

Research Article

The Influence of Biochemical and Immunological Bio Markers in Diagnosed Crohn's Disease Individuals

Nadia H. Kadhum*

¹ Department of Laboratory and clinical Sciences, college of Pharmacy, Babylon university, Iraq

*Correspondence author: nadia.h.kadhum@gmail.com

Abstract: Cytokines and Vitamin K in crohn's disease patients have been evaluated to discover the conceivable via biomarkers of diagnosed patients compared to control. Sera samples of Eighty patients and control of both genders. forty patients diagnosed crohn's which the span of age between (20-36) years and 40 healthy volunteers as a control with span age (18-39) years. The patient were guests to Marjan hospital in Babylon city during the period (1/July/2025 to 1/September/2025). The current results showed a significant difference in statistic marks at ($P < 0.05$). Vitamin K in patients below control. There is significance different between values of patients and controls in Magnesium, Calcium, Vitamin K, InterL10 and Toll-like receptor 4. According to word axel, there is magnitude significant relationship among cytokine InterL10 and Toll-like receptor 4, Magnesium, Calcium, & Vitamin K. The cytokines both InterL10 and Toll-like receptor 4 patients' levels larger than control levels. Calcium and Magnesium which there is significance variance between both patients and Control

Key Words: crohn's disease; InterL10; Toll-like receptor 4 & Vitamin K; biomarker; cytokine.

1. Introduction

Crohn's disease, is a syndrome and regional enteritis, is an inflammatory disease of bowel has ability to alter each member of the digestive tract. Manifestation of diseases include fever, abdominal pain, diarrhea and weight loss. A disease Crohn's can result lower dietary intake and mal absorption of calcium and magnesium, deficiencies is caused by inflammation (1).

Crohn's disease affects calcium and magnesium levels:

Malabsorption: characteristic of Crohn's disease like inflammation and damage to the small intestine can interfere with the body's ability to absorb nutrients, including calcium and magnesium. Diarrhea: Chronic or severe diarrhea, a common symptom of Crohn's disease, can result significant losses of electrolytes like magnesium from the body. A protein Toll-like receptor 4 is an immune receptor located at surfaces of many cells. They are known as immune cells. core task of TLR4 is is to Identify common microbial components, such as bacteria and viruses, called PAMPs (Pathogen-Associated Molecular Patterns). a TLR Identify these Constituents, it stimulates the immune cell, bring about the secretion of cytokines which To control by system inflammation and the immune response. (2). Humans cannot synthesize vitamin K de novo (i.e. via biochemical pathways as plants do). All vitamin K (phyllo Quinone K1 or menaquinones K2) must come from dietary sources or bacterial synthesis in the gut. (3)

Normal / Reference Levels & Intake

Measured plasma levels of vitamin K (K1) have reference ranges around 0.2 to 3.2 ng/mL, though other sources cite 0.10–2.2 ng/mL.

One source notes that impaired coagulation has been associated with levels below ~0.5 ng/mL. Dietary Adequate Intakes (AIs) for vitamin K in adults:

Males ≥ 19 years: ~ 120 $\mu\text{g/day}$; Females ≥ 19 years: ~ 90 $\mu\text{g/day}$ (4)

Gastrointestinal disorders such as irritable bowel syndrome (IBS), ulcerative colitis and inflammatory bowel disease (IBD) can cause Magnesium deficiency by reducing absorption or increasing losses through digestive secretions or chronic diarrhea. Meanwhile, Magnesium supplementation may result gastrointestinal indications like diarrhea, nausea & vomiting due to its osmotic laxative effect. (5)(6)

Received: August 16, 2025;
Revised: September 18, 2025;
Accepted: October 29, 2025;
Published: October 31, 2025;
Curr. Ver.: October 31, 2025.



Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY SA) license (<https://creativecommons.org/licenses/by-sa/4.0/>)

Malabsorption:

Diseases affecting the intestine reduce the body's ability to adequately absorb magnesium (7).

Increased Losses:

Chronic diarrhea, which may result from conditions such as IBS and ulcerative colitis, leads to substantial magnesium and fluid loss from the body (8).

Malnutrition: In some cases, magnesium deficiency is part of a broader malnutrition picture caused by these diseases, especially in the elderly (9).

Gastrointestinal diseases (GI) can be reason both rise and depressed calcium levels by influence alimentary of nutrient absorption assuming the hormones that regulate calcium (like Vitamin D and Parathyroid Hormone (PTH) and leading to imbalances in calcium excretion and absorption, and during the influence of inflammation and PH > 7 acidosis. Inflammatory bowel disease (IBD) causes hypocalcemia and bone issues like osteoporosis. Diseases such as primary hyperparathyroidism can cause raised blood calcium (hypercalcemia), which in turn can lead to the symptoms like stomach upset, pain, and constipation. (10). In disease of Crohn's, inflammation of small intestine, bowel resections, or mucosal damage can impair fat absorption, which absorption reduction of fat-soluble vitamins including vitamin K.

Many patients with Crohn's disease (CD) confine nutritional consumption of green leafy vegetables (foundations of vitamin K) due to symptoms (diarrhea, strictures), which further depresses vitamin K intake.

Studies illustration a rise prevalence the deficiency of vitamin K in Crohn's disease (CD): e.g. in children with CD, ~54% had deficiency (measured by des-γ-carboxyl-prothrombin (DCP) PIVKA-II) 11,12

Deficiency of Vitamin K in Inflammatory bowel disease (IBD) has been joined to worse bone health (osteopenia/osteoporosis) and more active disease.13

2. Martials & Procedures

Moral Appreciation

A proper approval was accomplished from administration of hospital and from patients and well control participants before their implying in the project. Method had been conversant before the sample collection, making definitely definite the patients and volunteers understood the procedure.

Sample Collection:

The collection of Eighty samples of both genders.40 patients with diagnosed crohn's disease with spectrum of age between (20-36) years and 40 healthy persons as control with age (18-39) years as volunteers. The patient and healthy volunteers from Hilla city.

Protocol of the tests of cholecalciferol, TLR4 and IL10:

The experiments had been performed by ELISA in Elabscience manufactures. www.elabscience.com. (11)

3.Result and Discussion

The collection of Eighty samples of both genders patients and control with diagnosed crohn's disease with spectrum of age between (20-36) years and 40 healthy persons as control with age (18-39) years as volunteers. Sample collection performed between at duration (1/July/2025 to 1/September/2025).

Table1. The Levels of Vitamin K IL10 & TLR4, magnesium and calcium in both patients & control.

	No.of patients	mean±SD patients	No.of control	mean±SD healthy control
Vitamin K	40	3.08 ±0.32	40	0.105±0.02
IL.10	40	680.5±141.1	40	505.3±104.5
TRL4	40	19.5±3.01	40	14.2±3.5
Calcium	40	5.6±0.7	40	9.5±1.2
Magnesium	40	0.34±0.013	40	2.01±0.022

The table 1 offering **The Levels of Vit K IL10 & TLR4, magnesium and calcium in both patients & control**

The Confidence Interval is 95% for average Vit K, IL10, TLR4, calcium and magnesium. Affording to descriptive statics and z-test of two samples mean significant results of variances for both patients and Control. Patients values of Vit K, Magnesium and Calcium fewer control readings due to mal absorption of food by gut. Patients levels of IL10 and TLR4 are greater than control readings of them. IL110 & TLR4 are immune markers, which are raised because of gut inflammation.

Table 2. offering cytokine IL10, TLR4, cholecalciferol & magnesium and calcium Correlations in patients.

	NO of patients	Correlation coefficient (r)
Vitamin K & IL10	40	-0.413
Vitamin K & TRL4	40	-0.420
Vitamin K l & magnesium	40	+0.641
Vitamin K & calcium	40	+0.763
IL10 & magnesium	40	-0.523
TRL4& magnesium	40	-0.602
TRL4& calcium	40	-0.71

The correlation is the connection between two variables.

If the coefficient of correlation [r]

The value is limited within the range between +1 to +0.7 the relation is strongly positive correlation.

If the [r] lie between +0.7 to +0.4 the relation is medium positive.

Less than +4 the relation is week positive.

Zero there is no correlation

[r] lie in the middle of -1 to -0.7 strong negative correlation

[r] lie in the middle of -0.7 to -0.4 medium negative correlation

[r] from (-0.4 to 0) is week negative correlation. ((15).

The correlation obtained from collected samples explained there are good correlation between biochemical and immunological parameters whether positive or negative which there are direct correlation between Vitamin K & magnesium, likewise Vitamin K & calcium According to axel word correlation 2 tailed at level $p < 0.01$

The correlation for all (Vitamin K & IL10, (Vitamin K & TRL4), (IL10 & magnesium), (TRL4& calcium) and (TRL4 & magnesium) is inverse relationship at level 0.01.

This means that upper values of Vitamin K are connected with upper values of trace minerals Magnesium & Calcium. At the 0.01 level ($p < 0.01$) The correlations were significant, which indicates strong statistical significance.

Overall, the findings suggest that vitamin K status is closely linked with mineral balance (calcium and magnesium), and it may also influence or be influenced by immune markers such as IL-10 and TLR4. In Crohn's disease, gut inflammation, diarrhea, fat malabsorption, dietary restrictions, and medication use; all lead to reduced calcium, magnesium, and vitamin K absorptions, growing the danger of coagulation problems and bone disease. (16,17)

4. Conclusion

The study showed up a significant difference between Crohn's disease patients and healthy Control for average of vitamin K , calcium, magnesium IL10 & TLR4. There are good correlations among each of the biochemical and immunological markers as shown previously. Vitamin K function is affected by immune disorders and other microbial infections, which the concentration of biochemical parameters Vit K, Magnesium and Calcium decreased when the immune parameters increased consequently corhn`n disease.

Reference

- Akira, S., Uematsu, S., & Takeuchi, O. (2006). Pathogen recognition and innate immunity. *Cell*, 124(4), 783–801. <https://doi.org/10.1016/j.cell.2006.02.015>
- Allen, L. H., et al. (2012). Causes of nutritional magnesium deficiency. *American Journal of Clinical Nutrition*, 95(2), 269–277.
- Ford, A. C., Sperber, A. D., Corsetti, M., & Camilleri, M. (2020). Irritable bowel syndrome. *The Lancet*, 396(10263), 1675–1688.
- Gröber, U., Schmidt, J., & Kisters, K. (2015). Magnesium in prevention and therapy. *Nutrients*, 7(9), 8199–8226.
- Harvard T. H. Chan School of Public Health. (2022). Vitamin K. <https://nutritionsource.hsph.harvard.edu/vitamin-k/>
- Jahnen-Dechent, W., & Ketteler, M. (2012). Magnesium basics. *Clinical Kidney Journal*, 5(Suppl 1), i3–i14.
- Medscape. (2023). Vitamin K: Reference range, interpretation, collection and panels. <https://emedicine.medscape.com/article/2088738-overview>
- Montoro-Huguet, M. A., Hallberg, L., Grabska, J., & Yngve, A. (2021). Small and large intestine (I): Malabsorption of nutrients. *Nutrients*, 13(4), 1254.
- National Institute of Diabetes and Digestive and Kidney Diseases. (2014, November 6). Crohn disease. Archived from the original. <https://www.niddk.nih.gov/health-information/digestive-diseases/crohn-disease>
- National Institutes of Health, Office of Dietary Supplements. (2022). Magnesium: Fact sheet for health professionals. <https://ods.od.nih.gov>
- O'Connor, E., Molgaard, C., Michaelsen, K. F., Jakobsen, J., Lamberg-Allardt, C., Ovesen, L., et al. (2014). Serum vitamin K1 response to vitamin K1 supplementation in Crohn's disease. *European Journal of Clinical Nutrition*, 68(11), 1281–1286.
- Rodgers, J. L., & Nicewander, W. A. (1988). Thirteen ways to look at the correlation coefficient. *The American Statistician*, 42(1), 59–66. <https://doi.org/10.2307/2685263>
- Schoon, E. J., Müller, M. C., Vermeer, C., Schurgers, L. J., Brummer, R. J., & Stockbrügger, R. W. (2001). Low serum and bone vitamin K status in patients with longstanding Crohn's disease and osteopenia. *Gut*, 48(4), 473–477.
- Schümann, K., Classen, H. G., Hages, M., Melcher, R., Neef, H., Nowak, H., et al. (1991). Importance of magnesium in nutrition. *Monatsschrift Kinderheilkunde*, 139(1), 14–19.
- Uwitonze, A. M., & Razzaque, M. S. (2018). Role of magnesium in vitamin D activation and function. *Journal of the American Osteopathic Association*, 118(3), 181–189. <https://doi.org/10.7556/jaoa.2018.037>
- Vagianos, K., Bector, S., McConnell, J., & Bernstein, C. N. (2007). Nutrition assessment of patients with inflammatory bowel disease. *JPEN: Journal of Parenteral and Enteral Nutrition*, 31(3), 311–319.