

Original Article

Correcting iron deficiency anemia among women with hypothyroidism; A quality-of-life perspective.

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Abstract

Background: Hypothyroidism is a disease characterized by the thyroid gland's compromised ability to produce the thyroid hormone. The condition is often accompanied by Iron Deficiency Anemia (IDA). Together the two have a significant impact on the quality of life (QoL). To gauge the effect of correcting iron deficiency anemia among women with clinical hypothyroidism, improving the quality of life.

Methodology: A total of 140 women pre-diagnosed with hypothyroidism and IDA were included in this experimental study and were presented to the medical outpatient department at Liaquat University Hospital, Hyderabad. All-female participants were recruited via non-probability – consecutive sampling and were included after taking written informed consent and administered corrective treatment (Iron salts). Data was recorded onto a pre-structured questionnaire containing inquiries about basic biodata, sociodemographic details, disease history, present clinical condition, laboratory findings and QoL using Thyroid-Dependent Quality of Life Questionnaire (ThyDQoL), and was analyzed using SPSS version 21.0.

Results: The mean age of participants included in the study was 29 ± 03 years (range 21 to 43). The mean serum ferritin level was 33 ± 03 ng/mL, while the total mean Iron Binding Capacity (TIBC) was 514 mcg/dL. In 92.1% of the patients, the normalized post-4-week treatment of the Underactive ThyDQoL score suggests improvement from a negative 7 to a negative 3 (cumulative mean value) of the sample.

Conclusion: The study results concluded that correcting anemia helps improve the QoL among patients with hypothyroidism. Since the remedy to anemia is achieved earlier than hypothyroidism management in most cases, it is recommended that the efforts are directed to screen and correct anemia (iron deficiency) among such patients.

Keywords

Iron Deficiency Anemia, Hypothyroidism, Quality of Life, Women's Health, Thyroid-Dependent Quality of Life Questionnaire (ThyDQoL).

Introduction

Thyroid disease is a major public health concern worldwide, and among the many variants of thyroid disease, hypothyroidism is of particular concern due to its high incidence and prevalence. Hypothyroidism is the 2nd most common endocrine disorder affecting women of childbearing age, while the other age groups too are not spared and affected to varying extents, though less common and are prevalent in as many as 20% of all women^{1,2}.

The thyroid gland is located at the anterior neck (inferior to the larynx) and comprises two lobes straddling the trachea. When the gland is unable to secrete ample thyroid hormone, a condition named 'Hypothyroidism' arises and leads to the metabolic deceleration of the entire body. Hypothyroidism manifests its effects on all the systems of the body and is characterized by fatigue (muscular system), cognitive impairment (nervous system), menstrual irregularities or infertility (reproductive system) and anemia (hematopoietic system)^{3,4}.

Mild to moderate levels of anemia is observed in almost all cases of hypothyroidism, and clinical symptoms manifest in up to 60% of all patients with hypothyroidism. Anemia in hypothyroidism can be normocytic (Inadequate thyroid hormone secretion), normochromic (chronic thyroid dysfunction), microcytic (malabsorption of iron) and hypochromic (malabsorption of iron), or macrocytic (malabsorption of folic acid, vitamin B12, inadequate nutrition)^{5,6}.

The severity of anemia is often linked to the situation of hypothyroidism, supporting the belief that the thyroid hormone influences the process of hematopoiesis. IDA is the most commonly encountered types of anemia in hypothyroidism^{7,8}. In most cases, anemia is the foremost clinical manifestation among the symptoms preceding the formal diagnosis of thyroid disease. This is despite the fact that hypothyroidism leads to a hypovolemic state, which makes the clinical diagnosis of anemia more difficult (owing to greater saturation of hemoglobin in the plasma).

The association is evident because hematological parameters return to normal when a euthyroid state is achieved^{9,10}.

IDA normally coexist with primary hypothyroidism that results in a hyper-adrenergic state. If iron and ferritin, both are low, taking a thyroid hormone, especially with any triiodothyronine (T3), will cause intolerable anxiety and may affect the QoL, and one will again return to their previous lower dose. Correction of iron deficiency in patients intolerant to thyroxine sodium therapy may result in tolerance to this agent^{11,12}.

Concerning IDA there may be a way to overcome this dilemma. It is suggested that in the absence of IDA, patients may be able to consume relevant medication (thyroid hormone) without worrying and dealing with anxiety and will not need to compromise on the QoL¹³. This research tests out this strategy and aims to generate much-needed evidence to guide a more holistic pharmacologic practice.

Methodology

This experimental study (Quasi-Experimental Design) was conducted with a total of 140 women, pre-diagnosed with hypothyroidism and IDA, presenting to the medical outpatient department at Liaquat University Hospital, Hyderabad. The women included in the study were chosen via non-probability – consecutive sampling after taking written informed consent and administered corrective treatment (Iron salts). Data was recorded onto a pre-structured questionnaire inquiring about basic biodata, sociodemographic details, disease history, present clinical condition, laboratory findings and QoL.

The disease specific QoL was measured via the Underactive ThyDQoL. The ThyDQoL is an individualized measure of the impact of hypothyroidism on the QoL. This 18-item tool exhibits high internal consistency, reliability and validity. Women between the age of 20 to 50 years were included in this study. In contrast, women with any pre-existing Generalized Anxiety Disorder

(G.A.D.) or comorbid systemic conditions that affect QoL were excluded from the study.

Ethical approval was sought from the institutional ethical review committee. The data was analyzed using SPSS version 21.0. The mean ThyDQoL score (pre-treatment) was compared against the score obtained post four weeks of treatment. The statistical significance was assessed using the paired t-test, and a p-value of less than 0.05, deemed statistically significant.

Results

The mean age of the study participants was 29 ± 03 years, ranging from 21 to 43. A majority of approximately 55% of the women hailed from a lower socioeconomic status, while the remaining hailed from a middle socioeconomic class with no representation from the upper socioeconomic class. Only 36.4% of the women were employed while the remaining were un-employed.

Table 1: Basic bio-data and sociodemographic details.

Variable	n(%)	
Age (Years)	20 – 30	84(60)
	31 – 40	49(35)
	41 - 50	07(5)
Socioeconomic Class	Lower	77(55)
	Middle	63(45)
	Upper	-
Employment Status	Employed	51(36.4)
	Un-Employed	89(63.6)

A majority of the study participants hailed from a younger age group, with more than half of them aged below 30 years of age. The sample was exclusively either a lower or middle socioeconomic class with no representation from the upper socioeconomic class. The employment status of the women too was not very encouraging.

Table 2: Mean IDA Measures.

Variable	Pre - Treatment	Post – Treatment
Mean Serum Ferritin Level (ng/mL)	33 ± 03	112 ± 18
Mean Total Iron Binding Capacity (TIBC) (mcg/dL)	514 ± 21	382 ± 17

The mean serum ferritin level was 33 ± 03 ng/mL, while the mean total iron-binding capacity (TIBC) measure was 514 mcg/dL. The levels normalized post-4-week treatment were observed in 92.1% of the patients.

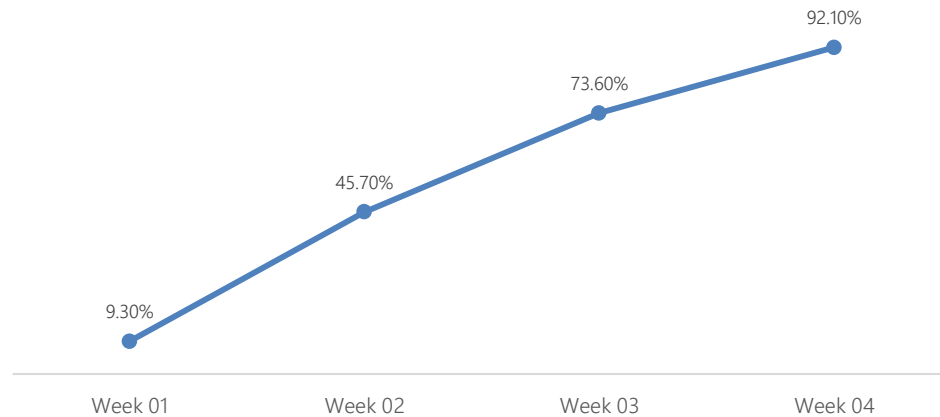


Figure 1: IDA Treatment.

The treatment trajectory was almost linear, with a persistent rise in the number of cured patients with the passage of time. The more significant treatment ratio was achieved upon moving on to week 02, as the ideal treatment time defined by literature is 2 to 3 weeks for IDA.

The study results suggest that the ThyDQoL score was improved from a negative 7 to a negative 3 (cumulative mean value) for the sample. The detailed transition is tabulated below.

Table 3: The ThyDQoL transition.

Time	Week 01	Week 02	Week 03	Week 04
ThyDQoL	- 7	- 4.3	- 3.8	- 3

*ThyDQoL: The Underactive Thyroid-Dependent Quality of Life Questionnaire

Discussion

Hypothyroidism is proven to be associated with IDA, and all study patients are suggested to have IDA. In the absence of iron malabsorption and devoid of a proven instance of blood loss, often believed to suffer from subclinical hypothyroidism. The common causes of IDA basically are low iron intake, iron malabsorption, and blood loss, but hypothyroidism may cause iron malabsorption or a decrease in iron incorporation, which results in an increased loss of iron^{13,14}.

Evidence from the studies exists to substantiate the primary belief that iron deficiency (regardless of clinically evident anemia) affects thyroid physiology. When coupled with clinically manifested anemia, the condition (IDA) affects the metabolism of the thyroid hormone via different mechanisms that include the decreased transport of oxygen (hypoxia), distorted thyroid metabolism via CNS control, nuclear T3 binding modification, and hindered thyroid peroxidase activity^{15,16}.

In addition to the QoL domain, the correction of an anemic state among patients with hypothyroidism yields overall benefits for the patients' general health and well-being. Research has reported that combined regimens of iron and levothyroxine yield far more favourable outcomes than what is achieved with the solitary administration of either of the therapeutic agents alone^{17,18}.

This research investigated the complete novel element of QoL and evaluate the effect that may result in the correction of IDA manifests in patients with hypothyroidism¹⁹. It was revealed that as the serum ferritin and TIBC levels normalized, the QoL, as shown by the ThyDQoL score, is suggested to improved significantly ($p < 0.05$), from a negative 7 to a negative 3 (cumulative mean value) for the sample.

This research showcases that treating IDA among patients with hypothyroidism helps improve the

QoL of the patients. Hence the simple act of administering corrective treatment for IDA can yield holistic benefits for the patients outside the bounds of simple disease statistics. Additionally, it allows thyroid hormones to be more safely administered to the patients without the risk for unavoidable organic anxious states. However, one limitation of the research was, that it does not consider the concurrent treatment trajectory of hypothyroidism in the patients during the study duration, neither does it compare the results against a controlled group.

Conclusion

From the results of the study, it is concluded that treating anemia helps improve the quality of life among patients with hypothyroidism, and since the remedy to anemia is achieved earlier than management of hypothyroidism in most cases, it is recommended that the efforts are directed to the screen and treating anemia (iron deficiency) among such patients.

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