



Distribution of *Giardia lamblia* Among local and Displaced Children in Kirkuk City

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Abstract

The aim of this study was to show the distribution of *Giardia lamblia* infection among local and displaced children in Kirkuk city, and its effect on some hematological parameters Haemoglobin (Hb), Packed cell volum (PCV) White Blood Cell Counts (WBCc). The stool samples were examined by direct wet mounts techniques, concentration and ELISA techniques. Blood sample were collected from each child and some hematological parameters were estimated for them. The overall rate of *Giardia lamblia* infection in displaced children 21.5% was higher than local ones 10.53%. The prevalence of infection males 15.64% was higher than females 12.01% in both local and displaced children. The hemoglobin value among local children was significantly lower than displaced children. while the PCV value among local children was significantly higher than displaced ones. The rate of WBC in local and displaced children was increased slightly, its value in local children 10.13% and in displaced children 10.30%. Its concluded that the distribution of *Giardia lamblia* was high in both local and displaced children. The rate of infection in displaced children was higher than local children.

Introduction

Giardia lamblia is a disease caused by *Giardia lamblia*, which is one of the most common intestinal parasitic infections all over the world. It affects people particularly children in developing countries [1], due to the use of contaminated water, inadequate sanitary condition and poor personal hygiene. Hence, this parasite can be spread by contaminated food and water with infectious stage of parasite. Also by fecal-oral route [2]. The disease can be acute or chronic [3]. However, asymptomatic carriers are common [4]. Epidemiological studies indicate that Giardiasis lead to decrease serum iron level due to mal absorption [5]. So anemia is common among individuals suffering from this disease [6]. In Iraq there are different reports about the distribution of *Giardia lamblia* infectin; In Kadhmyia hospital in Baghdad there was 1.77% [7]. Salman [8] found the rate of *Giardia lamblia* infection was 30.39% among primary school children in Kirkuk. In Dialya Jassim [9] examined 1-5 years old children of different health center, he found the rate of infection was 23%. In Ninevah governorate

AL-Daoudy [10] found the rate of Giardiasis was 14.3%. In Erbil Abdullah [11] found the rate of infection in children 22%, and other investigator [12] examined primary school children in different rural and urban area, He found the rate of infection was 13.3%. However, In Sulaimania Hussein [13] found the rate of infection was 11.9% in school children.

The aim of this study was to determine the prevalence of *Giardia lamblia* infection among local and displaced children (displaced are those individuals or group of individuals who are forced or obliged to leave their places of residence) in Kirkuk city and its effect on some hematological parameters; Hemoglobin (Hb), packed cell volume (PCV), and White blood cell counts (WBCc).

Materials and Methods

The aim of this study was to show the frequency of *Giardia lamblia* infection among local and displaced children and its effect on some hematological parameters. Samples of blood and feces were collected randomly during period from 1st of October

2015 to 1st of October 2016, among local and displaced children who attended Kirkuk hospitals. The number of children were 684 (484 local and 200 displaced), 326 were males and 358 were females. Their ages were ranging from below 2 years up to 13 years old. A special questionnaire form was prepared to get information's (Age, Gender) from children and their parents. Stool samples were collected from each child, kept in clean plastic container, kept in refrigerator and examined in microbiology laboratory in College of Nursing using direct wet smear (Fresh stool samples were examined under microscopic using the saline and iodine wet mount techniques to detect motile trophozoite or cyst), concentration, (Depending on the difference in the specific density of some solutions and eggs of worms and cysts of protozoa, where eggs and cysts float on the surface of these solutions, while deposition of feces to bottom and then take samples of solution to be detected after 5-20 minutes), and ELISA techniques. ELISA technique was done in stool samples using ELISA kit for *Giardia lamblia* antigens (DRG International/Germany). Blood samples were collected from each child, to carry on Hemoglobin (Hb), Packed cell volume (PCV) White Blood Cell Counts (WBCs). Using CBC checking device, Buole Medical AB/Swe lab Alfa /Sweden.

Statistical analysis .

Statistical analysis was carried out using statistically available soft ware (spss version 17). Comparisons between control and patient groups in both of local and displaced children were made using T-test at ($p \leq 0.05$) for each of PCV, Hb and WBC count, and chi-square test was used to compare infection rate between sexes and different age groups [16].

Results

The present study shows that the rate of *Giardia lamblia* among local children, was highest among 4-6 years old, 14.81 %, followed by 7-10 years 9.04 % and the lowest was among 1-3 years 3.03 %, Table 1.

Table 1. Distribution of *Giardia lamblia* among local children according to age group.

Age group (year)	No. examined	No. positive	Positive %
1-3	66	2	3.03
4-6	162	24	14.81
7-10	221	20	9.04
11-13	35	5	14.28
Total	484	51	10.53

Chi -sq=8.130 D.F=3 P=0.043 $P \leq 0.05$ SIG

The rate of *Giardia lamblia* infection among displaced children according to age groups, and the highest infection rate was among 4-6 years, 29.68 %, followed by 7-10 years 26.53 %, 1-3 years 14.28 % and the lowest rate was among 11-13 years old was 11.11 %, Table 2 .

Table 2. Distribution of *Giardia lamblia* among displaced children according to age group.

Age group (year)	No. examined	No. positive	Positive %
1-3	42	6	14.28
4-6	46	19	41.30
7-10	49	13	26.53
11-13	45	5	11.11
Total	200	43	21.5

Chi- Sq=7.450 D.F=3 P=0.0059 $P \leq 0.05$ NS

The rate of infection among local children according to gender was higher in males 12.4%, than females 8.54 % Table 3.

Table 3. Distribution of *Giardia lamblia* among local children according to gender.

Sex	No. examined	No. positive	Positive %
Male	250	31	12.4
Female	234	20	8.54
Total	484	51	10.53

Chi- Sq=1.684 D.F=1 P=0.194 $P \leq 0.05$ NS

The rate of infection among displaced children according to gender, was higher in males 26.31%, than females 18.54 %. The difference in the rate of infection between gender was not significant between difference gender, Table 4.

Table 4. Distribution of *Giardia lamblia* among displaced children according to gender.

Sex	No. examined	No. positive	Positive %
Male	76	20	26.31
Female	124	23	18.54
Total	200	43	21.5

Chi-Sq=1.903 D.F=1 P=0.168 $P \leq 0.05$ NS

The present study shows hematological parameters among local and displaced children, Hemoglobin (Hb), Packed cell volume (PCV) White Blood Cell Counts (WBCs). The Hb value among infected local was 9.85% and displaced was lower than controls 9.30%. Statistically there was significant different between infected and non infected groups ($p \leq 0.05$). The PCV value among both infected local 32.00 % and displaced children 26.29% was higher among infected children than controls in both local 10.13% and displaced children 10.30% Table 5.

Table 5. Some hematological parameters among 25 local and displaced children.

Parameters	Mean $\pm$ S.D			
	Local children		Displaced children	
	Infected	Non infected	Infected	Non infected
Hb value (gm/dl)	*9.85 $\pm$ 1.19	*15.08 $\pm$ 2.00	*9.30 $\pm$ 1.56	*14.0 $\pm$ 1.27
PCV%	*32.00 $\pm$ 2.22	*41.58 $\pm$ 3.79	*26.29 $\pm$ 2.64	*35.38 $\pm$ 7.13
WBC count ($\times 10^3$ /ml)	*10.13 $\pm$ 2.38	*6.68 $\pm$ 1.72	*10.30 $\pm$ 2.12	*6.36 $\pm$ 1.29

*mean significant at ($p \leq 0.05$)

A comparison between the efficacy of diagnostic methods for the detection of *Giardia lamblia*. where the percentage of infection by direct method was

5.99%, the concentration method was 7.74% and ELISA 90.62% , Table 6 .

Table 6: Comparison between the efficacy of different method in detection *Giardia lamblia* infection among children in Kirkuk city

Lab method	Total No. of samples	No . positive + ve	Positive percentage +ve %
Direct wet preparation	684	41	5.99
Flotation	684	53	7.74
ELISA	96	87	90.62

Discussion

In the present study some epidemiological factors were associated with the rate of infection with *Giardia lamblia*, such as age groups and sex distributions should also be taken in to consideration in this study . Some other parameters may be affected by parasitic infections such as hematological status are studied.

Giardia lamblia infection exhibits a high rate among our community especially among children., such high rate of infection among children could be related to a number of factors such as low socioeconomic status and climatic conditions, overcrowding, poor health hygiene, low education of children, another important factor which affects the rate of giardiasis is the presence of asymptomatic patients in the community who can be considered as the main source of infection through continuously excreting the cysts stages with their stools.

From the result of this study it was shown that the rate of *G. lamblia* in Kirkuk is being higher among displaced children than the local ones 10.53% VS 21.5% .The higher rate of *G.lamblia* in displaced children than local ones, might be related to socio economic status of displaced children and lack of health education and poor environmental condition and poor health services overcrowding and lack of healthy latrines.

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Regarding sex the higher rate of infection in males than females in both local and displaced children, might be due to the activity of male children as they played outside and they have more chance to expose to infection .This finding is in agreement with that reported by [17] in Dila government who found the rate of infection in governorate in male was higher than female 39.6% VS 23.1%, and [18] in Najaf governorate. While is not agreement with [19] in Najaf governorate and with [20] in Karbala. might be due to sample size. As far as age group are concern the highest rate of infection was among (4-6) year old this might be attributed to that children are playing in a group outside in addition to poor housing and overcrowding [21, 22 , 23].

Regarding the efficacy of different method for detection *G.lamblia* it was found that the efficacy of ELISA was highest 90.62%,flotation 7.74%, direct wet mount 5.99% ,this finding is in agreement with that reported by [24]. Regarding the hematological parameters, the lower Hb and PCV value among infected children than non infected one agree with finding of [25] in Kirkuk and [26] in Amman, and [27] in Palestine but disagree with finding of [28] in Thi-Qhar . While the WBC value was statistically higher in infected children than non infected control ones, this is against [28] .

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انتشار الخمج بطفيلي الجيارديا لامبليا بين الأطفال المحليين وأطفال النازحين في مدينة كركوك

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الملخص

جمعت 684 عينة دم وغائط من الاطفال المراجعين لمستشفى الاطفال ومستشفى ازادي التعليمي في كركوك وبعدد 484 عينة لاطفال المدينة و200 عينة من الاطفال النازحين للفترة من تشرين الاول 2015 ولغاية تشرين الاول 2016. وكان الهدف من الدراسة هو بيان انتشار الخمج بطفيلي الجيارديا لامبليا بين الاطفال المحليين والنازحين في مدينة كركوك وتأثير ذلك على بعض المعايير الدموية مثل خضاب الدم وحجم خلايا الدم المرصوص، تعداد خلايا الدم البيضاء الكلي. فحصت عينات الغائط عن طريق تقنيات الفحص المباشر والتركيز وتقنية الاليزا. سجلت نسبة الإصابة لدى اطفال النازحين وهي اعلى من نسبة الإصابة لدى اطفال المدينة والتي بلغت 21,5% وكانت معدلات الإصابة بين الذكور أعلى منه في الإناث في كل من الاطفال المحليين والنازحين. وكانت قيمة خضاب الدم او الهيموغلوبين بين الاطفال النازحين اقل منه في الاطفال المحليين في حين ان قيمة حجم خلايا الدم المضغوط لدى الاطفال المحليين كانت اعلى من قيمته عند النازحين. وكان معدل تعداد خلايا الدم البيضاء الكلي في اطفال النازحين اعلى من معدل تعداد خلايا الدم البيضاء الكلي في الأطفال المحليين.