nut. Rev.55 (6):223-232.
12. Al-Zain ,B. (2009).Impact of Socioeconomic Conditions and Parasitic Infection on Hemoglobin Level among Children in Um-Unnasser Village, Gaza Strip.Turk.J.Med.Sci.39(1):53-85.
13. Olivares ,J. ; Fernandez , R. ; Fleta ,J. ; Riz, M. ; Clavel ,A. And Moreno ,L.(2004). Iron Deficiency in Children with *Giardia lamblia* and *Enterobius vermicularis*. 24(1):1-5.
14. Despommier ,D.(2006).Pathophsiology Parasitic Disease Labratory Manual and Case Histories. Columbia University ,USA.pp:88.
15. WHO (1968). Nutritional anemia. Report of a WHO Scientific Group. Gerona,World Health Organization.
16. Khalaf , O.Z.(2008). Prevalence of Iron deficiency anemia in children between 6 month- 2 years of age. Board thesis , Iraqi board for medical specialization- Iraq. pp: 37.
17. Al-Sharbatti , S. ; Al-Ward , N.and Al-Timimi , D. (2003). Anemia among adolescents. Saudi Med.J. 24(2):
18. Oguntibeju , O.O.(2003). Parasitic Infestation and Anemia : The Prevalence in a Rural Hospital Setting. JIACM.4(3):210-212.

فقر الدم و الخمج بالدودة الدبوسية بين الأطفال العراقيين

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تم دراسة انتشار كل من الخمج بالدودة الدبوسية و فقر الدم في بغداد للفترة من حزيران 2008 و لغاية نيسان 2010 ضمن مجموعة من الأطفال تضم ستة و ثمانون طفلاً (41 من اطفال المدارس و رياض الأطفال و 45 من اطفال دور رعاية الأيتام) تتراوح اعمارهم من 2– 12 سنة , فحصت عينات الغائط للتحري عن بيوض و بالغات الديدان الدبوسية وتم قياس تركيز الهيموغلوبين لكل منهم.

اشارت النتائج الى عدم وجود علاقة بين تركيز الهيموغلوبين والخمج بالديدان الدبوسية , واظهرت النتائج ان 17.77% من المصابين بفقر الدم كانوا مصابين بالدودة الدبوسية بينما 39.02% من المصابين بفقر الدم هم غير مصابين بالدودة الدبوسية , حيث لم تكن هناك اي علاقة معنوية عند مستو ى دلالة ($p<0.05$) بين الخمج بالدودة الدبوسية و انتشار فقر الدم بين الأطفال.