Some Factors Influencing the Prevalence of *Gairdia lamblia* and *Entamoeba histolytica* in a Sample of Patients in North of Baghdad

Harith Sa'eed Al-Warid
Department of Biology, College of Science, University of Baghdad, Baghdad-Iraq.
E-mail :harithalward@yahoo.com.

Abstract

Different factors were examined related with the prevalence of *Giardia lamblia* and *Entamoeba histolytica* infections in population live north of Baghdad which were (seasonal tendency, travelling history and source of drinking water) during the period April 2009 till the end of March 2010. The study revealed that the total rate of parasitic protozoan infection (*G.lambli*a and *E. histolytica*) was (15.33%) , the infectiion rate of *G.lambli*a was higher than the infection rate of *E.histolytica* as their rates were (11.66%) and (3.66%) respectively.There was high significant relation ($p \leq 0.05$) between infection rate of these parasites and both of drinking water and travelling status of the patient , high infection rate of (*G.lambli*a and *E.histolytica*) was observed in patients who drunk tab water and patients with travelling history,while the minimum infection rate was seen in patients who drunk the other types of drinking water (boiled, filtered and bottled) and patients with no travelling history.Finally the peak of *Giardia* and *E.histolytica* positive rates were seen in June 2009 (20%) and July 2009 (9.67%) respectively, while the minimum positive rate was seen in January 2010(1.85%) and November 2009 (1.61%) respectively. Statistical analysis using Person Correlation (r) illustrated that there was positively significant association ($p \leq 0.05$) between temperature and each of *Giardia lamblia* and *E.histolytica* infection, while there was significant negative association between number of rainfall per month and each of *Giardia* and *E.histolytica* infections.

Keywords: Prevalence, *G.lamblia* , *E.histolytica.*

Introduction

Intestinal protozoa are frequently transmitted via contaminated food and/or drinking water, but may also be spread from person to person through fecal–oral contact [1]. Intestinal protozoan and helminthes parasites are widely prevalent causing considerable medical and public health problem in developing countries [2]. World Health Organization (WHO) estimate that 3.5 billion people worldwide are affected and that 450 million are ill as a result of these infections [3].*Giardia lamblia* and *Entamoeba histolytica*, are the major intestinal parasitic agents [4]. Although they are not serious life-threatening parasites, they are still important infectious agents, especially to infants [5].

In Iraq literatures showed different incidence level of *G.lamblia* and *E.histolytica* infection range from 3.78% to 48% and 4.05% to 33.8% respectively [6, 7 ,8] as well as some papers focus on sex related, occupation related prevalence [8] and age related especially in children [9, 10] but little about seasonal tendency, traveling related and source of drinking water related prevalence so more long-term data on seasonal, source of drinking water ,and traveling -related patterns of *G.lamblia* and *E. histolytica* infection are needed in our country.

Materials and Methods

This study was conducted in: AL-Noor primary health care center, AL-Noor General Hospital, AL-Khadimya Teaching Hospital and AL-Khadimya Hospital for children/ Baghdad, during the period from beginning of April 2009 till the end of March 2010.

Faecal samples were collected from 737 diarrheal and non diarrheal patients of both gender at various ages and occupations. Each sample was put in a clean screw cap container used for collecting stool samples, labeled with the number and date of collection.

A special form of information was filled for each patient, which include traveling, history and source of drinking water and other information.

Samples were concentrated by formalin-ether method. A drop was taken from each deposit by pasture pipette and was smeared on

a glass slide and then was examined by light microscope with ×100 objective [11].

Temperatures and the number of rainfalls in the North of Baghdad recorded from Iraqi Meteorological Organization and Seismology (IMOS).

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 Chi square test and Person Correlation: P value $\leq$ 0.05 was considered statistically significant.

Results and Discussion

The prevalence of *G. lamblia* and *E. histolytica* was studied in two locations, in North of Baghdad (AL-Shulaa and AL-khadimya). Results showed that the total rate of parasitic protozoan infection with (*G.lambli*a, *E.histolytica*) was (15.33%). The infection rate of *G.lambli*a was higher than the infection rate of *E.histolytica* as rate were 11.66% and 3.66% respectively, these results were differ from the result done in Al-Anbar governorate [12] which showed high prevalence of *E.histolytica* (26.4%) comparing with *G.lambli*a (9.5%), while it was in agreement with Atia[7] from Baghdad and Raza & Sami [8] from Sulaimania, they recorded high infection rate of *G.lambli*a (48%) and (7.96%) respectively comparing with less infection rate of *E.histolytica* (33.8%) and (4.05%) respectively. in USA and UK, giardiasis is the most commonly reported intestinal parasitic infection of man [13]. The differences in prevalence may be due to the variations in malnutrition, personal and community hygiene, population density, socio-economic status and the methods used in preparation and examination of faecal samples [7,14].

Contaminated water is a high risk factor for *G.lamblia* and *E.histolytica* infections, so prevalence of these two parasites were scored in patients related with tab water and other kind of drinking water (boiled, filtered and bottled water). Maximum infection rate of (*G.lambli*a, *E.histolytica*) was observed in patients who drunk tab water (62.13%) the priority of infection rate was for *G.lambli*a followed by *E.histolytica* as their rates were 48.52% and 13.61% respectively while patients who drunk the other kind of drinking water showed the minimum infection rate recorded (1.40%) with equal percentage (0.70%) for both *G.lambli*a and *E.histolytica*, (Table (1)). Statistical analysis showed that there was very high significant relation ($p \leq 0.05$) between the source of drinking water and the prevalence of these parasites. These results confirmed by study done by Hadi and Faraj [15] who showed that the contamination rate of some parasites in tap water reached to 17.2%.

G.lamblia and *E.histolytica* cysts had the greatest potential for transmission through drinking water because: human infective cysts are widely distributed in the environment, cysts can penetrate physical barriers in water treatment processes and are disinfectant resistant [16, 17] and each of *G.lamblia* and *E. histolytica* has a low infectious dose for humans [18].

Table (1)
Source of drinking water related prevalence of G.lamblia and E. histolytica.

Source of drinking water	No. of sample examined	No. of positive(infected with *Gairdia* and *E.histolytica*)	Positive%	No. of positive (infected with *Giardia*)	Positive *Giardia* %	No. of positive (infected with *E.histolytica*)	positive *E.histolytica*%
Tab Water	169	105	62.13	82	48.52	23	13.61
Other kinde (Boiled ,Filtered or Bottled)	568	8	1.41	4	0.70	4	0.70
Total	737	113		86		27	
Chi square:369.937 Degree of freedom:1 P value: 0				Chi square:371.138 Degree of freedom:2 P value: 0			

Other results of the current study showed infection rate of *G.lamblia* and *E.histolytica* and its relation with travelling history the maximum infection rate of (*G.lambli*a, *E.histolytica*) was observed in patients who had a travelling history (50%) the priority of infection rate was for *E.histolytica* followed by *G.lamblia* as their rate was (33.33%) and (16.66%) respectively while patients who had no history of travelling showed the minimum infection rate which was (14.16%) Table (2), the priority of infection rate was for *G.lambli*a followed by *E.histolytica* as their rate was (11.50%) and (2.66%) respectively statistical analysis showed that there was very high

significant relation ($p \leq 0.05$) between the history of travelling within two week prior infection and the prevalence of these parasites, some of the literatures referred that high attack rate of both giardiasis and amebiasis was reported in Europeans and North Americans traveling to certain areas of the world especially the endemic region [19,20,21] ,for example, studies of travelers to St. Petersburg, Russia, have demonstrated symptomatic giardiasis in as many as 95% of travelers [22], other example from United States, where, in general, water sanitation and public health are optimal, immigration from an endemic area or recent travel to an endemic area prove to be high risk factors for *E. histolytica* infection [23]. This significant association between travelling and intestinal protozoal infection may explained by the environmental contamination with transmissive stages which is expected to be more abundant during travelling.

Table (2)
Tavelling related prevalence of G.lamblia and E. histolytica.

Travelling status	No. of sample examined	No. of positive (infected with *Gairdia* and *E.histolytica*)	Positive%	No. of positive (infected with *Giardia*)	positive *Giardia*%	No. of positive (infected with *E.histolytica*)	positive *E.histolytica*%
traveler	24	12	50	4	16.66	8	33.33
Non traveler	713	101	14.16	82	11.50	19	2.66
Total	737	113		86		27	
Chi square:22.967 Degree of freedom:1 P value:0.00000165				Chi square:63.663 Degree of freedom:2 P value: 0			

In the current study an apparent seasonal tendency was recognized in the monthly prevalence of *G.lamblia* and *E.histolytica* infection from (April 2009 to the end of March 2010). The maximum positive rate was seen in June 2009 for *Giardia* and in July 2009 for *E.histolytica* the rate was (20%) and (9.67%) respectively, while the minimum positive rate was seen in January 2010 for *G.lamblia* and November 2009 for *E.histolytica* as the rate were (1.85%) and (1.61%) respectively Table (3), statistical analysis using Person Correlation (r) illustrated that there was positively significant association ($p \leq 0.05$) between weather temperature and each of *G.lamblia* and *E.histolytica* infection, while there was significant negative association between number of rainfall per month and each of *G.lamblia* and *E.histolytica* infection, this seasonal patterns with highest infection rates in the summer have also been reported in other studies [19,20], while other showed that the highest rate of infection with intestinal protozoa was recorded in spring months followed by summer months [9].

Seasonal variation in the incidence of an infectious disease reflects some seasonal change in the environment, in the pathogen, or in human behavior that increases the quantity of viable pathogens in the environment, changes the viability of individual pathogen cysts, or increases the probability of exposure of the human host to the pathogen ,for example, warm weather activities such as camping, hiking, and swimming tend to increase exposure to recreational water sources, and thus to waterborne pathogens, during the late spring through mid-fall months [21]. In Baghdad distribution of parasites as months of year appeared that summer was record the highest rate of contamination in tap water with parasites because some regions suffered from lack of tap water especially in summer, so the people used water pump that raised pollution problems [15].

Table (3)
Monthly distribution of G. lamblia and E.histolytica in north of Baghdad.

Month	Year	Total	No. of positive (infected with *Giardia*)	% positive *Giardia*	No. of positive (infected with *E.histolytica*)	% positive *E.histolytica*	Maximum temperature °C	Number of rainfall/month
April	2009	74	10	13.5	3	4.05	22.8	10
May	2009	70	8	11.4	3	4.28	36.1	2
June	2009	70	14	20	3	4.28	41.7	2
July	2009	62	10	16.1	6	9.67	45.6	0
August	2009	65	7	10.8	2	3.07	47.8	0
September	2009	57	4	7.02	3	5.26	42.8	3
October	2009	61	4	6.56	1	1.639	38.9	5
November	2009	62	7	11.3	1	1.61	22.2	8
December	2009	57	10	17.5	1	1.75	19.4	10
January	2010	54	1	1.85	1	1.85	19.4	8
February	2010	52	7	13.5	1	1.92	20.6	8
March	2010	53	4	7.55	2	3.77	33.9	8
total		737	86		27			

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الخلاصة

تمت دراسة مدى انتشار طفيلي الجيارديا والزحار الأميبي في سكان مناطق شمال بغداد، خلال الفترة من بداية نيسان 2009 حتى نهاية آذار 2010، في عينات من براز الأنسان، وقد درست عدد من العوامل التي يمكن ان تكون ذات صلة مع انتشار هذين الطفيليين وهي: (الموسمية ، السفر و مصدر ماء الشرب). كشفت هذه الدراسة ان معدل الأصابة الأجمالية بالطفيليين كانت (15.33%)، اظهر فيها طفيلي الجيارديا معدل اصابة اعلى من معدل الأصابه لطفيلي الزحار الأميبي حيث بلغت نسب الأصابة (11.66%) و (3.66%) على التوالي. كما ظهر وجود علاقة معنوية على مستوى ($P\leq 0.05$) بين معدل الأصابة بالأوالي وكل من مصدر مياه الشرب وعامل السفر ، حيث كان اعلى معدلات الأصابة بالأوالي في الأشخاص الذين يشربون ماء الحنفية والأشخاص المسافرين اذا ما قورن بالأشخاص الذين يشربون الأنواع الأخرى من المياه (المغلية، المفلترة و المعبأة) و الأشخاص غير المسافرين. سجلت اعلى معدلات الأصابه بطفيلي الجيارديا و طفيلي الزحار الأميبي في حزيران 2009 (20%) و تموز 2009 (9.76%) على التوالي بينما كانت ادنى معدلات الأصابة في كانون الثاني 2010 (1.85%) و تشرين الثاني 2009 (1.61%) بالنسبة للطفيليين على التوالي ، وقد بين التحليل الأحصائي بأستخدام معامل بيرسون وجود علاقه معنويه على مستوى ($P\leq 0.05$) ايجابيه بين نسبه الأصابه بالأوالي و معدلات درجات الحرارة بينما كانت العلاقه سالبه مع عدد مرات هطول الأمطار خلال الأشهر.