MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218\makrjms.2023.28.31

Thyroid Dysfunction In Women with Menstrual Disorders in the Reproductive Age Group: An Observational Study

[1]Vishakha Singh, [2]Neelam Patel, [3]Tanya Mahindra and [4]Abhishek Sing

[1]Department of Obstetric and Gynaecology People's College of Medical Science and Research Centre, Bhopal, Madhya Pradesh 462042, India
[2]Department of Obstetrics and Gynaecology, RKDF Medical College and Research Center Bhopal, Madhya Pradesh 462042, India
[3]Department of Obstetrics and Gynaecology, Sanjay Gandhi Hospital and Shyam Shah Medical College, Rewa, Madhya Pradesh 462042, India
[4]Department of Medicine, LN Medical College and JK Hospital Bhopal, Madhya Pradesh 462042, India

ABSTRACT

Thyroid disorders represent a prevalent category of endocrine disorders on a global scale. Thyroid dysfunction has the potential to interfere with numerous metabolic and physiological processes, including the menstrual cycle. The objective of this investigation was to identify a correlation between thyroid dysfunction and menstrual irregularities among female individuals. The present investigation is a cross-sectional study comprising a sample of 200 female participants. Women who experience menstrual disorders during their reproductive years. The study examined thyroid dysfunction in females who presented with menstrual irregularities. The evaluation of thyroid function was conducted by measuring the levels of serum free triiodothyronine (T3), free thyroxine (T4) and thyroid stimulating hormone (TSH). The study participants had a mean age of 25.7±6.8 years. The prevalent menstrual disorder among the participants was irregular menstrual cycle, accounting for 72.5% of the cases, followed by amenorrhea at 21.9% and menorrhagia at 5.6%. The age distribution of the patients revealed that the largest proportion (51.1%) fell within the age range of 15 to 24 years, followed by those aged 25-34 years (36.1%) and those aged 35 to 45 years (12.9%). The average levels of free T3 and T4 were 2.91±1.05 pg mL^{-1} and 1.42±0.57 ng dL^{-1}, respectively. The mean TSH level was 2.0 mIU L^{-1} with an interquartile range of 1.0-4.0. A prevalence of 25.8% (n = 60) was noted among the female population with regards to thyroid dysfunction. The prevalent thyroid dysfunctions in the study population were subclinical hypothyroidism (14.2%, n = 33), subclinical hyperthyroidism (6.9%, n = 16), overt hyperthyroidism (3%, n = 7) and overt hypothyroidism (1.7%, n = 4). The findings of the research indicate that there is a high prevalence of thyroid dysfunction, specifically subclinical hypothyroidism, among women who experience menstrual disorders. Conducting thyroid function screening on patients with menstrual disorders could be beneficial in eliminating thyroid disorders as possible causative factors for menstrual disturbances.

OPEN ACCESS

Key Words
Menstrual disorder, thyroid dysfunction, reproductive age

Corresponding Author
Abhishek Singh
Department of Medicine, LN Medical College and JK Hospital Bhopal, Madhya Pradesh 462042, India

Received: 12 March 2023
Accepted: 25 March 2023
Published: 2 April 2023

Citation: Vishakha Singh, Neelam Patel, Tanya Mahindra and Abhishek Sing, 2023. Thyroid Dysfunction In Women with Menstrual Disorders in the Reproductive Age Group: An Observational Study. Res. J. Med. Sci., 17: 28-31, doi: 10.59218\ makrjms.2023.28.31

INTRODUCTION

Menstrual disorders are a commonly observed issue among women who are of reproductive age and constitute a considerable proportion of visits to gynaecology outpatient departments, thereby signifying a significant burden. The aforementioned factors lead to significant social stigma, reduced productivity and quality of life, financial burden and medical procedures such as hysterectomy[1]. The influence of thyroid hormones on the normal functioning of reproductive physiology is significant as they have a direct impact on the ovaries and also interact indirectly with sex hormone-binding globulin[2]. The prevalence of thyroid disorders is greater in the female population as compared to their male counterparts. Additionally, these disorders have been associated with abnormal sexual development, menstrual irregularities, infertility and early onset of menopause. Thyroid disorders are a prevalent endocrine pathology in India[3]. As per scholarly investigations, the incidence of thyroid ailments exhibits an upward trend with the progression of age, wherein nearly 26% of women in the premenopausal and menopausal phases encounter some form of thyroid dysfunction[4]. Menstrual irregularities precede the clinical manifestation of hypothyroidism or hyperthyroidism[5]. Hypothyroidism has been linked to diverse reproductive disorders, including anomalous sexual development, irregular menstruation and infertility[6]. Occult menorrhagia, which is marked by slight changes in the duration and volume of menstrual blood, has been linked to subclinical hypothyroidism Sharma and Sharma[7] that occurs before the manifestation of symptoms. According to research, the incidence of subclinical hypothyroidism in women can reach up to 9.5%[8]. It has been observed that the occurrence of hyperthyroidism before puberty leads to a postponement in the initiation of menstruation. In females of reproductive age, hyperthyroidism is frequently linked to the presence of oligomenorrhea and amenorrhea as the most commonly observed abnormalities[9]. Moreover, a correlation can be observed between various forms of thyroid dysfunction and thyroid autoimmunity[10]. The prompt identification and treatment of thyroid disorders in individuals who display menstrual irregularities can avert the necessity for surgical interventions, such as curettage, hysteroscopy, hysterectomy and similar procedures[11]. The current investigation aimed to assess the prevalence of thyroid dysfunctions and their association with menstrual irregularities in women of reproductive age.

MATERIALS AND METHODS

The present cross-sectional investigation was conducted at the Department of Obstetrics and Gynaecology and solely those individuals who satisfied the inclusion criteria were incorporated in the study. The investigation spanned a duration of 18 months, commencing on April 1st, 2021 and concluding on September 30th, 2022. Upon receiving approval from the institutional ethical committee. All individuals who satisfied the predetermined criteria for inclusion were duly registered for participation in the study. The procedure of acquiring informed written consent was carried out. A standardized template was employed to collect initial data. The patients received a thorough clinical assessment and biochemical analysis in adherence to the established protocol. The study's inclusion criteria pertain to women within the reproductive age range who are currently encountering menstrual irregularities. The research methodology employed in this study is cross-sectional in nature. A female patient who is presenting with anomalous uterine bleeding is currently undergoing a thyroid profile examination. The study's exclusion criteria encompassed patients who employed contraceptive methods such as intrauterine contraceptive devices (IUCDs), oral contraceptive pills (OCPs), injectable depot medroxyprogesterone acetate (DMPA), or those with bleeding disorders. A comprehensive assessment of the patient was performed, encompassing a detailed medical history, clinical examination and laboratory investigations. A thorough examination was conducted on all individuals who satisfied the criteria for inclusion. A thorough assessment was carried out, which included an evaluation of the individual's menstrual, obstetric, medical, personal and surgical history, as well as a detailed clinical examination. A pre-existing proforma that was pre-designed and pre-structured was employed to facilitate the collection of data. The investigator obtained data from two sources: Historical records and biochemical blood analyses. The data from both sources were transcribed directly from the reports to the proforma. The utilisation of descriptive statistics was implemented to demonstrate the characteristics and qualities of the information. The chi-square test, a statistical method, was utilised to establish a correlation between variables. A significance level of 0.05 or lower will be considered statistically significant.

RESULTS

The sample population exhibited a mean age of 25.7±6.8 years. The research subjects demonstrated a notable frequency of menstrual irregularities, with irregular menstrual cycles being the most common (72.5%, n = 145), followed by amenorrhea (21.9%, n = 44) and menorrhagia (5.6%, n = 11). The majority of the patient cohort consisted of individuals between the ages of 15 and 24 years, comprising

Table 1: Thyroid hormones level according to menstrual disorders

Hormones	Irregular cycle (n = 145)	Amenorrhea (n = 44)	Menorrhagia (n=11)	Total (n = 200)	p-value
Free T3 (pg mL^{-1})	2.88±0.89	3.16±1.45	2.31±0.86	2.91±1.05	0.026
Free T4 (ng dL^{-1})	1.41±0.54	1.55±0.67	1.15±0.38	1.42±0.57	0.062
TSH (mL U L^{-1})	2.0 (1.0-3.0)	2.0 (1.0-4.0)	5.0 (2.5-6.0)	2.0 (1.0-4.0)	0.012

Table 2: Thyroid function status according to menstrual disorders and

	Irregular cycle (n = 145)		Amenorrhea (n = 44)		Menorrhagia (n = 11)		Total (n = 2000)		
Thyroid status	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage	p-value
Euthyroid	109	54.5	33	16.3	7	3.20	149	74.2	0.557
Subclinical hypothyroidism	17	8.60	8	3.90	3	1.40	28	14.2	0.122
Overt hypothyroidism	3	1.30	-		1	0.48	3	1.7	0.162
Subclinical hyperthyroidism	13	6.40	1	0.46	-		14	6.9	0.139
Overt hyperthyroidism	3	1.70	2	1	-		6	3	0.352

Table 3: Thyroid function status according to age range

	15-24 years (n = 102)		25-34 years (n = 72)		35-45 years (n = 26)		Total (n = 200)		
Thyroid status	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage	p-value
Euthyroid	79	39.5	52	26	17	8.6	149	74.2	0.449
Subclinical hypothyroidism	9	4.2	13	6.6	5	2.6	28	14.2	0.088
Overt hypothyroidism	1	0.48	1	0.48	2	0.86	3	1.7	0.081
Subclinical hyperthyroidism	9	4.3	4	1.7	2	0.86	14	6.9	0.6
Overt hyperthyroidism	4	2.1	2	0.86	-		6	3	0.443

51.1% of the sample size (n = 102). The age groups of 25-34 years (36.1%, n = 72) and 35-45 years (12.9%, n = 26) constituted the subsequent largest proportions of the population. The study reported average levels of unbound T3 and T4 hormones to be 2.91±1.05 pg mL^{-1} and 1.42 ± 0.57 ng dL^{-1}, respectively. The average TSH value was 2.0 mIU L^{-1}, with a corresponding range of 1.0-4.0. Table 1 displays the thyroid hormone levels associated with various forms of menstrual disorders. The study revealed a statistically significant difference in the levels of free T3 (p = 0.026) and TSH (p = 0.012) across different menstrual disorders.

The findings of the study indicate that a proportion of 25.8% (n = 52) of the participants displayed thyroid dysfunction, whereas the remaining 74.2% (n = 149) of the euthyroid patients did not exhibit any such dysfunction. The prevalent thyroid disorders that were observed include subclinical hypothyroidism (n = 28, 14.2%), subclinical hyperthyroidism (n = 14, 6.9%), overt hyperthyroidism (n = 6, 3%) and overt hypothyroidism (n = 3, 1.7%). Table 2 illustrates the manifestation of thyroid dysfunction in relation to the type of menstrual disorder and age group. There was no discernible difference in thyroid dysfunction across the various age subcategories and menstrual disorders (Table 3).

DISCUSSIONS

The current study has demonstrated that women who visited the thyroid laboratory most frequently had irregular menstrual cycles and a considerable number of patients were aged between 15 and 24 years. The findings of the study indicate that a considerable percentage of individuals who reported abnormal uterine bleeding fell within the age bracket of 35-45 years, accounting for 54% of the sample population. The age group of 25-34 years was the second most affected, with a prevalence rate of 28%[7]. Pahwa *et al*.[11] conducted a study on 200 patients with abnormal uterine bleeding. The results indicated that menorrhagia was the most prevalent menstrual complaint, accounting for 50% of the cases. Polymenorrhoea was the second most common complaint, accounting for 19% of the cases, followed by menometrorrhagia (18%), metropathiahaemorrhagica (7%) and irregular bleeding with an unknown pattern (6%). The findings of a study conducted on adolescent girls indicate that menstrual disorders were the second most commonly reported gynaecological issue, comprising 23.80% of cases[12]. The cohort under investigation consisted of a proportion of 25.8% female individuals who exhibited symptoms of menstrual disorders. Individuals diagnosed with menorrhagia demonstrated higher levels of thyroid-stimulating hormone (TSH) and lower levels of free triiodothyronine (T3) in contrast to those with other types of menstrual disorders. The current investigation has noted a decrease in the number of females experiencing menorrhagia, which may have plausibly impacted the heightened TSH levels and diminished free T3 levels that were observed in this ailment as compared to other menstrual disorders. The research findings indicate that the incidence of subclinical hypothyroidism surpasses that of other forms of thyroid dysfunction, such as subclinical hyperthyroidism, overt hyperthyroidism and overt hypothyroidism. Previous studies have documented the presence of thyroid dysfunction in various groups of women who suffer from menstrual disorders[7,11]. Sharma and Sharma[7] conducted a study wherein they observed that a proportion of 22 and 14% of patients demonstrated hypothyroidism and hyperthyroidism, respectively, among a cohort of individuals who

presented with abnormal uterine bleeding. A study was conducted by Pahwa *et al*.[11] which involved a sample of 100 patients who presented with abnormal uterine bleeding. The findings of the study revealed that a total of 22 patients were diagnosed with hypothyroidism, while 2 patients were diagnosed with hyperthyroidism. The remaining patients demonstrated euthyroidism, as reported in reference[11]. Previous research has documented the identification of thyroid dysfunction in a significant percentage of the study cohort among persons[13,10]. The existing literature has established a correlation between thyroid dysfunction and menstrual irregularities. Empirical data indicates that the occurrence of menstrual irregularities may exhibit an increase or decrease in the context of thyroid dysfunction[14]. The impact of thyroid hormones on the menstrual cycle has been documented, resulting in menstrual irregularities that can be ascribed to hyperthyroidism or hypothyroidism[15]. The ovaries are directly affected by thyroid hormones, which also exert an indirect influence on sex hormone binding proteins. Consequently, this phenomenon significantly affects the typical operations of the ovaries with regards to procreative mechanisms. Research has indicated that thyroid dysfunction can lead to reversible consequences, including menstrual irregularities and infertility. Poppe *et al*.[16] has indicated that the management of thyroid dysfunction has demonstrated efficacy in ameliorating menstrual irregularities and augmenting fertility.

CONCLUSION

The findings of the investigation indicate that there is a correlation between menstrual irregularities in women and thyroid dysfunction, particularly subclinical hypothyroidism. The implementation of thyroid dysfunction screening has the potential to assist in ruling out thyroid disease as a possible cause for menstrual irregularities. The study presents a number of constraints. The small size of the sample implies that a more extensive population may be required to authenticate the results. The cross-sectional study's results did not establish a causal relationship between thyroid dysfunction and menstrual disorders. The investigation did not examine the potential impact of thyroid autoimmunity and imbalances in iodine levels, whether excessive or deficient, on the emergence of thyroid disorders in the studied cohort.

REFERENCES

1. Gandi, S.R., P. Vishwekar, R.S. Yadav and N. Chauhan, 2019. Study of thyroid dysfunction in women with menstrual disorders: A prospective study. Int. J. Gynaecol., 9: 89-93.
2. Poppe, K., 2003. Thyroid autoimmunity and hypothyroidism before and during pregnancy. Hum. Reprod. Update, 9: 149-161.
3. Kochupillai, N., 2000. Clinical endocrinology in India. Curr. Sci., 79: 1061-1067.
4. Hollowell, J.G., N.W. Staehling, W.D. Flanders, W.H. Hannon, E.W. Gunter, C.A. Spencer and L.E. Braverman, 2002. Serum TSH, T_4 and thyroid antibodies in the united states population (1988 to 1994): National health and nutrition examination survey (NHANES III). The J. Clin. Endocrinol. Metab., 87: 489-499.
5. Gowri, M., B. Radhika, H. V and R. Ramaiaha, 2014. Role of thyroid function tests in women with abnormal uterine bleeding. Int. J. Reprod., Contraception, Obstet. Gynecol., 3: 54-57.
6. Ajmani, N.S., V. Sarbhai, N. Yadav, M. Paul, A. Ahmad and A.K. Ajmani, 2015. Role of thyroid dysfunction in patients with menstrual disorders in tertiary care center of walled city of Delhi. The J. Obstet. Gynecol. India, 66: 115-119.
7. Sharma, N. and A. Sharma, 2012. Thyroid profile In menstrual disorders. JK Sc., 14: 14-17.
8. Abraham, R., V.S. Murugan, P. Pukazhvanthen and S.K. Sen, 2009. Thyroid disorders in women of puducherry. Indian J. Clin. Biochem., 24: 52-59.
9. Thomas, R. and R.L. Reid, 1987. Thyroid disease and reproductive dysfunction: A review. Obstet. Gynecol., 70: 789-798.
10. Kakuno, Y., N. Amino, M. Kanoh, M. Kawai and M. Fujiwara *et al*., 2010. Menstrual disturbances in various thyroid diseases. Endocr. J., 57: 1017-1022.
11. Pahwa S, S. Gupta and J. Kumar, 2013. Thyroid dysfunction in dysfunctional uterine bleeding. J. Adv. Res. Biol. Sci., 5: 78-83.
12. Karki, C., N.S. Shrestha and R.T. Rayamajhi, 2014. Gynecological disorders of adolescent girls at Kathmandu medical college teaching hospital. Nepal J. Obstet. Gynaecol., 3: 44-47.
13. Khatiwada, S., R. KC, S.K. Sah, S.A. Khan, R.K. Chaudhari, N. Baral and M. Lamsal, 2015. Thyroid dysfunction and associated risk factors among Nepalese diabetes mellitus patients. Int. J. Endocrinol., Vol. 2015. 10.1155/2015/570198.
14. Khatiwada, S., R. KC, S. Gautam, M. Lamsal and N. Baral, 2015. Thyroid dysfunction and dyslipidemia in chronic kidney disease patients. BMC Endocr. Disord., Vol. 15. 10.1186/s12902-015-0063-9.
15. Koutras, D.A., 1997. Disturbances of menstruation in thyroid disease. Ann. New York Acad. Sci., 816: 280-284.
16. Poppe, K., B. Velkeniers and D. Glinoer, 2007. Thyroid disease and female reproduction. Clin. Endocrinol., 66: 309-321.