

# بسم الله الرحمن الرحيم



HOSSAM MAGHRABY



# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

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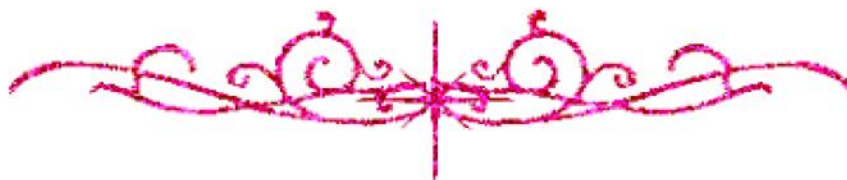
تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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تم بحمد الله



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# **Relation between Serum Ferritin And Visceral Fat Mass In Ain Shams Medical Students**

**Thesis**

*Submitted for Partial Fulfilment of  
Master*

*Degree in Clinical Nutrition*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سُبْحَانَكَ لَا إِلَهَ إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ  
الْعَلِيمُ الْحَكِيمُ

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# List of Contents

| Title                                                 | Page No. |
|-------------------------------------------------------|----------|
| List of Abbreviations.....                            | i        |
| List of Tables.....                                   | ii       |
| List of Figures .....                                 | iii      |
| Introduction .....                                    | 1        |
| Aim of the Work .....                                 | 2        |
| Review of Literature                                  |          |
| Serum Ferritin and its Physiological Role.....        | 3        |
| Visceral Fat and its Pathological Impact.....         | 12       |
| Relation Between Visceral Fat and Serum Ferritin..... | 22       |
| Subjects and Methods.....                             | 24       |
| Results.....                                          | 35       |
| Discussion .....                                      | 45       |
| Summary .....                                         | 49       |
| Conclusion .....                                      | 50       |
| Recommendations .....                                 | 51       |
| Arabic Summary .....                                  | --       |
| References .....                                      | 52       |

# List of Abbreviations

| Abb.           | Full term                                                           |
|----------------|---------------------------------------------------------------------|
| BIA .....      | Bioelectrical impedance analysis                                    |
| BMI.....       | Body mass index                                                     |
| CDC .....      | Centers for Disease Control and Prevention                          |
| Con A.....     | Concanavalin A                                                      |
| CRP .....      | C-reactive protein                                                  |
| DM.....        | Diabetes mellitus                                                   |
| DNA .....      | Deoxyribonucleic acid                                               |
| DTH.....       | Delayed-type hypersensitivity                                       |
| DXA.....       | Dual energy X ray absorptiometry                                    |
| FFA .....      | Free fatty acids                                                    |
| ID.....        | Iron deficiency                                                     |
| IL-10.....     | Interleukin                                                         |
| IL-6.....      | Interleukin 6                                                       |
| NAMS/ASU ..... | Nutrition Assessment of Medical Students of<br>Ain Shams University |
| NFkB.....      | nuclear factor kappa                                                |
| NNI .....      | National Nutrition Institute                                        |
| PHA.....       | Phytohaemagglutinin                                                 |
| SAT.....       | Subcutaneous adipose tissue                                         |
| SD.....        | Standard Deviation                                                  |
| SE.....        | Standard Error                                                      |
| SHep.....      | Serum hepcidin                                                      |
| TBF .....      | Total body fat                                                      |
| VAT .....      | Visceral adipose tissue                                             |
| WC.....        | Waist circumference                                                 |
| WHO.....       | World Health Organization                                           |
| WHR.....       | Waist-to-hip ratio                                                  |

# List of Tables



| Table No.         | Title                                                              | Page No. |
|-------------------|--------------------------------------------------------------------|----------|
| <b>Table (1):</b> | Descriptive analysis regarding demographic data .....              | 36       |
| <b>Table (2):</b> | Descriptive data regarding visceral fat (%) and Ferritin .....     | 37       |
| <b>Table (3):</b> | Descriptive data regarding food composition.....                   | 38       |
| <b>Table (4):</b> | Relation between visceral fat with gender .....                    | 39       |
| <b>Table (5):</b> | Correlation of Serum ferritin and anthropometric measurements..... | 40       |
| <b>Table (6):</b> | Correlation of visceral fat and serum ferritin.....                | 42       |
| <b>Table (7):</b> | Correlation of visceral fat and food composition .....             | 43       |

# List of Figures

| Fig. No.            | Title                                                                          | Page No. |
|---------------------|--------------------------------------------------------------------------------|----------|
| <b>Figure (1):</b>  | .....                                                                          | 27       |
| <b>Figure (2):</b>  | .....                                                                          | 29       |
| <b>Figure (3):</b>  | .....                                                                          | 31       |
| <b>Figure (4):</b>  | .....                                                                          | 32       |
| <b>Figure (5):</b>  | Descriptive data regarding gender.....                                         | 36       |
| <b>Figure (6):</b>  | Shows relation between visceral fat and gender.....                            | 39       |
| <b>Figure (7):</b>  | Shows negative correlation between serum ferritin with BMI .....               | 40       |
| <b>Figure (8):</b>  | Shows Positive correlation between serum ferritin with waist - hip ratio ..... | 41       |
| <b>Figure (9):</b>  | Correlation between visceral fat with serum ferritin.....                      | 42       |
| <b>Figure (10):</b> | Correlation between visceral fat and fat in food composition .....             | 44       |

## Abstract

**Background:** Adipocytes are not just storage organs for fat, they play a regulatory role in body homeostasis including iron metabolism. Concerns about the effect of visceral fat mass on serum ferritin has been raised as increase visceral fat mass accumulation may lead to sequestration of Fe within the reticuloendothelial system leading to decrease dietary Fe absorption from the intestine

**Aim of the work:** This study aims to detect relation between percentage of visceral fat mass and serum ferritin level in Sample of Ain Shams medical students.

**Patients and Methods:** this was a case–control study conducted on 150 medical students over 3 months they were divided into two subgroups: normal serum ferritin group and low serum ferritin group. All students were subjected to the detailed history and 24 hour dietary recall, anthropometric measurements, complete blood picture, measurement of serum ferritin =

**Results:** There were **significantly** negative association between visceral fat mass and serum ferritin also the serum ferritin showed **significant** positive correlations with BMI and waist hip ratio.

**Conclusion:** Higher visceral fat mass levels should be taken into account when assessing body Fe status and should probably be treated before providing dietary recommendations to correct low serum ferritin level.

**Keywords:** visceral fat mass, serum ferritin



# INTRODUCTION



Body fat distribution is now recognized as an important predictor and modifier of many of the adverse health consequences of obesity. Individuals with an upper body fat pattern, reflecting an excess of visceral fat, have significantly greater risk for diabetes, hypertension, hypertriglyceridemia, ischemic heart disease, non-insulin-dependent diabetes some cancers, and death from all causes (*Ioannis et al., 2018*).

Ferritin, an acute phase protein, is elevated in inflammatory conditions and its regulation is complex including number of factors such as: oxidative stress, inflammation, oncogenes, growth factors and other stimuli were implicated (*Humphreys et al., 2012*).

There is an indication that iron functioning in the maintenance of body weight and composition, and the relationship between adiposity and serum ferritin show a positive association, as excess fat may promote fatty acid oxidation and lead to oxidative stress, which has been shown to contribute to ferritin induction (*Alam et al, 2015*).

The bioavailability of Fe may be also linked to the chronic inflammation induced by increase total and visceral fat mass accumulation, as during fat deposition, reactivity of intracellular iron with lipids and increase lipid peroxidation occur causing sequestration of intracellular iron into the stores in order to reduce lipid peroxidation, leading to reduce functional iron and increase iron stores (*Pedro et al., 2013*).



## AIM OF THE WORK

This study aims to detect relation between percentage of visceral fat mass and serum ferritin level in Sample of Ain Shams medical students.



## Chapter 1

# SERUM FERRITIN AND ITS PHYSIOLOGICAL ROLE



Ferritin is present in most tissues as a cytosolic protein; small amounts of ferritin are secreted into the plasma.

It plays an important role in the storage of intracellular iron, the concentration of plasma (or serum) ferritin is positively correlated with the size of the total body iron stores in the absence of inflammation (*Dignass et al., 2018*).

### Normal level of serum ferritin:

Normal ferritin concentrations vary by age and sex. Concentrations are high at birth, rise during the first two months of life, and then fall throughout later infancy (*Cattaneo et al., 2010*).

At about one year of age, concentrations begin to rise again and continue to increase into adulthood (*Cattaneo et al., 2010*).

Beginning in adolescence, males have higher values than females; a trend that persists into late adulthood.

Values among men peak between 30-39 years of age and then tend to remain constant until about 70 years of age. Among women, serum ferritin values remain relatively low until menopause and then rise (*Cattaneo et al. 2010*).