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Original Research Article

A Hospital Based Assessment of Thyroid Disorders in Women during Reproductive Age: An Observational Study

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Abstract

Aim: The aim of the present study was to assess the thyroid disorders prevalence in women during reproductive age.

Methods: An Observational study including 200 reproductive women of the age group of 18-45 years was conducted in the Department of Obstetrics and Gynecology, for one year. Informed consent was obtained from all the participants and confidentiality of data was maintained. Written informed consent was obtained from all the parents of the participants before the commencement of the study.

Results: The disorder was more common in age group 40 years and older accounting for 45%. AUB was more common amongst multiparous woman contributing to 58%. The most common menstrual disorder pattern seen in AUB was menorrhagia which was 54%. Next commonest was polymenorrhea at 20%. Euthyroid, hypothyroid and hyperthyroid were 87%, 9% and 4% respectively. Majority of the hypothyroid cases were in age group >40 years. The highest number of hyperthyroid cases was in age group of 21-30 years. More number of hypothyroid cases were in >40 years age group and a smaller number of cases in <20 years age group. There was high association observed between age groups and thyroid type and it is found statistically significant ($p<0.001$).

Conclusion: The study results suggested that there was a strong association between the thyroid disorders and the reproductive functions in the women of reproductive age. The study recommends further detailed studies in this area for further understanding the relationship and to plan effective treatment strategies.

Keywords: Thyroid Disorders, Reproductive Women, Endocrine Disorders

Introduction

Thyroid disorders are fairly common in women of reproductive age. Hashimoto thyroiditis and Graves disease, both autoimmune thyroid disorders, are eight to ten times more frequent in women than in men and have a peak prevalence in early adulthood. [1] Of note, hypothyroidism is estimated to occur in 4% of pregnancies (0.5% overt and 3.5% subclinical hypothyroidism) and hyperthyroidism in 2.4% of pregnancies (0.6% overt and 1.8% subclinical hyperthyroidism). [2] Thyroid hormone is important for both maternal and child health. Although the fetal thyroid gland is present and functional by 10–12 weeks gestation, it does not mature until 18–20 weeks. [3] Thus, the fetus depends on maternal thyroid hormone delivered via transplacental passage during a critical period of development in early gestation.[3] Consequently, maternal thyroid dysfunction can lead to adverse pregnancy and child neurodevelopmental outcomes. In addition, in the postpartum period, ~5% of women might experience transient thyroid dysfunction from postpartum thyroiditis within 12 months of delivery. [4]

The most frequent thyroid disorder in pregnancy is maternal hypothyroidism. The geographical variation in the prevalence of hypothyroidism during pregnancy is very wide and ranges from 2.5% to 11%. [5] The prevalence of hypothyroidism is more in Asian countries as compared to western countries. Untreated or inadequately treated and subclinical hypothyroidism all can increase the risk of miscarriage, preeclampsia, anemia, fetal growth restriction, placental abruption, perinatal and neonatal morbidity and mortality, preterm delivery, small head circumference, and low birth weight

impaired neuropsychological development. [6] Hypothyroidism consists of two clinical forms: subclinical and overt hypothyroidism. The subclinical hypothyroidism is characterized by an elevated serum thyroid-stimulating hormone (TSH) with normal free thyroxine (FT4) and is observed in 3%-5% of women in pregnancy. Overt hypothyroidism is characterized by an elevated serum TSH and subnormal FT4 is observed in 0.3%-0.5% of women in pregnancy. [7,8]

Several studies have reported that thyroid dysfunction -both overt and subclinical-has been associated with increased risk of abortions, anemia, preeclampsia, placental abruption, placental abnormalities, intrauterine growth restriction (IUGR), stillbirths, preterm delivery, postpartum hemorrhage, and even myopathy, congestive heart failure are reported among the affected pregnant mothers. [9] Reduced intellectual function in the offspring, congenital anomalies, and cretinism are most commonly seen in the babies of women, where iodine deficiency is the cause of hypothyroidism. [10] Thus, thyroid disorders during pregnancy predispose to increased feto-maternal and neonatal morbidity and mortality.

The aim of the present study was to assess the thyroid disorders prevalence in women during reproductive age.

Materials and Methods

An Observational study including 200 reproductive women of the age group of 18-45 years was conducted in the Department of Obstetrics and Gynecology, Jawaharlal Nehru medical College and Hospital, Bhagalpur, Bihar, India for one years. Informed consent was obtained from all the participants and confidentiality of data was maintained. Written informed consent was obtained from all the parents of the participants before the commencement of the study.

Exclusion Criteria

- All pregnant women, infertile women on hormonal therapy, women presenting with infertility due to male factors, those with congenital anomalies of the female urogenital tract, those with a history of thyroid disease/surgery, and those treated with thyroid medication or irradiation were excluded from the study
- Patients with severe complications were excluded from the study.
- Unwilling participants were excluded from the study.
- Women undergoing any endocrine therapy or treatment were also excluded.

Methodology

All participants underwent thorough physical ex-amination. A blood sample of 5 milliliters was collected from each participant using plain vacutainer bottles from the antecubital fossa under aseptic conditions. The samples were allowed to clot and retract at room temperature for four hours before being centrifuged at 5000 rpm for five minutes and the separated sera were harvested and stored at -20°C until analysis.

Serum freeT3 (fT3), feeT4 (fT4), and TSH were analyzed using commercial ELISA kits. The reference intervals in the laboratory of assay included: 0.39-6.16 mIU/L for TSH, for FT3 was2.15- 6.45 pmol/L for, and 10.30-25.78 pmol/L for FT4.

The diagnosis of euthyroid was made as serum TSH, FT3, and FT4 concentrations within the reference interval while overt hypothyroidism was made as serum TSH concentration above the reference interval and FT3, and FT4 concentrations be- low the reference interval.

Subclinical hypothyroidism and Subclinical hyperthyroidism were defined as serum TSH concentration above the reference interval and FT3, FT4 concentrations within the reference interval and serum TSH concentration below the reference interval and the FT3, FT4 concentrations within the reference interval respectively.

Overt hyperthyroidism was defined as serum TSH concentration below the reference interval and FT3, and FT4 concentrations above the reference interval, and overt hypothyroidism was defined as se- rum TSH concentration above the reference interval and FT3, and FT4 concentrations below the reference interval. All instruments used were validated. Information related to the patients was kept confidential.

Statistical Analysis:

The statistical software SPSS 20.0 version was used to analyze the data. Data was presented as frequency and percentage.

Results

Table 1: Demographic data

Age group	Frequency	Percentage
<20	38	19
21-30	12	6
31-40	60	30

>40	90	45
Total	200	100
Parity		
Nullipara	44	22
Primipara	40	20
Multipara	116	58
Total	200	100
Complaint		
Menorrhagia	108	54
Polymenorrhea	40	20
Oligomenorrhea	30	15
Hypomenorrhea	22	11
Total	200	100

The disorder was more common in age group 40 years and older accounting for 45%. AUB was more common amongst multiparous woman contributing to 58%. The most common menstrual disorder pattern seen in AUB was menorrhagia which was 54%. Next commonest was polymenorrhea at 20%.

Table 2: Distribution of thyroid disorders in participants

Thyroid status	Frequency	Percentage
Euthyroid	174	87
Hypothyroid	18	9
Hyperthyroid	8	4
Total	200	100

Euthyroid, hypothyroid and hyperthyroid were 87%, 9% and 4% respectively.

Table 3: Age and thyroid status

Age	Euthyroid	Hypothyroid	Hyperthyroid	Total
	No.	No.	No.	
<20	34	2	2	38
21-30	8	2	2	12
31-40	54	4	2	60
>40	78	10	2	90
Total	174	18	8	200

Majority of the hypothyroid cases were in age group >40 years. The highest number of hyperthyroid cases was in age group of 21-30 years. More number of hypothyroid cases were in >40 years age group and a smaller number of cases in <20 years age group. There was high association observed between age groups and thyroid type and it is found statistically significant ($p<0.001$).

Discussion

The occurrence of hyperthyroidism is less during pregnancy with the prevalence being 0.1%-0.4%. Overt hyperthyroid-ism is seen in nearly 2% of pregnancy characterized by a reduced TSH and an increased FT3/FT4 while subclinical hyper-thyroidism is seen in 1.7% of pregnancy and is characterized by a suppressed serum TSH and normal FT4. [11] Physiological changes during pregnancy may mimic hyperthyroidism like fatigue, anxiety, increase in basal metabolism, heart rate, palpitations, heat intolerance, warm and wet skin, hand tremors, and systolic murmur, which causes difficulty in diagnosis. [12,13] Pregnant women suffering from hyperthyroidism have more severe tachycardia and thyromegaly, along with exophthalmia, and lack of weight gain despite having adequate food. [5] Thyroid dysfunction is usually overlooked and ignored in pregnant women because of the non-specific and hypermetabolic state of pregnancy. [14]

AUB is one of the frequent presentation in gynecological OPD, occurs in 9-14% women between menarche to menopause. [15] Menstrual abnormality is primarily a disorder of hypothalamic-pituitary-ovarian axis either directly or indirectly by their effects on target organs. Other than the reproductive hormones endocrinological disturbances also play a crucial role for etiopathogenesis of AUB. Amongst range of effect on the development, growth and metabolism of every organ system of human body. [16] Variation in production and activity of thyroid hormones that is thyroxine (T4), tri-iodothyronine (T3) and thyroid

stimulating hormone (TSH) may cause menstrual abnormality. TSH receptors have been found on granulosa cells. T3, T4 have been found in follicular fluid and T4 can enhance the action of gonadotropins in luteinisation and progesterone secretion – all these facts suggest the role of thyroid hormone in female reproductive physiology. [17] The disorder was more common in age group 40 years and older accounting for 45%. AUB was more common amongst multiparous woman contributing to 58%.

The cases of thyroid dysfunction are on rise worldwide. [18] In India also the same is observed for which there may be multiple causes like family history or life- style modifications or excess of stress. [19] Earlier studies reported that there was more cases of hypo- thyroidism and sub clinical hypothyroidism in the women of reproductive age. [20] The present study confirms the views as we have observed more cases of hypothyroidism when compared with hyper thyroidism. Further, in context of parity, it was reported that those with primi and multi parous were exhibited more thyroid dysfunction. [21] The most common menstrual disorder pattern seen in AUB was menorrhagia which was 52%. Next commonest was polymenorrhea at 22%. Verma A et al [22] and Jinger SK et al [23] had similar observations. This is probably related to anovulation that occurs in hypothyroidism.

The most common menstrual disorder pattern seen in AUB was menorrhagia which was 54%. Next commonest was polymenorrhea at 20%. Euthyroid, hypothyroid and hyperthyroid were 87%, 9% and 4% respectively. Majority of the hypothyroid cases were in age group >40 years. The highest number of hyperthyroid cases was in age group of 21-30 years. More number of hypothyroid cases were in >40 years age group and a smaller number of cases in <20 years age group. There was high association observed between age groups and thyroid type and it is found statistically significant ($p<0.001$). It was noticed in many studies mentioned before and including this study, the incidence of AUB in more towards perimenopause and hypothyroidism is frequent in older woman in general population, which includes perimenopausal period. This justifies screening for thyroid profile even in asymptomatic older woman. It is recommended to screen with S. TSH assay every 5 years beginning at 35, then every 2 years after 60 years. [24]

Conclusion

The study results suggested that there was a strong association between the thyroid disorders and the reproductive functions in the women of reproductive age. The study recommends further detailed studies in this area for further understanding the relationship and to plan effective treatment strategies.

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