



CODEN [USA]: IAJPBB

ISSN : 2349-7750

## INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Research Article

### A COMPARATIVE STUDY ON SERUM FERRITIN LEVELS IN IHD PATIENTS VERSUS HEALTHY SUBJECTS

Dr Maryum Rizwan<sup>1</sup>, Dr Wardah Mohsin<sup>2</sup>, Dr Maryam Ijaz<sup>3</sup>

<sup>1,3</sup> Khawaja Muhammad Safdar Medical College Sialkot, <sup>2</sup>Sharif Medical and Dental College, Lahore.

**Article Received:** November 2020    **Accepted:** December 2020    **Published:** January 2021

**Abstract:**

*The development of coronary heart disease (IHD) is associated with increased iron stores in the body. The incidence of coronary artery disease (CHD) in pre-menopausal women was associated with lower body iron stores in the first group compared to men of the same age and postmenopausal women.*

***Aim:** To compare serum ferritin in healthy individuals and patients with Ischemic heart disease.*

***Place and Duration:** In the Cardiology department of AIM DHQ Hospital Sialkot for one year duration from August 2019 to July 2020.*

***Methods:** 137 people were enrolled in the study, 47 healthy people without IHD history and 90 patients with IHD. We compared serum ferritin levels in healthy men and men with IHD, IHD in healthy premenopausal and premenopausal women with IHD and in healthy postmenopausal and postmenopausal women with IHD were evaluated for serum ferritin levels.*

***Results:** Serum ferritin levels in IHD patients were significantly higher than in healthy controls in all three groups. In addition, serum ferritin levels in IHD patients suggest an increase in iron stores.*

***Conclusion:** Iron stores are higher in patients with ischemic heart disease than in healthy people.*

***Keywords:** Acute myocardial infarction, ischemic heart disease, ischemic heart disease,*

**Corresponding author:**

**Dr. Maryum Rizwan,**

Khawaja Muhammad Safdar Medical College Sialkot.

QR code



*Please cite this article in press Maryum Rizwan et al, A Comparative Study On Serum Ferritin Levels In IHD Patients Versus Healthy Subjects., Indo Am. J. P. Sci, 2021; 08(1).*

**INTRODUCTION:**

Sullivan proposed the iron hypothesis in 1981. He associated the development of IHD to higher body iron stores [1-2]. The low incidence of CHD in premenopausal women compared to women of the same age and postmenopausal women was associated with lower body iron stores in the first group [3-4]. Many epidemiological studies have been conducted to assess the iron hypothesis, and serum ferritin is the most commonly used indicator of iron status in these studies. However, inconsistent results have appeared in epidemiological studies linking iron status and CVD risk, and there are supportive and non-supportive studies [5-6]. The aim of this study was to compare serum ferritin in healthy individuals and patients with IHD. To minimize differences due to factors such as gender and menopause, we compared serum ferritin levels in healthy men and men in IC, healthy premenopausal women and IC men, healthy postmenopausal women, and women with postmenopausal IHD [7-8].

**MATERIALS AND METHODS:**

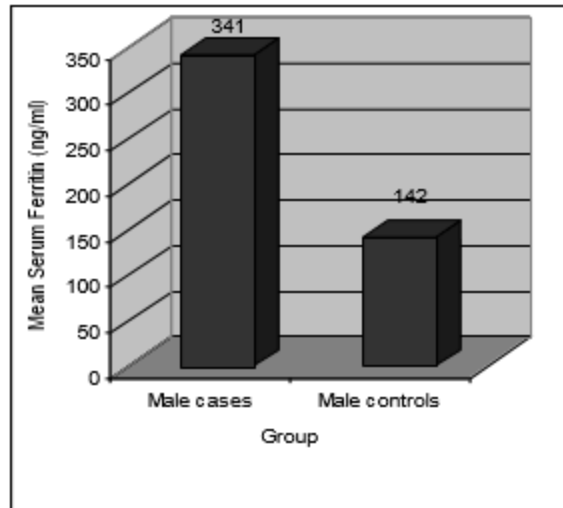
This analytical cross-sectional study conducted at AIM DHQ Hospital Sialkot, in the cardiology department for one year duration from August 2019 to July 2020. The study included 137 people, 47 healthy people (40-60 years, both sexes) and 90 patients with IC (40-60 years, both sexes) without IHD history. Ninety patients (during the first 48 hours of AMI) who were diagnosed with acute myocardial infarction presenting themselves in different wards were selected as patients. The diagnosis of AMI was based on a typical history, changes suggestive of ECG and cardiac biomarkers in serum. A group of 42 healthy subjects without IHD in the interview was selected as a control group. Subjects from each group were enrolled in the study upon arrival, and were then classified by sex and menopause status. Because ferritin is an acute phase protein and can be elevated in acute and chronic inflammation, malignancies and

severe liver disease, patients with these conditions are excluded. Selected topics were informed about the study and consent was obtained. The corresponding data has been registered in proforma. Venous blood samples were taken overnight after fasting (i.e., after 12-14 hours of fasting) between 8:00 a.m. and 09:00 because biphasic circadian rhythm was reported for serum ferritin, samples were almost always taken at the same time in the morning. Blood was allowed to clot and the serum was separated by centrifugation. Serum was transferred to labeled aliquots and stored at  $-200^{\circ}\text{C}$ . Ferritin enzyme immunoassay kit (BIOCHECK, INC.) Was used to quantify ferritin concentration in serum samples. We compared serum ferritin levels of healthy men and male patients with IHD, healthy premenopausal women and premenopausal women with IHD, healthy postmenopausal women and postmenopausal women with IHD. Data were entered and analyzed using SPSS (16.0). An independent t-test was used to observe differences in group means. A p value  $<0.05$  was considered statistically significant.

**RESULTS:**

Of the 90 patients with IHD, 63 (70%) were men and 27 (30%) were women. Of the 47 controls, 18 (38%) were men and 29 (62%) were women. Of the 27 women with IHD, 19 (70%) were post-menopausal and 08 (30%) were pre-menopausal. Of the 29 women in the control group, 12 (41%) were postmenopausal and 17 (59%) were premenopausal. The serum ferritin concentration range in men with IHD and men in the control group was 24-1054 ng / ml and 01-736 ng / ml, respectively. A significant difference was observed between the serum ferritin concentration of men with IHD and men from the control group ( $340.56 \pm 266.95$  compared with  $142.17 \pm 181.09$  ng / ml,  $p < 0.05$ ), which shows that men with IHD have an average serum ferritin higher than men from the control group (Fig. 1).

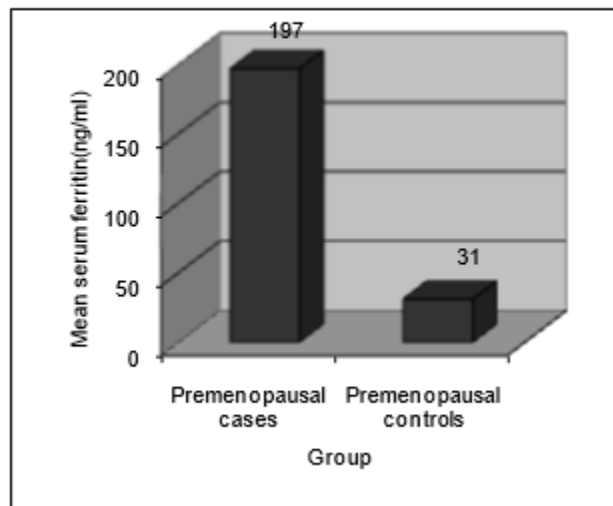
Fig. 1: Differences in serum ferritin of male IHD patients and male controls



The serum ferritin concentration range in premenopausal patients with IHD and premenopausal patients was 56-478 ng / ml and 02-180 ng / ml, respectively. A significant difference was observed between the serum ferritin concentration in premenopausal patients with IHD and the

premenopausal control group ( $197.25 \pm 143.30$  vs.  $30.59 \pm 50.74$  ng / ml,  $p < 0.05$ ), which shows that in premenopausal IHD patients, mean serum ferritin is higher than in the premenopausal control group (Fig. 2).

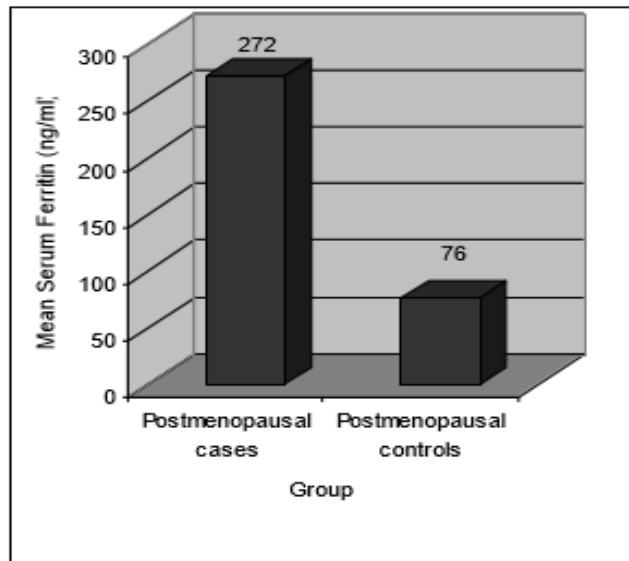
Fig. 2: Differences in serum ferritin of premenopausal IHD patients and premenopausal controls



The serum ferritin concentration range in postmenopausal IHD and postmenopausal control patients was 36-802 ng / ml and 05-476 ng / ml, respectively. A significant difference was also observed between serum ferritin levels in postmenopausal patients with IHD and

postmenopausal control ( $271.63 \pm 243.45$  vs.  $75.50 \pm 128.64$  ng / ml,  $p < 0.05$ ), which shows that in postmenopausal patients with IHD the average serum ferritin is higher than in the postmenopausal control group (Fig. 3)

Fig. 3: Differences in serum ferritin of postmenopausal IHD patients and postmenopausal controls



### DISCUSSION:

Ferritin is a ready source of iron for the major iron storage compound and metabolic requirements. It is a large multimeric protein found in almost all body cells [9-10]. The highest concentrations are found in the reticuloendothelial cells of the spleen, liver and bone marrow, and liver parenchymal cells. Initially, ferritin was an intracellular protein that could not be measured in serum. In 1972, a sensitive radioimmunoassay for ferritin was developed, which proved to be a normal component of serum [7]. The concentration of low content of ferritin in the blood is closely related to the amount of iron stores in the body. Serum ferritin is a measurable, non-invasive indicator of body iron stores and is an increase of 65 mg in the body. Iron stores reflect a 1  $\mu\text{g} / \text{L}$  3.9 increase in serum ferritin. The reference range for serum ferritin is 10-120  $\mu\text{g} / \text{L}$  for women and 20-250  $\mu\text{g} / \text{L}$  for men [11-12]. High iron reserves were found. Serum ferritin was > 300  $\mu\text{g} / \text{L}$  in men and > 200  $\mu\text{g} / \text{L}$  in women. The average serum ferritin was higher in men with IC than in control men. Similarly, patients with premenopausal IHD had higher mean serum ferritin than premenopausal controls. In addition, post-menopausal IHD patients had serum ferritin higher than those in the postmenopausal control group. The mean serum ferritin concentration in men with IHD was > 300  $\mu\text{g} / \text{L}$ , indicating a high iron level, while the mean serum ferritin concentration in the control group was in the normal range [13]. The average serum ferritin concentration in pre-menopausal IHD patients was very close to the iron overload cut-off recommended by Fleming et al. The mean ferritin concentration in premenopausal control serum was within normal

limits. In addition, the average serum ferritin concentration in postmenopausal IHD patients was > 200  $\mu\text{g} / \text{L}$ , suggesting a high iron level, and the average serum ferritin concentration in postmenopausal women was within normal limits. These findings show that relative iron depletion protects against IHD and confirms the hypothesis that Sullivan's development of IHD may be associated with the purchase of iron stores in the body. In addition, our results are consistent with Salonen's findings and Klipstein-Grobusch et al reported that higher serum ferritin levels are associated with an increased risk of MI [14]. Kiechl et al. In addition, by reporting that men and women with iron deficiency are a low-risk group, people with leading iron stores face a high risk of carotid atherosclerosis [15].

### CONCLUSION:

We concluded that IHD patients had higher iron stores than healthy controls, as indicated by higher serum ferritin.

**Acknowledgments:** We are grateful for the great cooperation in all working subjects. We are also grateful to the employees of and administration for providing the opportunity to conduct this research project.

### REFERENCES:

1. Rehman S, Aziz M, Fatima S, Ashraf S, Hameed A, Rehman W. Mean ferritin level comparison in patients with coronary heart disease and control subjects. *The Professional Medical Journal*. 2019 Dec 10;26(12):2048-53.

2. Rehman S, Aziz M, Fatima S, Ashraf S, Hameed A, Rehman W. COMPARISON OF MEAN FERRITIN LEVEL IN PATIENTS WITH CORONARY HEART DISEASE AND CONTROL SUBJECTS. *Professional Medical Journal*. 2019 Dec 1;26(12).
3. Sezgin Y, Becel S. Comparison of serum lipid parameters and serum vitamin B12 levels. *J Clin Anal Med*. 2019 Mar 1;10(2):198-201.
4. Son R, Fujimaru T, Kimura T, Taki F, Futatsuyama M, Nagahama M, Nakayama M, Komatsu Y. Association between serum ferritin levels and clinical outcomes in maintenance hemodialysis patients: a retrospective single-center cohort study. *Renal Replacement Therapy*. 2019 Dec 1;5(1):17.
5. Kariş D, Tarhan D, Boyacıoğlu K, Köksal C, Ercan AM. The comparison of zinc, copper and iron levels in serum, aorta and left internal mammarian artery tissues in coronary by-pass graft surgery patients. *Journal of Trace Elements in Medicine and Biology*. 2019 Jan 1;51:86-90.
6. Aboromia MM, El-Sherbeny AA, Abd El-Hady EA. Iron-deficiency anemia as a risk factor for dyslipidemia in Egyptian patients. *The Egyptian Journal of Haematology*. 2019 Jan 1;44(1):14.
7. Munasinghe LL, Ekwaru JP, Mastroeni MF, Mastroeni SS, Veugelers PJ. The association of serum 25-hydroxyvitamin D concentrations with elevated serum ferritin levels in normal weight, overweight and obese Canadians. *PloS one*. 2019;14(3).
8. Beverborg NG, van der Wal HH, Klip IT, Anker SD, Cleland J, Dickstein K, van Veldhuisen DJ, Voors AA, van der Meer P. Differences in Clinical Profile and Outcomes of Low Iron Storage vs Defective Iron Utilization in Patients With Heart Failure: Results From the DEFINE-HF and BIostat-CHF Studies. *JAMA cardiology*. 2019 Jul 1;4(7):696-701.
9. Al-Kraity WR, Jawad MM. Assessment Of Visfatin Level In Patients With Coronary Heart Disease. In *Journal of Physics: Conference Series* 2019 Sep (Vol. 1294, No. 6, p. 062033). IOP Publishing.
10. Guerini FR, Ripamonti E, Costa AS, Zanzottera M, Agliardi C, Bolognesi E, Clerici M, Racca V. The Syntaxin-1A gene single nucleotide polymorphism rs4717806 associates with the risk of ischemic heart disease. *Medicine*. 2019 Jun;98(24).
11. Çiftçiler R, Güven A, Haznedaroğlu İC, Aksu S. Effects of Smoking on Hematological Parameters and Ferritin Levels. *Medical Bulletin of Haseki/Haseki Tip Bulteni*. 2019 Dec 1;57(4).
12. Zhu Y, He B, Xiao Y, Chen Y. Iron metabolism and its association with dyslipidemia risk in children and adolescents: a cross-sectional study. *Lipids in health and disease*. 2019 Dec;18(1):50.
13. Toprak AE, Gerin F, Erman H, Duran İ, Atalay E, Korlaelçi F, Öztürk Ü. Serum fetuin-A levels and association with hematological parameters in chronic kidney disease and hemodialysis patients. *Turkish Journal of Biochemistry*. 2019 Aug 1;44(4):517-23.
14. Małgorzata B, Jolanta M, Ewa KZ, Paulina D, Artur J, Karolina W, Marcin K, Aleksandra M, Paulina M, Jacek M, Marcin Z. SP354 Hcpidin 25, anaemia parameters and kidney failure—are they connected in multiple myeloma patients?. *Nephrology Dialysis Transplantation*. 2019 Jun 1;34(Supplement\_1):gfg103-SP354.
15. Mensà E, Giuliani A, Matakchione G, Gurău F, Bonfigli AR, Romagnoli F, De Luca M, Sabbatinelli J, Olivieri F. Circulating miR-146a in healthy aging and type 2 diabetes: age- and gender-specific trajectories. *Mechanisms of ageing and development*. 2019 Jun 1;180:1-0.