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Serum Ferritin Levels And Post-Menopausal Symptoms, In A Small Group Of Post Menopausal Women, Who Attended OPD In Government Vellore Medical College And Hospital, Tamil Nadu.

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ABSTRACT

Post Menopausal Symptoms like hot flushes, night sweats, mood swings are very common. In patients with severe symptoms, hormone replacement therapy is given, but not all patients respond well to the therapy. Hence, researchers are looking for other possible reasons for the symptomology and other treatment modalities. One such parameter is serum Ferritin. This study aims in studying the serum ferritin levels and Post-Menopausal Women, attending the OPD in Government Vellore Medical College and Hospital, Tamil Nadu. It is a Case-Control Study. (1) Case: Post-Menopausal Women with Hot Flushes/Osteoporotic changes (2) Control: Post-Menopausal Women without Hot Flushes/Osteoporotic changes. In selected subjects, serum sample was got and Serum Calcium, Phosphorous and Alkaline Phosphatase was done along with routine chemistry. The level of serum ferritin was assayed using commercially available ELISA kit using ELISA Reader (allied biotechnology). The mean value of Serum Ferritin in Control Group and Test group is 44.875 and 129.27, respectively. The results were compared, and the Significance of Association was checked using the Students Unpaired t-test and the *P*-value is 0.499 (for a t-value of 0.000157). At this value, the significance is because of chance alone. There is no Statistically Significant Association between increase in Serum Ferritin and Occurrence of Post-Menopausal Symptom like Hot Flushes/Osteoporosis in Post-Menopausal Women who attended the OPD in Govt Vellore Medical College & Hospital, Vellore, Tamil Nadu.

Keywords: Ferritin, Hot Flush, HRT, Menopause, Osteoporosis, Post-Menopausal Women

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INTRODUCTION

Menopause, is said to be attained when Woman aged 45-55 years, has stopped menstruating for more than one year [1]. Even before Menopause, many women get symptoms like hot flashes, night sweats, mood changes, sleep disturbances, cognitive disturbances as well as genitourinary and sexual function changes [2]. These physiological changes are attributed to the hormonal changes, associated with menopause.

Studies done in the past, like the SWAN (Study of Women's Health Across the Nation) and the Melbourne Women's Midlife Health Project, concluded that, there is usually a decrease in oestrogen level and an increase in FSH levels [2].

Of all the symptoms, the vasomotor symptoms (Hot Flashes and Night Sweats) are the most common (80%) and it significantly affects the Quality of life and frequently requires medical treatment [2]. It has been postulated that estrogen deficiency is the main reason behind all these symptoms and signs. Till recent times, Hormone replacement therapy has been the usual mode of treatment and has lots of benefits than side effects, especially in women 60 years or less and when Menopause is more than 10 years [3].

But, results of Meta-Analysis of many Randomized Controlled trials, have shown that only 65% of Post-Menopausal Women get satisfactory symptom control with HRT. Though it was useful for many symptoms and complications of menopause, its use doesn't reduce cardiovascular and osteoporotic risks, as concluded by 2 large randomized controlled trials, the Heart estrogen-progestin replacement study (HERS) and the women health initiative (WHI) [4].

Hence, it is imperative to think of other causal factors causing the Post menopausal Symptoms and also additional treatment and preventive strategies. One such marker that's widely researched is Ferritin. Many recent studies have proved that there is a significant inverse relationship between Oestrogen and serum Ferritin levels [5]. Few studies have concluded that an increase in serum iron, could be a major factor affecting the postmenopausal women's health [6].

Ferritin is a large molecule with a molecular weight of 45 K Da, with a Protein shell around an Iron Core. It is a storage form of Iron and each Ferritin molecule can bind up to 4500 iron atoms [7].

Ferritin level is often assayed as a part of Anaemia work up (where it is the first marker to get reduced, even before the serum iron levels).

The level increases in Inflammatory conditions, tumours and liver diseases. Ferritin levels is increased several folds in post-menopausal women [8], when compared with Ferritin levels in the pre-menopausal women.

Now, our present study is intended to find whether there is a significant increase in serum ferritin levels in all post-menopausal women, as compared to the pre-menopausal women?

If there is such an increase, is it correlating with the occurrence of post-menopausal symptoms and signs?

With these questions, this study was taken up and conducted in Menopausal women attending OP at GVMCH, Vellore, Tamil Nadu.

MATERIALS AND METHODS

Study Design

The Study Protocol was Reviewed and Approved by the Institutional Ethical Committee Review Board.

It is a Case-Control Study among Selected Subjects who attended the Gynaecology Clinic, Master Health Check up's and Out-Patient Department in GVMCH, Vellore, Tamil Nadu.

Materials

Post-Menopausal Women were selected after prior Informed Consent and appropriately grouped, based on the responses obtained, using a Questionnaire.

Inclusion Criteria

Women of Post-Menopausal Status*. (Menopause is the period that corresponds to cessation of menstrual cycles in a woman for at least 12 continuous months.

*Post-Menopause is defined as the period dating from the Final Menstrual Period, regardless of whether the menopause was induced or spontaneous) [9].

Exclusion Criteria

- Pre-existing Inflammatory disorders
- Pre-existing Bone conditions
- Pre-existing Connective tissue disorders
- Tumors
- Other debilitating illnesses

100 Women with symptoms were grouped as “Cases” and 100 Women without symptoms were grouped as “Controls.”

Cases: Post-Menopausal Women with Hot Flushes/Osteoporotic symptoms - 100

Controls: Post-Menopausal Women without Hot Flushes/Osteoporotic symptoms - 100

Method

A written, informed consent was got from all the Selected Study Participants.

General Examination was done, and baseline demographics recorded.

Serum samples was got from the selected subjects. Routine Chemistry, Serum Calcium, Phosphorous and Alkaline Phosphatase, was done using Fully Automated Analyzer and Results were recorded.

The level of Serum Ferritin was assayed using commercially available ELISA kit using ELISA Reader.

RESULTS AND STATISTICS

The total number of subjects included for the study was 200. Out of this 100 were Cases and 100 were Controls. The baseline demographics didn't show any statistically significance with respect to mean age of participants amongst the Cases and Controls.

Table 1, shows the Mean values of serum Ferritin levels in Cases and Controls. The mean value of Serum Ferritin in Control Group is 44.875 and Test group is 82.167 respectively, which is within the normal reference range of Serum Ferritin Levels. Table 2 shows the Statistical Inference of the Unpaired Student's T test. The results were compared, and the Significance of Association was checked using the Students Unpaired t-test and the *P*-value is 0.499 (for a t-value of 0.000157). At this value, the significance is because of chance alone.

Table 1: Mean Value of Ferritin in Cases and Controls

	Mean
Cases (n=100)	44.875
Controls (n=100)	82.167

Table 2: Statistical Inference of the Unpaired Student's T test

Cases	Controls	Statistical inference
N=100	N=100	T value 0.000335059 (This corresponds to p-Value of 0.49986) Statistically Insignificant
Student's T Test Tail 1 Type 2		

DISCUSSION

In this present study, the results and the statistical analysis of the results clearly points out that, there is no significant increase in serum Ferritin levels in post-menopausal women and the small increase in the mean in post-menopausal women with symptoms like hot flushes etc., is statistically insignificant and is most likely due to chance alone.

However, there are studies done in the past, with the conclusion of a positive and strong association between increase in serum Ferritin levels and Post Menopausal Symptoms and Signs, including CVS complications, Arthritis related changes etc.,

Study done by Lillian Nordbo Berge et al., "Serum Ferritin, Sex Hormones, and Cardiovascular Risk Factors in Healthy Women", concludes that, Menopause is associated with increase in serum ferritin level in women and there is higher cardiovascular risk for post-menopausal women as compared to the pre-menopausal women [10].

Erhabor O1 et al., in his study "Ferritin Level in Pre and Postmenopausal Women Attending Usmanu Danfodiyo University Teaching Hospital Sokoto" says that the premenopausal women, who were included in his study had significantly lower level of serum ferritin than the postmenopausal women, which again contradicts the results and inference of our present study [11].

Most studies have showed a significant positive correlation between increased serum ferritin and the post-menopausal signs and symptoms and there are not much studies which concord with our present study conclusion.

Interestingly though, study done by Seung Joo Chon et al., has inferred that the raised serum ferritin levels in pre-menopausal women was significantly associated with bone marrow density changes, especially on the lumbar spine level, but not in the post-menopausal women, which somewhat supports our study's conclusion [12].

While Bin Chen et al., in his review says that there is clear cut role for iron accumulation and osteoarthritic changes that occur in post-menopausal woman, and he also further hypothesizes possible role of hepcidin therapy in such patients.[13]

It is to be noted that, according to our present study, there is no significant increase in serum ferritin level in Post Menopausal woman and the mean value falls very much within the expected range. A study done in US (Am J Clin Nutr 2003; 78:1160 -7) [14], concords with this conclusion.

limitations of our study

Sample size may not reflect the entire subset of population.

It does not include the tests that may pick up subclinical changes that may be there, say for example Bone Marrow Density, TMT etc.,

Future Scope

This study can be made into a prospective study, with follow up and investigations done during specified intervals, so that any increase in ferritin levels that may happen at a later date and onset of changes related to menopause can be correlated and significance of association checked.

CONCLUSION

There is no significant increase in levels of serum Ferritin Levels in Post Menopausal Woman and the small increase that occurs in mean of serum ferritin levels in Post Menopausal woman with symptoms, is also statistically insignificant and due to chance alone.

REFERENCES

- [1] Ko S and Kim H. Menopause-Associated Lipid Metabolic Disorders and Foods Beneficial for Postmenopausal Women. *Nutrients* 2020;12(1):202.
- [2] El Khoudary S, et al. Menopause Transition and Cardiovascular Disease Risk: Implications for Timing of Early Prevention: A Scientific Statement from the American Heart Association. *Circulation* 2020;142(25).
- [3] Lee S, et al. The 2020 Menopausal Hormone Therapy Guidelines. *Journal of Menopausal Medicine* 2020;26(2):69.
- [4] Mosconi P, Donati S, Colombo C, Mele A, Liberati A, and Satolli R. *BMC Women's Health* 2009;9(1).
- [5] Jian J, Pelle E, and Huang X. *Redox Signaling* 2009;11(12):2939-2943.
- [6] Ma H, et al. Serum ferritin levels are associated with carotid atherosclerosis in Chinese postmenopausal women: the Shanghai Changfeng Study. *British Journal of Nutrition* 2015;114(7):1064-1071.
- [7] Wang W, Knovich M, Coffman L, Torti F, and Torti S. *Biochimica et Biophysica Acta (BBA) - General Subjects* 2010;1800(8):760-769.
- [8] Ju S, and Ha A. *Nutrition Research and Practice* 2016;10(1):81.
- [9] Sherman S. *The American Journal of Medicine* 2005;118(12):1405.
- [10] Berge L, Bønaa K and Nordøy A. *Arteriosclerosis and Thrombosis: A Journal of Vascular Biology* 1994;14(6):857-861.
- [11] Erhabor O. *Haematology International Journal* 2017;1(2).
- [12] Chon S, et al. Association between Levels of Serum Ferritin and Bone Mineral Density in Korean Premenopausal and Postmenopausal Women: KNHANES 2008–2010. *PLoS One* 2014;9(12):e114972.
- [13] Chen B, Li G, Shen Y, Huang X, and Xu Y. *Experimental and Therapeutic Medicine* 2015;10(1):7-11.
- [14] Liu J, Hankinson S, Stampfer M, Rifai N, Willett W, and Ma J. *The American Journal of Clinical Nutrition* 2003;78(6):1160-1167.