

## Association between Serum Cholesterol Level and *Giardia lamblia* Infection among Children with Acute Diarrhea in Al-Najaf Governorate

العلاقة بين مستوى الكوليسترول في مصل الدم والإصابة بطفيلي الجيارديا المعوية لدى الأطفال المصابين بالإسهال الحاد في محافظة النجف

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### الخلاصة:

**خلفية البحث:** الجيارديا هو مرض ينتقل مباشرة الى الانسان عن طريق تناول الماء الملوث بالطفيلي وعن طريق الملابس والاتصال الجنسي. يزداد خطر الإصابة في الأطفال الذين يعانون من سوء التغذية وتأخر النمو مقارنة بالأطفال الاصحاء .  
**الهدف :** تهدف من هذه الدراسة الكشف عن العلاقة بين شدة الإصابة لطفيلي الجيارديا المعوية الطور الخضري النشط والكوليسترول في الدم وتأثيره على المريض.

**المنهجية:** طرق الدراسة سيطرة حالة من ١٢-١ / ٢٠١٥ في مستشفى الزهراء التعليمي في محافظة النجف الاشراف. دراسة الأطفال حتى سن الخامسة الذين يعانون من الإسهال. تبحث هذه الدراسة في الكوليسترول الكلي في الدم يعني أن ٥٠ حلقة من المارة الإسهال الجيارديا المارة الخضري ومقارنة مع نسبة الكوليسترول في الدم من ٥٠ حالات إسهال في الأطفال غير المصابين بالجيارديا . معدل أوزانهم (٩٠،٨٥-١٨٠،٢) كغم ومعدل أطوالهم (١٠٩،١٥-٧٥،٥٥) سم .

**النتائج:** كان هناك اختلاف كبير في نسبة الكوليسترول في الدم يعني بين الحالات والمجموعات الضابطة أنخفض مستوى الكوليسترول الكلي في الدم بشكل كبير من شدة الجيارديا ( $P < 0.05$ ). أجمالي مستوى الكوليسترول المرتبطة عكسيا مع شدة المرض . أظهر مستوى مصل الكوليسترول والمساواة بين الجنسين من المرضى لا توجد علاقة معنوية ( $P > 0.05$ ).

**الاستنتاجات:** تشير النتائج إلى أن هناك أهمية *G.lambli* على مستويات الدهون ولها القدرة على الحفاظ على نسبة الكوليسترول في الدم منخفضة.

**التوصيات:** تشجيع طلاب البحث العلمي لمتابعة الدراسة من البحث العميق في التسبب الجيارديا.و الانخراط مع كل فرع من فروع العلم أو مؤسسة علمية مع غير ذي صلة.

### Abstract:

**Background:** Giardia is a disease that is transmitted directly to humans through contaminated water, ingestion parasite and through clothing and sexual contact. Increased risk of injury in children who suffer from malnutrition and delayed growth compared to healthy children.

**The aim of the study:** The purpose of this study was to detect the relationship between the severity of the infection of the parasite *G.lambli* vegetative phase active and cholesterol in the blood and its impact on the patient.

**Study Design:** The study ways to case - control of 1-12 / 2015 in the educational-Zahra hospital in the province of Najaf. Study of children up to age five who are suffering from diarrhea. This study examines the total cholesterol in the blood means that the 50 episodes of diarrhea passers Giardia trophozoite passers vegetative and compared with the proportion of cholesterol in the blood of 50 cases .Giardiasis is the most common waterborne disease in human. Infected children revealed malnutrition and growth retardation compare to health group and may lack the important caloric source and lipid malabsorption .

**Aim of Study:** The aim of the study is found out the relationship between the severity of the injury to the parasite *Giardia lamblia* or vegetative active and cholesterol in the blood and its impact on patient.

**Methods:** Study design: The case control study of 1-12 / 2015 in Zahra educational children's section of a hospital in the province of Najaf. A study of children up to age five who are suffering from diarrhea. This study examines the mean serum total cholesterol to 50 episodes of diarrhea passers Giardia trophozoite passers vegetative and compared with cholesterol in the blood of 50 cases of diarrhea in children infected with Giardia. weight rate (9.85 to 18.2) kg and average height (75, 55 to 109.15 cm)

**Results:** There was a significant difference in mean serum cholesterol between cases and control groups ( $P < 0.05$ ). The total cholesterol serum level significantly declined by severity of giardiasis. The total

cholesterol level inversely correlated with the severity of the disease. The serum level of cholesterol and gender of the patients showed no significant relationship ( $P > 0.05$ ).

**Conclusions:** the results suggest that there is a significance of *G.lamblia* on lipid levels and have ability to keep low serum cholesterol.

**Recommendations**

1. Promote scientific research students to pursue the study of deep research in the pathogenesis Giardia.
2. Engage with each branch of science or scientific institution with irrelevant.

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**Introduction:**

Parasite Giardia genus *Giardia lamblia* cause diseases of the digestive system such as acute or chronic diarrhea and may lead to bad absorption, <sup>(1)</sup> of the main species found in mammals and the only type that causes the disease in humans. Some studies have found decreased cholesterol in some children infected with the parasite. Occurs as a result of the use of contaminated water or foods parasite, or direct contact with infected persons (for example, in child care centers) <sup>(2)</sup>.

Scientifically known as laboratory results and that there is a relationship between the percentage of cholesterol per minute and intestinal parasite *G. lamblia* trophozoite , where studies have found that the parasite feeds on cholesterol , can eliminate *G.lamblia* by starving the parasite of cholesterol , decrease or increase in serum lipoprotein and the parasite planted on the center Zorai laboratory <sup>(3)</sup>.The cell membrane of the parasite needs to cholesterol <sup>(4)</sup>. Gets a parasite on the cholesterol from the small intestine that are rich diet cholesterol It is directly related to the absorption of cholesterol Trophozoite parasite<sup>(5)</sup>.

It observed *In vitro* that lipoprotein cholesterol(LPC) in pre- encystation parasite Giardia, encystations *G.lamblia* important in the process of revitalization of the parasite at this stage <sup>(4)</sup> .Studies proved that cholesterol -related in the working group of gene expression -1 encystations specific has contributed to the inhibition encystation *G.lamblia* process , and previous studies have shown that the receptor signals is responsible for regulating cholesterol *G. lamblia* encystations process <sup>(6)</sup> .

**Objective:**

The aim of the study is found out the relationship between the severity of the injury to the parasite *G. lamblia* or vegetative active and cholesterol in the blood and its impact on patient .

**Material and methods**

**Study design:** Case- Control study the period of the study from January until December 2015 in the province of Najaf. Study on children up to the age of five who suffer from diarrhea.

**Ethics study:** Took oral accompanying approval with the kids when interviewed sampling of kids.

## Sample collection

### 1- Fecal samples

Macroscopic and microscopic diagnosis of the *G.lamblia* was done by finding the trophozoite in stool for subjects attending the hospital. 50 patients (cases) who were found to be positive for *.lamblia* trophozoite by at least one method of:

1- Direct smear:

a) Lugol's iodine.

b) Normal saline: to detection motile trophozoite.

2- Concentration methods: formal-ether sedimentation.

3. Ziehl–Neelsen staining

That was considered as the study group 50 non Giardiasis, age-matched people Without any disorders were enrolled as control group.

All patients underwent the study group to all medical laboratory tests and the exclusion of patients not infected with Giardiasis. For ones in the control group three successive fecal samples were examined by saline-Lugol, formalin-ether concentration and Ziehl–Neelsen staining methods to exclude *G.lamblia* infection.

The 50 positive stool samples divided into three groups' according to parasite density :(4)

a. Heavy infection: 6 – 10 trophozoite per microscopic field.

b. Moderate infection: 3 – 6 trophozoite per microscopic field.

c. Mild infection: 1 – 3 trophozoite per microscopic field.

### 2-Blood sample

Blood samples were collected from 100 individual at different ages group 50 of them were suffer from giardiasis and 50 used as a control, 5 ml of venous blood was collected from each individual.

Serum was separated after centrifugation at 3000 RPM for 10 minutes and then conduct analysis using an automated biochemistry analyzer chemical .Total cholesterol samples of the study group, as well as samples are measured in parallel control.

### Statistical analysis:

Application of SPSS version 21 used for statistical difference between means of lipid profile and chi square for categorical association at level of significance  $\alpha = 0.05$ .

### Results:

**Table (1) Total cholesterol mean difference among children with and without *G.lamblia* infection.**

	Group	N	Mean	Std. Error Mean	P value
cholesterol	control	50	3.7360	.07438	0.0001
	Cases	50	2.0920	.04462	

\*The mean difference is significant at the 0.05 level.

The results in table (1) showed there is high significant between cholesterol patients with and without *G.lamblia* infection .There was a significant difference in mean serum cholesterol between cases and control groups ( $P < 0.05$ ).

**Table (2): Mean cholesterol difference by severity of *G.lamblia* infection**

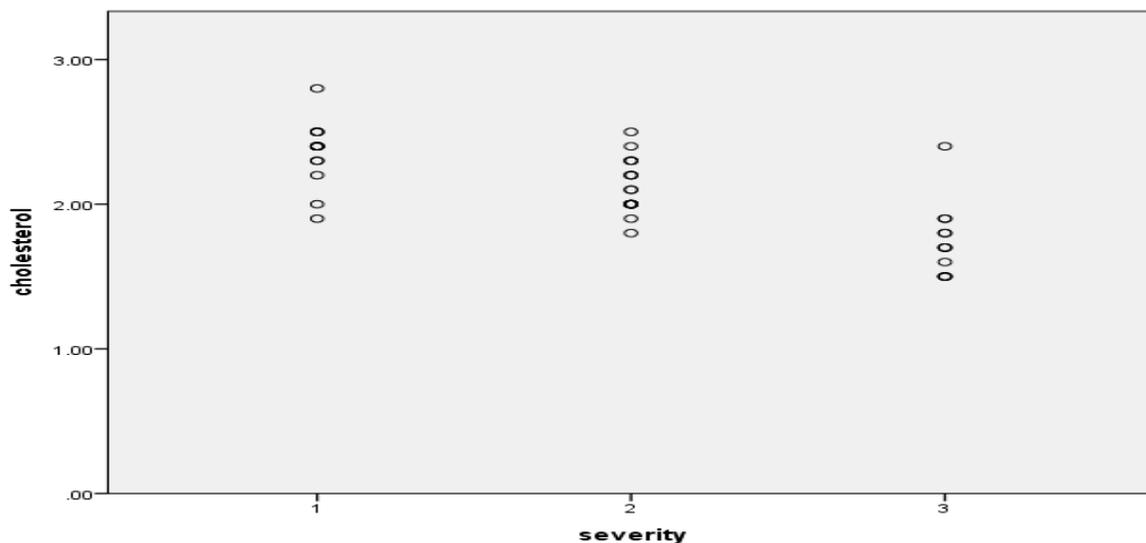
Severity of giardiasis	N	Mean Cholesterol (mmol /l)	Std. Deviation	Std. Error	95% Confidence Interval for Mean		P value
					Lower Bound	Upper Bound	
Mild	16	2.3625	.20616	.05154	<b>2.2526</b>	<b>2.4724</b>	<b>.001</b>
Moderate	21	2.1095	.17580	.03836	<b>2.0295</b>	<b>2.1895</b>	
Sever	13	1.7308	.24962	.06923	<b>1.5799</b>	<b>1.8816</b>	
Total	50	2.0920	.31548	.04462	<b>2.0023</b>	<b>2.1817</b>	

In table (2) the results showed that the mean difference is not significant at the  $p > 0.05$  level between cholesterol and age. The total cholesterol serum level significantly declined by severity of Giardiasis.

**Table (3): Mean cholesterol (mmol /l) and mean age( months) by gender in children with *G. lamblia* infection .**

Variables	Gender	N	Mean	Std. Error Mean	P value
Cholesterol	M	27	2.0556	.06346	.382
	F	23	2.1348	.06243	
Age	M	27	37.61	3.557	.248
	F	23	31.78	3.430	

Table (3) show there is no significant between cholesterol and age up to five years or cholesterol and gender. The serum level of cholesterol and gender of the patients



showed no significant relationship ( $P > 0.05$ ).

**Figure (1): correlation between serum cholesterol level (mmol/l) and severity of *Giardaintestinalis* infection**

The total cholesterol level inversely correlated with the severity of the disease (Figure:1).

## Discussion

*G. lamblia* parasitic causative that lead to diarrhea, fatty, poor digestion, and malabsorption. Carbohydrates and vitamins A and B12<sup>(7)</sup>. This study evidence the study of serum cholesterol in the blood to understand *G. lamblia* relationship, the relationship between the Giardiasis and steatorrhea and to determine whether that steatorrhea diarrhea, fatty and the impact of blood lipid levels in *G. lamblia* patients and whether this effect It is a major or not<sup>(8)</sup>. That the reasons for a mile parasite in the s *G. Lamblia* mall intestine and enhances its growth is the presence of bile fat and mucous membranes of the intestinal epithelial cells. It can absorb bile salts conjugated by both active and passive means of facilitating encystations<sup>(5)</sup>.

This study reveals a significantly low total serum cholesterol in the patients infected with Giardiasis, this result corresponding to the result of Ma'ani *et al*<sup>(2)</sup>. It was observed that blood cholesterol levels and decline in patients suffering from *G. lamblia*, while other types of fat in the same regular patients because of *G. lamblia* and cholesterol consumption in the host in a living cell installation, because the parasite is unable to synthesize cholesterol by itself. Also Saki*etal*.<sup>(9)</sup>. who pointed out that cholesterol deprivation induces changes in the plasma membrane fluidity of Trophozoite.

It was observed that blood cholesterol levels and decline in patients suffering from *G. lamblia*, while other types of fat in the same regular patients because of *G. lamblia* and cholesterol consumption in the host in a living cell in spallation with subsequent activation of signal transduction pathways that culminate in the expression of encystation-specific genes and was consistent with study of Yichoy *et al*.<sup>(5)</sup>, that suggested that most lipids and fatty acids are taken up by endocytic and non-endocytic pathways and are used by *G. lamblia* for energy production and membrane/organelle biosynthesis.

Steatorrhea resulting from the loss of the parasite *G. lamblia* to lipids, one of the complex things in the parasite *G. lamblia*, a lack of cholesterol is necessary *G. lamblia* trophozoite 's not enough for his needs turn into cysts environmentally resistance; and contain future of protein density low lipoprotein (LDL -R), so contact person for the packaging and internalization of lipoproteins *G. lamblia* gain the ability to acquire the necessary components from different environments<sup>(6)(10)</sup>. *G. lamblia* affect fat parameters, it affects intestinal malabsorption of fats resulting in loose stool offensive, and lowering cholesterol in the blood, because it is used in the synthesis of the cell membrane of the parasite. Decreases good lipoproteins (LDL) levels, associates with significantly increase in triglycerides and (LDL) levels. That may be associated with risk of coronary heart diseases<sup>(11)</sup>.

## Conclusions:

The results suggest that there is a significance of *G. lamblia* on lipid levels and have ability to keep low serum cholesterol

## Recommendation

1. Promote scientific research students to pursue the study of deep research in the pathogenesis of *G.lambliia* .
2. Engage with each branch of science or scientific institution with irrelevant.

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