



THE RELATIONSHIP OF THYROID DISEASE WITH ANAEMIA AMONG EARLY PREGNANT TRIBAL WOMAN IN SOUTHERN PART OF RAJASTHAN

Medical Biochemistry

Basant Kumar

Research Scholar, Department of Biochemistry. Pacific Medical University Udaipur (Raj.)

Nita Sahi

Professor & HOD. Department of Biochemistry PMCH, Udaipur

ABSTRACT

Aims: Usually the obstetrical problems are associated with Iron deficiency anaemia and various thyroid diseases and varied range of complications are produced by them. We can demonstrate the effect of iron deficiency anaemia on thyroid hormones during the first trimester. Thus, Anemia and thyroid disorders are common health problems in pregnant women being the most endangered group. **Methods:** this study was a cross-sectional study done at Pacific Medical College & Hospital which enrolled 100 in the first trimesters of their pregnancy. Based on serum hemoglobin values, test groups were subdivided into anaemic cases of 50 out of 100 and healthy controls of 50 out of 100. Iron and T₃, T₄, and TSH were evaluated for all. **Results:** in the healthy women, serum Fe, T₃ and T₄ were significantly higher as compared to with anemic patients **Conclusion:** Thyroid disorders anaemic patients present with thyroid disorders. in the first trimester, serum iron and thyroid hormones should be assessed to prevent any complications. When screened out for both the parameters can improve pregnancy outcome. For improving maternal and fetal outcome, it is recommended that the primary health care has to be strengthened; therefore, its prevention and its early diagnosis and lastly treatment of the anemia in pregnancy should be given utmost priority.

KEYWORDS

INTRODUCTION

The tribals living in the urban localities have come in interaction with a plurality of ethnicity. In the city of Udaipur there are a number of spiritual and linguistic groups with these groups the adjoins of tribal is new. amongst the nutritional deficiency, most commonly Iron deficiency Anaemia (IDA) is seen. among menstruating women, [1]. IDA is demarcated as as reducing the blood hemoglobin levels to less than 12 mg/dL for females. The prevalence is 9–22% less and less than 11 mg/dL for the women being pregnant. In the first stage of IDA there is depletion of tissue iron stores. Serum ferritin, which is an iron storage protein, is a sensitive and reliable biomarker of body iron storage [2]. The etiological causes of anaemia must be determined before appropriate treatment starts.

Hemodilution is the primary cause of a decreased hemoglobin level. Negative impact of hypothyroidism impairs hematologic system and causes anemia. Iron deficiency anaemia can be affected by a negative iron balance caused by elevated iron demand and unequal iron flow to the fetus [3].

Pregnancy changes affect the endocrine system. TSH levels decrease in the first trimester of a healthy pregnancy as a hormonal adaptation to hCG's stimulating effect on the TSH receptors, with peak hCG values between 7 and 11 weeks of pregnancy. Thyroid function test may be influenced by gender, gestational age and laboratory assay procedures which contribute to conflicting results. [4,5]. According to Yu B et al. [6], the use of non-pregnant normal population comparison values as a basis for diagnosis causes 5.7-18.4 % of misdiagnoses in clinical practice.

The American Thyroid Association (ATA) proposed using a gestational age and area-specific reference point for TSH because the risk of misclassification was as high as 10.5% in the early pregnancy [7]. Thyroid disorder may result in four different types of anaemia among which iron deficiency anemia is most common. Many types of anaemias may develop as a result of thyroid dysfunction, most frequently is IDA. Minerals The prevalence is 9–22% needed for a normal functioning thyroid gland is Iodine and Iron [8]. The latter is crucial for thyroid peroxidase function (hem-dependent enzyme) needed for incorporation of iodine to form thyroid hormones.

Iron deficiency anemia will lead to decrement of iron level, decrement of T₄ and increase of TSH levels. Interestingly, Thyroid hormones play an important role in the erythropoiesis by positive feedback mechanism on erythropoietin gene expression which increases secretion of the erythropoietin. Earlier studies revealed a conflicting result in relation of thyroid hormone and anemia. We aimed to verify the role of various thyroid hormones in the anaemic southern population during the first trimester of their pregnancy.

MATERIAL AND METHODS

The study design was a cross-sectional study done at Pacific Medical College & Hospital which enrolled 100 in their early stages of the pregnancy. Based on serum hemoglobin values, group I participants were subdivided into anaemic cases of 50 out of 100 and healthy controls of 50 out of 100. Iron, and T₃, T₄, and TSH were evaluated for all. This study consists of 50 cases of anemic pregnant tribal women (Group I) and 50 non-anemic pregnant tribal women (Group II) to the Department of Gynaecology PMCH Udaipur.

The Study Group Comprised:-

- 50 anemic pregnant tribal women
- 50 normal pregnant tribal women
- The pregnant women were considered as anemic in following meant-
- Level of Hb (gm/dL)
- 9-11 gm/dL – mild anemic
- 7-8 gm/dL – moderate anemic
- Less than 7 – severe anemic

Inclusion Criteria

- Patient with anemia during pregnancy
- 1 trimester pregnant tribal women
- Age between 18 to 40 years

Exclusion Criteria

- The patient with anemia before pregnancy was kept in the exclusion criteria.
- Women having thyroid disorder, iron deficient, previous history of anemia, renal disease, heart disease, cholesterol lowering patient and malnourished women who were on antithyroid drugs were also kept in the exclusion criteria.

Blood Collection

- About 5 ml of blood was withdrawn from the cephalic or median cubital vein. A Blood sample withdrawn was and processed accordingly and centrifuged to obtain serum.

Statistical Analysis

It was done using SPSS-21 (Statistical Packages for Social Sciences-version 21). Independent t-test was used to assess the differences between means.

RESULT & DISCUSSION

The study was carried out at pacific Hospital which enrolled 100 in early pregnancy. They were subdivided into two groups on the basis of their serum hemoglobin levels; Hb <11 mg/dL is anaemia; in normal healthy pregnant women serum iron, T₃ and T₄ was substantially high. Serum T₃ and TSH were non-significant in anemic cases.

Table 1. Showing result of blood analysis of the two study groups:

Study Variables	Non-Anemic pregnant tribal women Mean $\pm$ SD (50)	Anemic pregnant tribal women Mean $\pm$ SD (50)	P-value
Iron μ g/dl	139.64 $\pm$ 5.11	39.64 $\pm$ 5.11	<0.0001 (Significant)
TSH μ IU/mL	2.84 $\pm$ 0.79	4.42 $\pm$ 0.64	Non - Significant
T3 nmol/lit	2.47 $\pm$ 0.82	1.06 $\pm$ 0.64	Non - Significant
T4 nmol/lit	167.28 $\pm$ 10.23	53.42 $\pm$ 10.83	<0.0001 (Significant)

IDA has been linked with many bad obstetrical and neonatal outcomes. The correlation of IDA and thyroid dysfunction has been a focus of interest as it forms a surrogate cause for a poor milestone in newborns and impaired cognitive outcome and intellectual performance in school-aged children [3, 8]. Due to mild thyroid insufficiency and hypothyroidism throughout pregnancy, the incidence of spontaneous miscarriage, abruption placentae, preterm birth, fetal distress, and preeclampsia are increased. [12-14]. The current study showed the level of T3 and T4 was reduced in non-anemic,[15-17]. Teng X et al. [18] studied the relationship of IDA with hypothyroxinemia in a cohort study of 723 pregnant women. this study revealed where the relationship between iron and T4 was studied in early stages of pregnancy. Godinez et al. [19] explored the effect of IDA and iron supplement on the thyroid functions before and after treatment.

CONCLUSION

First-trimester pregnant women with IDA could be considered potential group for the development of maternal hypothyroxinemia, so screening for both during first-trimester antenatal care visits for improves the obstetrical service outcome for both the mother and the baby was recommended.

Conflict of Interest -Nil

REFERENCES

- Mirza FG, Abdul-Kadir R, Breymann C, Fraser IS, Taher A. Impact and management of iron deficiency and iron deficiency anemia in women's health. Expert review of hematology. 2018 Sep 2;11(9):727-36.
- Lopez A, Cacoub P, Macdougall IC, Peyrin-Biroulet L. Iron deficiency anemia. The Lancet. 2016 Feb 27;387(10021):907-16.
- Pavord S, Daru J, Prasanna N, Robinson S, Stanworth S, Gilling J, BSH Committee. UK Guidelines on the management of iron deficiency in pregnancy. Br J Haematol. 2019 Oct 2.
- Zimmermann MB & Boelaert K. Iodine deficiency and thyroid disorders. Lancet Diabetes Endocrinol 2015;3: 286–295.
- Castillo Lara, M., Vilar Sánchez, A., Cañavate Solano, C. et al. "Hypothyroidism screening during the first trimester of pregnancy". BMC Pregnancy Childbirth 2017; 17, 438.
- Yu B, Wang QW, Huang RP, Cao F, Zhu ZQ, Sun DC, Zhou H, Zhang YM. Establishment of self-sequential longitudinal reference intervals of maternal thyroid function during pregnancy. Experimental Biology and Medicine. 2010 Oct;235(10):1212-5
- Alexander EK, Pearce EN, Brent GA, et al. Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease During Pregnancy and the Postpartum. Thyroid 2017; 27:315–89.
- Moreno-Reyes RG, Linoer DV, Oyen HV, Vandevijvere S. High prevalence of thyroid disorders in pregnant women in a mildly iodine-deficient country: a population-based study. Journal of Clinical Endocrinology and Metabolism 2013; 93:3694–3701.
- Szczepanek-Parulska, E, Henrik, A & Ruchala, M. Anemia in thyroid diseases. Polish Archives Internal Med 2017; 127, 352–360.
- Dorgalaleh A, Mahmoodi M, Varmaghani B, et al. Effect of thyroid dysfunction on blood cell count and red blood cell indices. Iran J Pediatr Hematol Oncol. 2013; 3: 73-7.
- Soppi E. Iron deficiency is the main cause of symptom persistence in patients treated for hypothyroidism. In 15th International Thyroid Congress, Thyroid 2015; 25, A–74.
- Rosario PW, Carvalho M, Calsolari MR. TSH reference values in the first trimester of gestation and correlation between maternal TSH and obstetric and neonatal outcomes: a prospective Brazilian study. Arch Endocrinol Metab. 2016; 60(4):314–8.
- Nori W, Abdulghani M, Roomi AB, Akram W. To operate or to wait? Doppler indices as predictors for medical termination for first trimester missed abortion. Clinical and Experimental Obstetrics & Gynecology. 2021 Jan 27; 48(1):168-74.
- Nori W, Roomi AB, Akram W. Platelet indices as predictors of fetal growth restriction in Pre-eclamptic Women. Revista Latinoamericana de Hipertensión. 2020; 15(4): 280-285.
- Yu X, Shan Z, Li C, et al. Iron deficiency, an independent risk factor for isolated hypothyroxinemia in pregnant and non-pregnant women of childbearing age in China. J Clin Endocrinol Metab 2015; 100:1594–601.
- Zhang HY, Teng XC, Shan ZY, Wang ZJ, Li CY. Association between iron deficiency and prevalence of thyroid autoimmunity in pregnant and non-pregnant women childbearing age: a cross-sectional study. Chinese medical journal. 2019 Sep 20; 132(18):2143.
- Li, Shuxiang, et al. "The relationship between iron deficiency and thyroid function in Chinese women during early pregnancy." Journal of nutritional science and vitaminology 62.6 2016; 397-401.
- Teng X, Shan Z, Li C, Yu X, Mao J, Wang W, Xie X, Du J, Zhang S, Gao Z, Zhang X. Iron deficiency may predict greater risk for hypothyroxinemia: a retrospective cohort study of pregnant women in China. Thyroid. 2018 Aug 1; 28(8):968-75.
- Gökdeniz E, Demir C, Dilek İ. The effects of iron deficiency anemia on the thyroid functions. Journal of Clinical & Experimental Investigations/Klinik ve Deneyisel Araştırmalar Dergisi. 2010 Dec 1; 1(3).