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Original article

Evaluation of Serum Ferritin in Diffuse Hair Loss Among Females

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Abstract
Since iron is necessary for vital function in the hair follicle, iron deficiency may interfere with the production of new hair. The connection between levels of body iron and loss of hair has been looked at by numerous studies, but in terms of the results, they have been largely inconsistent. The study aimed to determine if lower stores of tissue iron, as demonstrated by blood ferritin levels, are evident in patients with female pattern hair loss and chronic telogen effluvium. The study was carried out in our dermatology clinic and was cross-sectional. 50 patients diagnosed with hair loss of chronic diffuse type, aged 18 to 60, were enlisted. Only 2% of cases had serum ferritin levels within the recommended level. Although low serum ferritin is frequent in women, our research showed no discernible link between it and diffuse hair loss.
Keywords. Diffuse Hair Loss, Ferritin Level, Females.

Introduction

A plethora of studies have examined the particulars of the correlation between the status of body iron and distinct types of hair loss, nevertheless, the outcomes were relatively discrepant. The hair count in a scalp characterized as average is approximately 100,000 hair, in addition to roughly 86% within the anagen, about 13% within telogen, and 1% within catagen (1). An indication of Telogen Effluvium (TE) is characterized by the shedding of club hairs of normal type in which a rapidly abrupt generalized shedding takes place 2-3 months in the wake of triggering event, on the other side an indication of FPHL in female patients diagnosed with loss of hair of chronic diffuse type is featured by loss of hair in a progressively diffuse pattern that demonstrate either widening of frontemporal or central parting line or central scalp thinning from levels of serum ferritin correlation. The distinctive feature of CTE is an overly concerning pattern of diffuse shedding, which is attributed to no apparent cause and arises on the head, classified as normal looking as well and abundant hairs are evident (2).

The aetiology of Hair loss is multifaceted and comprises both internal and external triggering factors. Such factors comprise either intrinsic as the normally occurring ageing process, or extrinsic as inappropriate dietary habits, as well as nutritional intake. Exposure to ultraviolet rays might result in the generation of free radicals, pollution, oxidative stress, hair follicle-related microinflammation, hair styling, and products of hair care (3). Environmental factors, hereditary, nutrition-related, and immunological factors can all contribute to hair loss. Iron deficiency (ID) has been highlighted by several authors that it is prevalently evident in patients who experience loss of hair, in particular, alopecia areata (4, 5), female pattern hair loss (FPHL) (5), as well as diffuse alopecia in women (6, 7). Diffuse loss of hair in women is a prevalent and difficult issue for dermatologists to treat (8). The most prevalent cause, regardless of whether it is of acute or chronic type (i.e., exceeding six months), is TE, which is then accompanied by female pattern hair loss (FPHL) (2).

Levels of both vitamin D and ferritin didn't differ significantly between TE and FPHL (9). Ferritin, which is the primary iron-binding protein within non-erythroid cells, and a remarkably conserved complex of protein that is crucial for the storage of iron (10). The study aimed to determine if lower stores of tissue iron, as demonstrated by levels of blood ferritin, are evident in patients with female pattern hair loss, in addition to chronic telogen effluvium.

Methods

Study design

After getting ethical approval NBC:007.H.25.29. A cross-sectional study was carried out among females at dermatology outpatient clinics in Al-Bayda, Libya, in 2025. Selection of the ffifty cases were carried out in accordance with the criteria of exclusion and inclusion.

Inclusion criteria

All of the consenting participants were between the ages of 18-60 years, diagnosed with hair loss of chronic diffuse type as well as diffuse hair thinning.

Exclusion criteria

Participants who underwent treatment for systemic diseases by medications, those suffering from hormonal disorders, trichotillomania, and chronic diseases.

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Data collection

Following the acquisition of a thorough history, only individuals who met the criteria of inclusion were admitted into the study. Obtaining a thorough history was accomplished, furthermore, examination of dermatological as well as systemic types was conducted. The hair-pull test, in addition to clinical assessment, was carried out to diagnose both TEJ and FPHL. In terms of the hair pull test, approximately 20-60 hairs are firmly grabbed between the fingers at their bases and pulled away from the scalp. A positive test is indicated by the fact that there is more than 10% hair loss removed from the scalp. The concept behind this test is to gently tug on the hair to induce telogen hair shedding. The scale of Ludwig was used to grade the FHPL. The study participants' levels of serum ferritin were assessed using a standardized approach at Hi Tech laboratory Alborj.

Data analysis

Insertion of the questionnaire data was carried out using SPSS version 20; afterwards, the Chi-Square Test, in addition to descriptive statistics, was used to analyse the data. In terms of results, it was created using mean ± standard deviation.

Results

Fifty women participated in this study, 27 of them diagnosed as FPHL. However, 23 had been diagnosed as TE. The mean and standard deviation for age were 30.92±1.26, while the mean of serum ferritin level and standard deviation were 27.02±3.09 (Table 1).

Table 1. Demographics' response rate

Age	Frequency	Percent %
18 – 30	28	56
31 – 43	16	32
44 and older	6	12

Ranges of serum ferritin level according to age group, the majority of participants(34%) had serum ferritin levels less than 13 ng/mL, while only 2% of respondents had serum ferritin levels more than 70 ng/mL, which is the recommended level (11). Only 10% of cases had serum ferritin levels within the range 51-70ng/mL (Table 2).

Table 2. Percentage assessment of serum ferritin level

Ferritin level ng/mL	Frequency	Percent%
Less than 13	17	34
13 – 30	16	32
31 – 50	11	22
51 – 70	5	10
71 and more	1	2

About 26% of patients with FPHLH had serum ferritin levels less than 13ng/mL, and only 2% of them had serum ferritin levels more than 70ng/mL. However, most cases with TE had serum ferritin levels between 13- 50ng/ML (Figure 1).

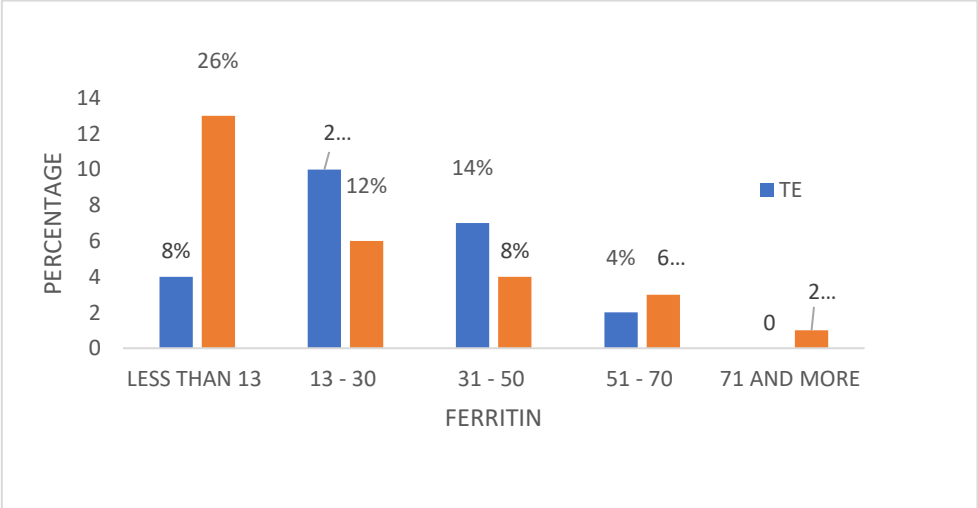

Figure 1. Comparison between serum ferritin levels in hair disorders

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The correlation between two hair diseases of hair loss (FHPL & TE) and serum ferritin level was described using the chi-square test as shown in Table 3. The P value was considered insignificant (0.111) since more than 0.005.

Table 2. Chi-square test of association between ferritin level and the hair disorders

Ferritin	Hair loss disorders		p-value
	TE	FPHL	
Less than 13	4	13	0.111
13 – 30	10	6	
31 – 50	7	4	
51 – 70	2	3	
71 and more	0	1	

Discussion

While some studies have proposed a link between iron deficiency and conditions such as alopecia areata (AA), androgenetic alopecia (AGA), telogen effluvium (TE), and diffuse hair loss patterns, others have found no such correlation (12). A study involving 194 women with chronic diffuse telogen hair loss found that no apparent link between low serum ferritin and hair loss was evident (13)In another study, 80 patients with telogen effluvium, including 20 controls, showed normal serum ferritin levels, further suggesting no connection between ferritin levels and hair loss (14). Other study participants included 80 females with hair loss and 40 controls, who were found to that levels of serum ferritin that were lower in TE and FPHL cases (9).

The study involved 181 healthy women with hair loss. No correlation between hair loss and levels of serum ferritin found(15)The study investigates iron deficiency and hair loss in women. It compares women with diffuse telogen hair loss to controls it found that lower ferritin levels correlate with increased hair loss risk (16). The paper discusses iron deficiency and hair loss. It was found that iron deficiency may be related to various types of hair loss (12). However, another study indicated that Iron deficiency is common in women but not linked to hair loss. Once this study concluded that no significant difference in iron deficiency between the hair loss and control groups was evident (17) as our study indicated.

Conclusion

Although about only 2% had serum ferritin levels at the recommended level, the statistical tests indicated no significant correlation between diffuse hair loss and low serum ferritin level

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Conflicts of Interest

No evident professional, personal, or financial conflicts of interest to declare.

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المستخلص

نظرا لأن الحديد ضروري للوظيفة الحيوية في بصيلات الشعر ، فقد يتداخل نقص الحديد مع إنتاج شعر جديد. بحثت العديد من الأبحاث في العلاقة بين مستويات الحديد في الجسم وتساقط الشعر ، لكن النتائج كانت غير متسقة إلى حد كبير . تهدف هذه الدراسة إلى تحديد ما إذا كان المرضى الذين يعانون من تساقط الشعر الأنثوي وتساقط الشعر المزمن لديهم اقل مستوى مخزون الحديد في الدم . أجريت هذه الدراسة في عيادة الأمراض الجلدية. 50 مريضة تم اختيارهم يعانون من تساقط الشعر المنتشر المزمن ، تتراوح أعمارهم بين 18 و 60 عاما. معلومات أساسية. 2 ٪ فقط من الحالات كانت تحتوي على مستوى مخزون حديد ، ضمن المستوى الموصى به . انخفاض مصل الفيريتين شائع في النساء التي تعاني من تساقط ولكن دراستنا أشارت إلى أنه لم يكن هناك ارتباط ذو اهمية احصائية.

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