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Original Research Article

Study of Thyroid Profile in Women with Menstrual Irregularities in Reproductive Age Group in Mithilanchal Area

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Abstract

Background: By interactions with sex hormone-binding globulin and direct effects on the ovaries, thyroid hormones play a significant role in normal reproductive physiology. Infertility and menstrual abnormalities can result from thyroid disease. In the current study, thyroid-related symptoms, thyroid function tests, and menstrual patterns in women with thyroid disease were examined in the Mithilanchal area of North Bihar.

Methods: This cross-sectional study was carried out at the DMC in Laheriasarai, Bihar, in the Department of Physiology. From July 2018 to December 2018, the Department of Obstetrics and Gynecology at Darbhanga Medical College and Hospital, Laheriasarai, Bihar, evaluated thyroid dysfunction in 70 women with irregular menstruation. All selected women of reproductive age (15–45 years) in Mithilanchal area who experienced irregular periods were registered. The study did not include women who were currently taking anti-thyroid medications or had a history of thyroid malfunction. Age, thyroid hormone level, and monthly irregularity type for each individual were noted. Thyroid hormones were determined using the ELISA method. Thyroid stimulating hormone (TSH) levels, serum free triiodothyronine (T3), and free thyroxine (T4) were used for the assessment of thyroid dysfunction. SPSS version 25 was used for data analysis.

Results: With a range of ages from 15 to 45, the study population's average age was 27.8 ± 5.3 years. Patients were divided into three groups based on their ages: 15–25 years, n=34 (48.57%), 26–35 years, n=23 (32.85%), and 36–45 years, n=13 (18.57%). 22.85% of people (n=16) had thyroid problems. Regular menstruation 67.14% (n=47), Oligomenorrhea 4.28% (n=3), Menorrhagia 15.71% (n=11), Polymenorrhea 7.14% (n=5), and Metropathia 5.71% (n=4) were the clinical manifestations of menstrual patterns. Of the 16 women with thyroid dysfunction overall, 41 (58.6%) had normal thyroid function, 28 (40%) had hypothyroidism, and 1 (1.4%) had hyperthyroid function. TSH levels were 2 mIU/L IQR on average (1.0-4.0). T3 and T4 levels were 2.83±1.13 pg/ml and 1.38±1.1 ng/dl on average, respectively.

Conclusion: The current study discovered that among women of reproductive age with various menstrual irregularities, hypothyroidism is the most common thyroid malfunction. Menorrhagia, polymenorrhea, and oligomenorrhea were the most typical clinical manifestations. Thus, a thyroid function test should be required in all DUB cases in order to identify thyroid malfunction and determine whether or not the patient needs additional medical attention.

Keywords: Menstrual Pattern, Reproductive Age Group Women, Thyroid Dysfunction.

Introduction

The proper reproductive system's physiology depends heavily on thyroid hormones. It may exert direct effects on the reproductive system through specific receptors that regulate organ growth and metabolism, as well as indirect effects on growth factors like insulin-like growth factor, oestrogen, and prolactin through interactions with other hormones released in the hypothalamic-pituitary-gonadal axis [1,2]. Due to variations in serum TSH levels, including hyper- and hypothyroidism, women may have infertility [3]. Between 0.3% and 4.3% of women of reproductive age have hypothyroidism [4]. A condition known as autoimmune thyroiditis, which is characterised by the destruction of thyroid proteins such thyroglobulin and thyroid peroxidase, may result in the loss of glandular function [5]. Delayed puberty, irregular menstruation, and anovulation. Other factors that may contribute to hypothyroidism in women of reproductive age include the frequency of spontaneous abortion, preterm birth, and congenital anomalies [6].

In women of childbearing age, hypothyroidism may result in Graves' disease, which is brought on by elevated antibodies against the thyroid-stimulating hormone (TSH) receptor. Ovarian cysts, increased follicular atresia, and menstrual problems make hyperthyroidism less common than hypothyroidism [7]. Thyroid diseases are more common in women than in men. There are several menstruation patterns among women, including irregular uterine bleeding, amenorrhea, dysmenorrhea, and oligomenorrhea. Many reproductive issues, including irregular menstruation, altered cycle duration, aberrant sexual development, blood flow, and infertility, are linked to hypothyroidism. Occult menorrhagia, a mild irregularity in menstruation frequency and length, has been linked to hypothyroidism. Patients with metabolic syndrome, diabetes, and renal illness are more likely to experience thyroid dysfunction, according to prior research [8]. There is scarcity of data regarding the association of menstrual irregularities with thyroid dysfunction. Determining the menstrual patterns of women in the reproductive age group with thyroid impairment in the Mithilanchal area of North Bihar was the goal of the current study.

Material and Methods

This cross-sectional study was conducted at Department of Physiology, DMC, Laheriasarai, Bihar. 70 women with menstrual irregularities who were assessed for thyroid dysfunction in the Department of Obstetrics and Gynecology outpatient Department of Darbhanga Medical College and Hospital, Laheriasarai, Bihar from July 2018 to December 2018. All the reproductive age group women between (15-45 years) with menstrual irregularities from Mithilanchal area were enrolled. Women with a history of thyroid irregularities and taking anti-thyroid drugs were excluded from the study. Individual age, thyroid hormones level, and type of menstrual irregularities were recorded. ELISA technique was used for the determination of thyroid hormones. Thyroid stimulating hormone (TSH) levels, serum free triiodothyronine (T3), and free thyroxine (T4) were used for the assessment of thyroid dysfunction. Competitive ELISA

principle was used for the estimation of fT3 and fT4. All the reproductive age women were categorized into three distinct groups

based on menstrual pattern; group-I of menstrual irregularities consists of polymenorrhea and oligomenorrhea, group-II of amenorrhea, and group-III with menorrhagia. The normal range of fT3 and fT4 thyroid hormones was 1.3-4.3 pg/ml and 0.9-2.3 ng/dl respectively. The normal range of TSH was 0.38-6.21 mIU/L. Thyroid hormones within range were considered normal (euthyroids). Hypothyroidism was referred to in cases where TSH> 6.21 mIU/L with normal range of fT3 and fT4 value.

Hypothyroidism was referred to a case where TSH< 0.38 mIU/L with normal range of fT3 and fT4.

SPSS version 25 was used for data analysis. Numerical variables were described as mean ± SD whereas categorical variables were expressed as frequency and percentage. ANOVA test was applied to continuous variables and chi-square test for categorical variables at 5% level of significance and 95% confidence interval.

Results

With a range of ages from 15 to 45, the study population's average age was 27.8±5.3 years. Patients were divided into three groups based on their ages: 15–25 years, n=34 (48.57%), 26–35 years, n=23 (32.85%), and 36–45 years, n=13 (18.57%). 22.85% of people (n=16) had thyroid problems. Regular menstruation 67.14% (n=47), Oligomenorrhea 4.28% (n=3), Menorrhagia 15.71% (n=11), Polymenorrhea 7.14% (n=5), and Metropathia 5.71% (n=4) were the clinical manifestations of menstrual patterns. Of of the 16 women with thyroid dysfunction overall, 41 (58.6%) had normal thyroid function, 28 (40%) had hypothyroidism, and 1 (1.4%) had hyperthyroid function. TSH levels were 2 mIU/L IQR on average (1.0-4.0).

T3 and T4 levels were 2.83±1.13 pg/ml and 1.38±1.1 ng/dl on average, respectively. Table 1 shows how each woman in the reproductive age group is distributed by age. Table 2 illustrates the pattern of menstrual disruption. Table 3 shows the status of thyroid dysfunction. Tables 4 and 5 indicate the relationship between age and menstrual cycle and thyroid condition. The levels of thyroid hormones are shown in Table 6 together with the menstrual cycle.

Table 1: Age-wise distribution of all the women (n=70)

Age in years	No. of cases	Percentage
15-25	34	48.57%
26-35	23	32.85%
36-45	13	18.57%

Table 2: Menstrual irregularities among reproductive age group (n=70)

Menstrual irregularities	No. of cases	Percentage
Irregular menstruation	47	67.14%
Oligomenorrhea	3	4.28%
Menorrhagia	11	15.71%
Polymenorrhea	5	7.14%
Metropathia	4	5.71%

Table 3: Status of thyroid dysfunction

Thyroid Dysfunction	No. of cases	Percentage
Normal	41	58.6%
Hypothyroidism	28	40.0%
Hyperthyroidism	1	1.4%

Table 4: Thyroid status with age group

Age(years)	Normal N (%)	Hypothyroidism N (%)	Hyperthyroidism N (%)	Total N (%)
15-25	15 (36.58%)	5 (17.85%)	0 (0)	20 (28.57%)
26-35	12 (29.26%)	9 (32.14%)	1 (50%)	22 (31.42%)
36-45	14 (34.16%)	14 (50.0%)	0 (0)	28 (40.0%)
Total	41 (100)	28 (100)	1 (100%)	70 (100%)

Table 5: Association of thyroid status with menstrual pattern

Menstrual irregularities	Normal N (%)	Hypothyroidism N (%)	Hyperthyroidism N (%)	Total
Oligomenorrhea	1 (2.43%)	2 (7.14%)	1 (50)	4 (5.17%)
Irregular menstruation	27(65.85%)	20 (71.4)	0 (0)	47(67.14%)
Menorrhagia	8 (19.51%)	3 (10.71%)	0 (0)	11 (15.7%)
Polymenorrhagia	3 (7.31%)	2 (7.14%)	0 (0)	5 (7.1%)
Metropathia	2 (4.87%)	1 (3.57%)	0 (0)	3 (4.28%)
Total	41 (100)	28 (100)	1 (100)	70 (100%)

Table 6: Thyroid hormones level based on menstrual irregularities

Thyroid hormones	Total N=70	Irregular menstruation N=93	Oligomenorrhea N=6	Menorrhagia N=22	Polymenorrhagia N=10	Metropathia N=9	P-value
fT3 (pg/ml)	2.83±1.13	2.83±1.13	2.79±0.73	2.29±0.92	3.03±1.36	3.21±1.51	0.031
fT4 (ng/dl))	1.38±1.1	1.38±1.1	1.39±0.52	1.21±0.41	1.31± 2.77	1.61±0.70	0.056
TSH (mIU/L)	2.0 (1-4).	2.0 (1-4).	2 (1-3)	5 (2.5-6)	2 (1-4)	2 (1-4)	0.011

Discussion

In the current study, we discovered that among women of reproductive age who experienced irregular menstruation, menorrhagia was the most common significant complaint. The most common thyroid disorder in women of reproductive age who experience irregular menstruation is hypothyroidism. The majority of the patients were in the 15–25 age range. Up to 28% of women in the reproductive age group had irregular menstrual cycles, according to a study [9]. On 100 women with menstruation dysfunction, Pahwa *et al*. conducted a similar study and discovered menorrhagia (50%) followed by polymenorrhea, metropathia, and oligomenorrhea [10]. Another study from Iraq found that 23.8% of adolescent girls had irregular periods [11]. Menorrhagia (15.7%) was the most common clinical manifestation of menstruation disturbance in the current study, followed by polymenorrhea, oligomenorrhea, and metropathia. Menstrual cycle, menarche, postpartum period, pubertal growth, postmenopausal years, and fertility may all be impacted by thyroid disease.

In the current study, women of reproductive age who have irregular periods have a 22.85% incidence of hypothyroidism. The most common symptom among women with thyroid issues in the reproductive age range was menorrhagia. A study by Abalovich *et al*. reported findings that were comparable [12]. When Kaur *et al* [13]. studied 100 patients, they discovered that 14 of them had hypothyroidism. According to Sharma *et al* [14]. patients with irregular menstrual bleeding had an incidence of hypothyroidism and hyperthyroidism of 22% and 14%, respectively.

According to Korevaar *et al*., 22% and 76% of cases, respectively, had hypothyroidism and euthyroidism [15]. 8.4% of women with irregular uterine haemorrhage also had hypothyroidism. Similarly, Al-Naffii *et al* [16]. discovered that among women in the reproductive age range, hypothyroidism and hyperthyroidism occurred at rates of 17.6% and 4.7%, respectively.

According to Maraka *et al* [17] menorrhagia affected 55.3% of women who had irregular menstrual flow. Another study conducted by Ajamani *et al* [18] discovered that among women with disrupted uterine haemorrhage, menorrhagia was 50% prevalent. In contrast to the 1% hyperthyroidism found in the present study, Verrma *et al* [19] observed 4% hyperthyroidism. According to the study's findings, few women under the age of <20 and most women >35 have hypothyroidism. Hyperthyroidism cases were in the age group 26 to 45 years. There is strong association between thyroid disorders and women's age group ($p<0.001$).

76.6% and 23.4%, respectively, of 171 hypothyroid patients in a different study reported having regular and irregular menstrual periods. About 66.4% of the women in the current study had irregular periods. Menorrhagia, polymenorrhea, and oligomenorrhea were the three most common menstrual irregularities. Their research also acknowledged that menstruation irregularities are less usually linked to hypothyroidism. Moreover, compared to individuals who have a milder form of the disease, women with severe hypothyroidism are more prone to menstruation abnormalities [20].

In the current study, menstrual abnormalities and thyroid dysfunction were both seen in 22.85% of the women. According to reports, women with menorrhagia as a monthly irregularity had lower T3 and higher TSH levels. Hypothyroidism was more common in women with thyroid dysfunction than hyperthyroidism. According to earlier research on menstrual irregularities, women's rates of thyroid dysfunction varied depending on the demographic [21,22].

In the current study, we found that women with thyroid issues substantially more frequently experienced all sorts of menstrual irregularities. The hormonal disorders including hypothyroidism and hyperthyroidism have a significant impact on irregular menstrual cycles [23]. Hypothyroidism can lead to irregular menstrual cycles.

Thyroid hormones have an impact on the reproductive system's regular operation both directly by impacting the ovaries and ultimately through interactions with sex hormone bonding proteins. By addressing menstrual abnormalities, thyroid insufficiency can be addressed to increase fertility [24]. Contrary to popular belief, hyperthyroidism rarely interferes with ovulation, menstruation, or pregnancy unless it is severe enough to cause amenorrhea [25].

Conclusion

Menstrual problems and thyroid abnormalities are closely associated. Menorrhagia is the most typical and significant symptom of hypothyroidism,

followed by oligomenorrhea and polymenorrhea. According to a recent study, hypothyroidism is the most common thyroid malfunction among women of reproductive age who experience irregular menstruation. Therefore, it would be cost-effective to perform a thyroid examination on all patients who appear with menstrual irregularities in order to prevent needless surgeries or expensive therapies.

References

1. Valdes S, Maldonado-Araque C, Lago-Sampedro A, Lillo JA, Garcia- Fuentes E, Perez-Valero V, *et al*. Population-based national prevalence of thyroid dysfunction in Spain and associated factors: Diabetes study. Thyroid. 2017 Feb;27(2):156–66.
2. Van den Boogaard E, Vissenberg R, Land JA, van Wely M, Ven der Post JA, Goddijn M, *et al*. Significance of (sub)clinical thyroid dysfunction and thyroid autoimmunity before conception and in early pregnancy: a systematic review. Hum Reprod Update. 2016 Jun;22(4):532–3.
3. Velkeniers B, Van Meerhaeghe A, Poppe K, Unuane D, Tournaye H, Haentjens P. Levothyroxine treatment and pregnancy outcome in women with subclinical hypothyroidism undergoing assisted reproduction technologies: systematic review and meta-analysis of RCTs. Hum Reprod Update. 2013 May–Jun;19(3):251–8.
4. Abdel Rahman AH, Aly Abbassy H, Abbassy AA. Improved in vitro fertilization outcomes after treatment of subclinical hypothyroidism in infertile women. Endocr Pract. 2010 Sep–Oct;16(5):792–7.
5. Aghajanova L, Lindeberg M, Carlsson IB, Stavreus-Evers A, Zhang P, Scott JE, *et al*. Receptors for thyroid-stimulating hormone and thyroid hormones in human ovarian tissue. Reprod Biomed Online. 2009 Mar;18(3):337–47.
6. Poppe K, Velkeniers B, Glinoer D. The role of thyroid autoimmunity in fertility and pregnancy. Nat Clin Pract Endocrinol Metab. 2008 Jul;4(7):394–405.
7. Feldthusen AD, Pedersen PL, Larsen J, Toft Kristensen T, Ellervik C, Kvetny J. Impaired fertility associated with subclinical hypothyroidism and thyroid autoimmunity: the Danish general suburban population study. J Pregnancy. 2015; 2015:132718. Erratum in: J Pregnancy. 2017; 2017:9864034.
8. Mendis-Handagama SM, Ariyaratne HB. Effects of thyroid hormones on Leydig cells in the postnatal testis. Histol Histopathol. 2004 Jul;19(3):985–97.
9. Osuka S, Iwase A, Goto M, Takikawa S, Nakamura T, Murase T, *et al*. Thyroid autoantibodies do not impair the ovarian reserve in euthyroid infertile women: a cross-sectional study. Horm Metab Res. 2018 Jul;50(7):537–42.
10. Pahwa Sangeeta, Gupta Shailja, Kaur Jasmine. Thyroid dysfunction in dysfunctional uterine bleeding. Journal of Advance Researches in Biological Sciences 2013;5(1):78-83.
11. Hassan, F. F. (2017). The Frequency of Histopathological Patterns in Endometriam Obtained from a Sample of Iraqi Women with Abnormal Uterine Bleeding. Karbala Journal of Medicine, 10(3).
12. Abalovich M, Mitelberg L, Allami C, Gutierrez S, Alcaraz G, Otero P, *et al*. Subclinical hypothyroidism and thyroid autoimmunity in women with infertility. Gynecol Endocrinol. 2007 May; 23(5):279–83.
13. Kaur, T., Aseeja, V., & Sharma, S. (2011). Thyroid dysfunction in dysfunctional uterine bleeding

14. Sharma, N., & Sharma, A. (2012). Thyroid profile in menstrual disorders. JK science, 14(1), 14.
15. Korevaar TIM, Mínguez-Alarcón L, Messerlian C, de Poortere RA, Williams PL, Broeren MA, *et al*. Association of thyroid function and autoimmunity with ovarian reserve in women seeking infertility care. Thyroid. 2018 Oct;28(10):1349–58
16. O Al-Naffii, K., AA Nasseralah, H., A Al-Hillali, K., & FM Ali, A. (2008). Hypothyroidism in Adults Early Clinical Presentation in Relation to Age. Kerbala Journal of Medicine, 2(3), 352-356
17. Ajmani, N. S., Sarbhai, V., Yadav, N., Paul, M., Ahmad, A., & Ajmani, A. K. (2016). Role of thyroid dysfunction in patients with menstrual irregularities in tertiary care center of walled city of Delhi. The Journal of Obstetrics and Gynecology of India, 66(2), 115-119.
18. Maraka S, Mwangi R, McCoy RG, Yao X, Sangaralingham LR, Singh Ospina NM *et al*. Thyroid hormone treatment among pregnant women with subclinical hypothyroidism: US national assessment. BMJ 2017; 356:68-65.
19. Verma, S. K., Pal, A., & Jaswal, S. (2017). A study of thyroid dysfunction in dysfunctional uterine bleeding. Int J Reprod Contracept Obstet Gynecol, 6(5), 2035-39.
20. Andrisani A, Sabbadin C, Marin L, Ragazzi E, Dessole F, Armanini D, *et al*. The influence of thyroid autoimmunity on embryo quality in women undergoing assisted reproductive technology. Gynecol Endocrinol. 2018 Sep;34(9):752–5.
21. Reinblatt S, Herrero B, Correa JA, Shalom-Paz E, Ata B, Wiser A, *et al*. Thyroid stimulating hormone levels rise after assisted reproductive technology. J Assist Reprod Genet. 2013 Oct;30(10):1347–52.
22. Prevalence of thyroid dysfunction among young females in a South Indian population Kumaravel Velayutham, Sivan Arul Selvan S and A.G. Unnikrishnan1 Indian J Endocrinol Metab 2015;19(6):781-784.
23. Manish Chandey, Ranjeet Kaur, Gurinder Mohan, Rahul Mannan. Prevalence of hypothyroidism in adults by screening TSH: a study from North India. International Journal of Advances in Medicine 2016;3(1):44-46.
24. Alexander EK, Pearce EN, Brent GA, Brown RS, Chen H, Dosiou C *et al*. Guidelines of the American Thyroid Association for the diagnosis and management of thyroid disease during pregnancy and the postpartum. Thyroid 2017;27(3):315-389.
25. Weghofer A, Himaya E, Kushnir VA, Barad DH, Gleicher N. The impact of thyroid function and thyroid autoimmunity on embryo quality in women with low functional ovarian reserve: a case-control study. Reprod Biol Endocrinol. 2015 May;13;43