ORIGINAL ARTICLE

Frequency of Thyroid Disorder with Iron Deficiency Anemia in Pregnancy

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ABSTRACT

Objective: To determine the frequency of thyroid disorders in iron deficiency anemic pregnant women. **Setting:** Department of Gynaecology and Obstetrics unit 1 Liaquat University Hospital (LUH) Hyderabad.

Duration: Six months from August 2020 to February 2021

Design: Cross-sectional study.

Subject and Methods: A total of 180 women with first trimester pregnancy presented with iron deficiency anemia and either of parity were included. After taking informed consent a 3ml blood sample was taken from the study participant and immediately was sent to Hospital diagnostic laboratory for the thyroid profile. The data was collected on pre-designed proforma.

Results: The average age of the women was 29.94±4.84 years. There were more cases in primigravida than multigravida 71.6% and 28.4% respectively. Frequency of thyroid disorders in anemic pregnant women was 23.5%. Hypothyroidism was seen in 13.5% cases, and hyperthyroidism was in 10% of cases.

Conclusion: In our study the frequency of thyroid disorders in anemic pregnant women found to be 23.5% on 1st trimester of pregnancy.

Key Words: Anemia, Iron deficiency, Hypothyroidism, Hyperthyroidism, pregnancy,

INTRODUCTION

Anemia is among one of most frequently encountered medical problem affecting the pregnancy especially in developing countries.¹ The major causes of anemia are inadequate supply of iron, folic acid and vitamin B12 however proper intake of proteins, amino acids and other are vital to maintain hemoglobin level.² vitamins Nevertheless iron deficiency is among the most commonly seen deficiency with the prevalence of 14% and 51% in developed and in underdeveloped countries.[3] Iron deficiency can lead to several impacts on bodily and have linked hampering of thyroid function in iron deficiency anemia.⁴ There is proven evidence of having adverse maternal and fetal outcome as a result of anemia and thyroid disorders.⁵ Such adverse outcome include preterm delivery, placental abruption, fetal loss, pre-eclampsia and decreased intellectual functions in offspring.⁶ Overt hypothyroidism has been reported in 0.2% of patients during pregnancy,^[7] while subclinical hypothyroidism has been reported in 2.3% of patients.^[8] Overt hyperthyroidism is related with fetal death, growth restriction of fetus, preterm birth, and preeclampsia; but, subclinical or mild hyperthyroidism (repressed TSH alone), which affects 1.7% of pregnancies, has not been liked with negative outcome.⁹ Anemic women who had an euthyroid pregnancy (autoimmune positive), however, had a twofold risk of preterm delivery and miscarriage.¹⁰ Thyroid disease affect approximately 2%-5% of expectant mothers, and if early enough, effective intervention is discovered possible.¹¹ Women having hypothyroidism have lower fertility; even though they conceive, their chances of having an abortion are higher, and so do their risks of anemia, gestational hypertension, postpartum hemorrhage, and abruptio placenta.¹² Anemia has been shown in certain studies to decrease thyroid function via lowering TPO activity.¹³ In comparison to euthyroid women, women having thyroid dysfunction are far more inclined to develop anemia.¹⁴ Poor iron status among mothers has recently attracted attention as a predictor of elevated TSH and lower total T4 levels in pregnancy, particularly in regions with substantial iodine shortage.¹⁵ Globally, over 20 million individuals suffer from neurological complications as a result of intrauterine iodine deficiency.¹⁰ This study has been conducted to find out the frequency of thyroid disorders in anemic pregnant women.

MATERIALS AND METHODS

This cross-sectional study was carried out in Department of Gynaecology and Obstetrics at Liaquat University hospital (LUH) Hyderabad from August 2020 to February 2021. Non-probability consecutive sampling technique was used. All the pregnant women with iron deficiency anemia, first trimester gestation, age 22-42 years, singleton pregnancy and either of parity were included. All the pregnant women without iron deficiency anemia, gestational age >13 weeks, women with known thyroid disorder and not willing to participate in the study were excluded. After taking informed consent a 3ml blood sample was taken from each study participant and immediately sent to Hospital diagnostic laboratory for the thyroid profile. Hypothyroidism was characterized by low production of thyroid hormones by thyroid gland, S.TSH 0.04-10.8mu/l, free t3 8.04-22pmol/l. free t4 0.37-6.58pmol/l. Hyperthyroidism was characterized by high production of thyroid hormones by thyroid gland, S.TSH 0.04-10.8mu/l, free t3 8.04-22pmol/l, free t4 0.37-6.58pmol/l. The data collected process was

carried out using a pre-designed proforma. The collected data was processed for analysis using SPSS version 20.

RESULTS

A total of 180 women with first trimester were studied and their average age was 29.94 ± 4.84 years and mean gestational age was 30.25 ± 4.77 weeks. There were 65.92% primigravida and 34.08% multigravida. The average TSH, free T3, free T4 was 3.68 ± 4.27 mIU/L, 14.14 \pm 9.12pmole/L and 4.78 \pm 4.91pmol/L respectively. Table.1

There were 23.5% of cases with thyroid disorders. There were more cases of hypothyroidism as compare to hyperthyroidism.Table.2

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Variables		Statistics
Age (mean+SD)		29.94+4.84 years
Gestational Age (mean+SD)		11.30+2.22 weeks
BMI (mean+SD)		26.88+2.83 kg/m ²
Parity (mean+SD)		1.49+0.73
Parity	Primiparous (frequency/%)	129(71.6%)
	Multiparous (frequency/%)	49(28.4%)
Hb		9.23±0.78
Serum Ferritin		11.75±2.06
TSH(mIU/L)		3.68±4.27
Free T3(pmole/L)		14.14±9.12
Free T4(pmol/L)		4.78±4.91

Table. 2. Frequency of thyroid disorders in anemic pregnant women n=180 $\,$

Thyroid status	No of cases	Percentage
Euthyroid	137	76%
Hypothyroid	24	13%
Hyperthyroid	19	10.5

DISCUSSION

Considering anemia is the most frequently medical disorder in Pakistani women and scant work of its association with thyroid disorders this study is planned find out the frequency of thyroid disorders in pregnant women with iron deficiency anemia. The current study found the frequency of thyroid disorder as 23.5%. Over all reported frequency of any variety of thyroid disorder is reported as 2-5% in pregnant women.¹⁶ An Indian study reported the prevalence of thyroid disorder ranging from 4.8 to 11%. The frequency of hypothyroidism was found as 13%, which was comparable to a community-based large from the USA where 15.5% case of hypothyroidism reported.¹⁷ The reported frequencies from Indian studies range from 1% to 3.5% ,while an Iranian study reported the frequency of 13.7%.^{18,19} An study from Delhi suggested 14.3% incidence of hypothyroidism in the course of first trimester.²⁰ The interaction between thyroid and pregnancy in recent era has changed the view about defining the cut off values that can significantly be related to previously reported prevalence.²¹ It is imperative to screen the high risk women for hypothyroidism in pregnancy even if they conceive, abortion risk, anemia, gestational hypertension, postpartum hemorrhage and abruptio placenta is

increased.¹² A recent study have been found that 49% of cases had hypothyroidism.²² Earlier reports revealed the hypothyroidism as the most commonly pregnancy related thyroid disorder and our findings do correlate the fact as we have increased number of hypothyroidism, never the less the number of hyperthyroid cases found very high in comparison to global rate. We found an overall higher frequency of thyroid disorders in comparison to the world wide reports along with increased number of both hypo and hyperthyroidism. The difference may be related to the selection criteria for restriction to 1st trimester pregnant women along with iron deficiency anemia while the reported prevalence was from pregnant women from all gestational age with other anemic etiology. Nutritional deficiencies have been linked to hypothyroidism, with iron deficiency being the most well-known example.²³ Anemia affects around 60% of hypothyroidism patients and is linked with the duration or severity of thyroid insufficiency.23 According to Fein and Rivlin's research, nutritional deficiencies occur in subclinical hypothyroidism, with iron deficiency being the most well-known.²⁴ Hypothyroidism is inclined to exacerbate anemia's severity. Poor iron status of mothers has recently attracted attention as a potential predictor of elevated TSH and lower total T4 levels in pregnancy, particularly in regions where iodine shortage is substantial.¹⁵ Iron deficiency is thought to lower the thyrotropic responses to TRH, T4 and T3 levels, reduce T3 turnover, and possibly impair T3 nuclear binding.25 Iron deficiency may inhibit the thyroid peroxidase (a hemedependent enzyme), decreasing thyroid hormone production and resulting in a decrease in total T4 and total T3 concentrations in the blood.²⁵ Hypothyroidism may be reversed by Iron repletion. Malabsroption and iron deficiency anemia are linked with hypothroidism. A study documented by Cinemre H et al., showed that among subclinical hypothyroidism suffering women, oral iron absorption and treatment efficacy improved following levothyroxine replacement.²⁶ Though routine thyroid screening during pregnancy has not been recommended and mostly the recommendations are targeted for high risk women, nevertheless a few studies found it as cost effective in view of offering treatment to improve fetomaternal outcome.

CONCLUSION

As per study the frequency of thyroid disorders in anemic pregnant women found to be 23.5% during 1st trimester of pregnancy. This highlights the fact that screening for thyroid disorders in iron deficient anemic women should be considered in order to offer timely treatment for avoiding the related complications. However this study has just focused on 1st trimester screening of iron deficient women .Further studies may be focused to screen all pregnant women irrespective of gestational age and other type of anemia to have further insight of our understanding and hence to optimize treatment in the best interest of the women and her fetus.

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