

<https://doi.org/10.33472/AFJBS.6.4.2024.883-889>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

PREVALENCE OF HYPOTHYROIDISM AMONG REPRODUCTIVE AGE GROUP WOMEN IN URBAN FIELD PRACTICE AREA OF A TERTIARY CARE HOSPITAL IN TAMIL NADU, INDIA - A CROSS-SECTIONAL DESCRIPTIVE STUDY

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Article History

Received: 16 March 2024

Accepted: 19 April 2024

Published: 25 May 2024

ABSTRACT

Background- Women of reproductive age frequently struggle with menstrual issues. Patients with these diseases and their families may experience severe anxiety. One of the common causes of irregular menstruation is thyroid disease. The study aimed to identify the prevalence of hypothyroidism in women of reproductive age, describe the condition's numerous clinical manifestations, and evaluate the menstrual cycle of those who had the condition.

Methodology: This was a cross-sectional study conducted between May 2022 to April 2023 in the urban field practice area of Kancheepuram district, Tamilnadu. A total of 250 women of reproductive age group were selected using simple random sampling. The study variables were age, education occupation, socio-economic class, various symptoms of hypothyroidism, and pattern of menstruation were all collected. The data were collected using an interviewer-administered pre-structured questionnaire and analyzed descriptively by using SPSS software.

Results: The prevalence of hypothyroidism was estimated to be 15%. The most common menstrual abnormality was menorrhagia. The majority of the hypothyroidism had lethargy, constipation, and weight gain as their symptoms of concern. Nearly half 18(48.6%) of them had menorrhagia, followed by 14(37.8%) with oligomenorrhoea, 3(8.1%) with polymenorrhoea, and a minimum of 2(5.4%) with menometrorrhagia.

Conclusion: The findings advocate for routine thyroid screening in women with menstrual disorders to ensure timely diagnosis and treatment thereby improving their quality of life and reproductive health outcomes.

INTRODUCTION

Menstrual dysfunction is an abnormal menstrual cycle marked by variations in cycle length, flow duration, or both. 10% of complaints connected to gynecology are due to menstruation dysfunction.^[1] Numerous menstruation irregularities are a sign of thyroid disease. Numerous changes in reproductive function, including a delayed start to puberty, anovulatory cycles, and abnormally high fetal wastage, are linked to both hypothyroidism and hyperthyroidism.^[2]

Women in the reproductive age range frequently struggle with menstrual issues. Patients with these diseases and their families may experience severe anxiety. Thyroid issues are among the most prevalent endocrine conditions in India.^[3] The prevalence of thyroid diseases rises with age and affects about 26% of premenopausal and menopausal women.^[4] In older age groups, women are more likely than males to suffer from thyroid diseases. One of the most frequent illnesses seen in endocrinology office practice is hypothyroidism. Women are 10 times as likely as males to experience thyroid issues.^[5]

Amenorrhea related to hypothyroidism may be exacerbated by increased prolactin levels, which may be caused by increased TRH levels.^[6] This can be due to autoimmune diseases too. Thyroid autoimmune disease is the most common cause of thyroid dysfunction in women of reproductive age.^[7] A rise in thyroid-releasing hormone (TRH) levels brought on by hypothyroidism stimulates the release of thyroid-stimulating hormone (TSH) and prolactin (PRL), which in turn suppresses the synthesis and production of gonadotropins. According to several surveys, the prevalence of overt hypothyroidism ranges from 0.1% to 2%.^[8]

Increased menstrual flow is the most frequent reproductive system symptom of hypothyroidism, according to clinical observations. Although monthly irregularities in hypothyroid women have been well documented, it is unclear how many hypothyroid patients initially needed treatment for menorrhagia. Additionally, the majority of individuals have subclinical hypothyroidism, which can easily go unnoticed. This condition is now known to increase the risk of monthly irregularities, cardiovascular disorders, and improper brain development in fetuses.^[9] Hypothyroidism is frequent enough to justify attention in women with menstrual disorders.^[10]

As it is throughout the world, hypothyroidism is thought to be a widespread medical condition in India. Data on the prevalence of hypothyroidism in India's adult population are present but in south India, this study focuses on current prevalence. This study was aimed to determine the prevalence of hypothyroidism among women of reproductive age group residing in the urban field practice area of Kancheepuram district, Tamilnadu and to assess the menstrual pattern among hypothyroid respondents.

Materials & Methods

This was a cross-sectional descriptive study conducted in an Urban field practice area of Kancheepuram district, Tamilnadu, from May 2022 to April 2023 aimed to determine the prevalence of hypothyroidism among women of reproductive age group residing in the urban field practice area of Kancheepuram district, Tamilnadu and to assess the menstrual pattern among hypothyroid respondents.

Women of reproductive age group 18 - 45 in an urban field practice area of Kancheepuram district, Tamilnadu. A total of 250 Women of reproductive age were selected using a systematic random sampling method with a total population of 2500 women in reproductive age group and sampling interval of 10. The sample size of 249 was calculated using $4pq/d^2$, where prevalence of 18.1 % from a previous study was taken,^[11] with 5% absolute precision and 95% Confidence interval and 80% power and 5% of loss to follow-up. A whole of 250 women were taken into study. Informed consent was obtained from the women prior to the investigation. Institutional ethical committee approval and clearance from the human institutional ethics committee (005/SBMC/IHEC/2022/1471)

Inclusion criteria

All women in reproductive age group between 15-45 years of age attending OPD of obstetrics and gynaecology who gave consent of the study were included in the study.

Exclusion criteria

Pregnancy, history of thyroid cancer or thyroid related surgery, chronic smokers and alcoholics, patient with any pituitary disorders, patient with h/o corticosteroid, lithium carbonate etc and patient who did not give consent for study were excluded from the study

Data was collected on various socio-demographic characteristics such as age, education, occupation, religion, and socio-economic class. Data on Symptoms of hypothyroidism, and pattern of abnormal uterine bleeding was collected. All the selected participants were asked to be on overnight fasting the previous day by the healthcare staff and early morning fasting blood was collected by a lab technician in the morning.

Operational Definition of Variables used in the study have been listed below [12].

Oligomenorrhea: is when a cycle lasts more than 35 days

Hypomenorrhea: is less severe bleeding that lasts no more than two days.

Menorrhagia: is cyclical, heavy bleeding that occurs at regular intervals and is linked to clots (>60 ml/changes 6 pads each day).

Polymenorrhea: is a cycle of bleeding that is typical in volume yet happens every 21 days.

Amenorrhea: refers to the absence of menstruation

Interview was conducted based on administered semi-structured questionnaire. A house-to-house survey was made in the urban area of Tamilnadu to identify the prevalence of hypothyroidism among women of reproductive age group. Data collection was conducted through structured interviews and clinical examinations. Trained researchers and healthcare professionals administer standardized questionnaires to collect demographic information, medical history, and symptoms suggestive of hypothyroidism. Participants were provided with information about the study objectives, procedures, and confidentiality of data. Informed consent was obtained prior to data collection.

Three milliliters of venous blood were drawn in the morning under aseptic conditions from simple vials following an overnight fast. After allowing the blood to coagulate, it was centrifuged for 15 minutes at room temperature at 3000 rpm. Using a Mini Vidas auto analyzer, the enzyme linked fluorescence assay (ELFA) method was used to measure the levels of T3, T4, and TSH in the supernatant serum. The following were the reference intervals for T3, T4, and TSH in our laboratory: TSH: 0.4 - 4.2 mIU/L; T4: 59 - 135 nmol/L; T3: 1.23 - 3.23 nmol/L. Euthyroid people had normal T3, T4, and TSH levels; hypothyroid people had low T3, T4, and high TSH levels.

Data Analysis

Data analysis was analyzed descriptively using Microsoft Excel, SPSS software version 22, and epi info. Continuous variables were summarized as mean with sd or median with Inter Quartile Range(IQR) based on normality and categorical variables were summarized as frequency with proportion. Prevalence of hypothyroidism was expressed as proportion with 95% Confidence interval.

Results

The results obtained from data analysis are illustrated as graphs and tables. Table 1 shows various determinants of study respondents, it can be observed that the majority of the study population belonged to the age group between 25-31 years with 103 (41.2%). Nearly 73 (29.4%) of the study respondents belonged to clerical or skilled occupations, and 66(26.3%) belonged to semi-skilled occupations. Among the study respondents, a maximum of 77(30.9 %) had completed up to primary education and 20% had completed high and higher secondary levels of education. The majority of the study respondents belonged to the lower middle-class socio-economic group 77 (30.9%). Table 2 illustrates the prevalence of thyroid dysfunctions among the study respondents. It was observed that 37 participants (14.8%) had hypothyroidism, with a 95% confidence interval ranging from 10.8% to 19.6%.

Table 1. Sociodemographic determinants among women of reproductive age group in urban field practice area of Tamil Nadu, India

Characteristics	Category	Frequency (n)	Percentage (%)
Age	18-24	36	14.4
	25-31	103	41.2
	32-39	81	32.4
	>40	30	12.0
Occupation	Professional/Semi-professional	48	19.0
	Clerical/skilled	73	29.4
	Semi-skilled	66	26.3
	Unskilled	30	12.3
	unemployed	32	13.0
Education	Illiterate	13	4.9
	Primary education	77	30.9
	Middle school	61	24.4
	High and higher secondary	50	20.0
	Graduate	23	9.3
	Postgraduate	26	10.5
Socioeconomic class*	Upper class	23	9.0
	Upper middle	26	10.6
	Lower middle	77	30.9

	Upper lower	59	23.7
	Lower class	65	25.7
Religion	Hindu	211	84.5
	Christian	16	6.4
	Muslim	23	9.1

*Modified BG Prasad Scale

Table 2. Thyroid dysfunction among study respondents

Thyroid dysfunction	n(%)	95% CI
Hypothyroidism	37 (14.8)	10.8 to 19.6
Normal	213 (85.2)	80.3 to 89.2

The chart in Figure 1 illustrates the various symptoms of hypothyroidism reported by the respondents. The most prevalent symptom was weight gain, experienced by 23 respondents (62.2%). This was followed by lethargy, reported by 5 respondents (13.1%), and constipation, noted by 4 respondents (10.8%). Other symptoms were also reported but were less common

Sypmtoms of hypothyroidism

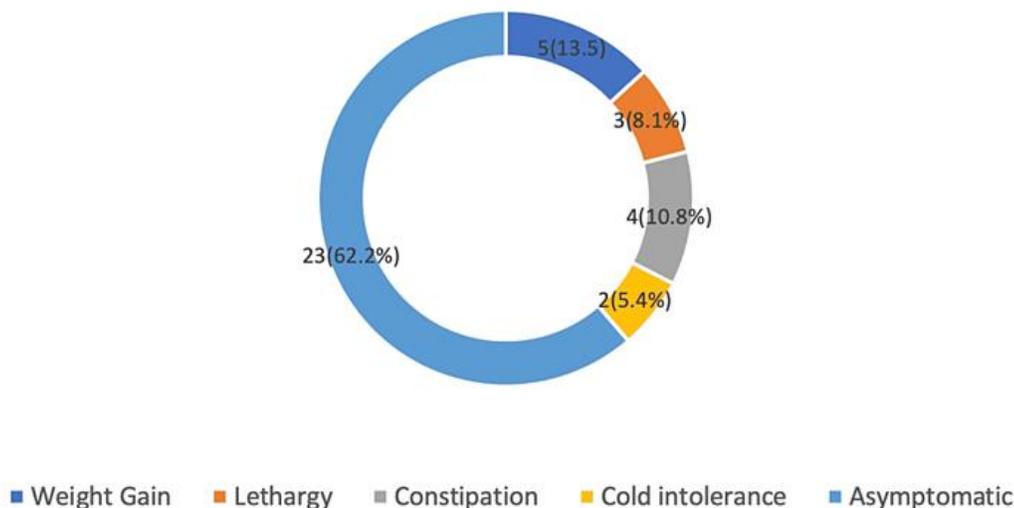


Figure 1: Symptoms of hypothyroidism among those study participants with hypothyroidism (N=37)

Table 3. Patterns of abnormal uterine bleeding among study respondents (n=250)

AUB	Frequency (n)	Percentage (%)
Menorrhagia	113	45.2
Polymenorrhoea	72	28.8
Oligomenorrhoea	35	14.0
Menometorrhagia	20	8.0
Hypomenorrhoea	2	0.8
No symptoms	8	3.2

Table 3 shows the patterns of Abnormal uterine bleeding (AUB) among the study participants. Nearly 113(45.2%) of hem hand menorrhagia, followed by 72(28.8%) having polymenorrhoea, and a minimum of 2(0.8%) had hypomenorrhoea.

Table 4: Distribution of different abnormal uterine bleeding patterns among study participants in relation to their thyroid function

Bleeding pattern	Hypothyroidism	
	Frequency (n)	Percentage (%)
Menorrhagia	18	48.6
Polymenorrhoea	3	8.1
Oligomenorrhoea	14	37.8
Menometorrhagia	2	5.4
Hypomenorrhoea	0	0.0

The distribution of different AUB patterns among hypothyroids is depicted in Table 4. It can be noticed that nearly half 18(48.6%) of them had menorrhagia, followed by 14(37.8%) with oligomenorrhoea, 3(8.1%) with polymenorrhoea, and a minimum of 2(5.4%) with menometorrhagia.

Discussion

In this study, the prevalence of hypothyroidism among women of reproductive age in an urban field practice area of Tamil Nadu was found to be 14.8% with a 95% confidence interval of 10.8% to 19.6%. For instance, a study have shown that hypothyroidism is a common endocrine disorder in India, affecting approximately 8.2% of the adult population, with a higher incidence in women.^[14]

Thyroid diseases have a close correlation with menstrual disruption, a benign yet crippling condition. By measuring free triiodothyronine (T3), free thyroxine (T4), and thyroid stimulating hormone (TSH), this study emphasizes the link between menstrual disorder and thyroid malfunction. The average age of the ladies in this research who had thyroid dysfunction was 26 years old. Based on a cross-sectional study, 148 women with menstruation disorder discovered a mean age of 34.6 years.^[9]

In another study conducted by Vanderpump *et al.* (1995), the mean age for thyroid diseases was 34 years in the 20-year follow-up,^[7] which added that aging accelerates the development of hypothyroidism. The mean age of the 944 women submitted for thyroid testing, according to a study on the clinic-biochemical spectrum of hypothyroidism, was found to be 36.2 years old.^[15] The average age of girls with overt hypothyroidism was also discovered. In the study a correlation between hypothyroid women and menorrhagia (59.2%) was discovered. In a retrospective review conducted, menorrhagia (36%) was the most often reported symptom among 50 individuals with myxoedema, of whom 28 (56%) experienced menstrual irregularities,^[16] which aligns with our study.

The need to check thyroid function in these women with menstruation disorder cannot be overstated. Menstrual irregularities may be the presenting symptom in women who are developing milder hypothyroidism, according to community surveys. In this study, oligomenorrhoea (29.7%) and menorrhagia (27%) were detected in women with hypothyroidism. Comparing this link to other studies reveals that it is substantial. The results of the current study were in agreement with another study on endocrinological abnormalities in hypothyroid women, which found that menorrhagia occurred 16% of the time and oligomenorrhoea occurred 26% of the time.^[17]

The study also discovered a link between thyroid malfunction and the length of menstrual dysfunction. The majority of individuals who had abnormal bleeding that had lasted longer than 4 months also had an elevated likelihood of thyroid abnormalities (85%). A comparable study on the clinic-biochemical spectrum of thyroid disease by Sampath *et al.* revealed this correlation. According to them, 65% of women's menstruation complaints began before the average duration of 6 months. Twenty (51%) of the 37 women in the current study who had hypothyroidism as a diagnosis complained of weight gain, while seven (28%) complained of weariness. Clinical symptoms of hyperthyroidism in 18 patients included weight loss (43%) and anxiety (23%). Statistics show that women with dysfunction reported almost all hypothyroidism-related symptoms more frequently.^[15]

Thyroid dysfunction symptoms were more indicative of the hypothyroid condition. Other research has previously shown this to be true. Weight increase was the most prevalent symptom in instances of hypothyroidism (53.8%), followed by generalized weakness (36%), according to examination of clinical presentations of a hypothyroid cases from 2007 and reduced perspiration, hoarseness of voice, paresthesias, and cold intolerance are the most distinct and distinctive symptoms of hypothyroidism.^[18] However, we discovered that the symptom of weight increase was more prevalent in this study (51%).^[19]

Loss of weight (74%) and anxiety (53%) symptoms were shown to be the two most common Grave's disease symptoms by Stoffer SS *et al.* Heat intolerance and tremors were frequently observed, according to the examination of the clinical presentation of graves disease. But in this study, it was discovered that worry (39%) and weight loss (56%) were both prevalent. In the sample population of the current investigation, thyroid abnormalities and Body Mass index abnormalities had a strong correlation.^[20]

In this investigation, severe thyroid abnormalities were linked to the presence of infertility (2.4%) and history of abortions (5.2%). Though significant, the prevalence does not match the 29% prevalence of thyroid dysfunction reported by Poppe *et*

al. in 2002 in their study on thyroid dysfunction in infertile women, or the 34.3% infertile women and 10.2% in women with pregnancy loss who had thyroid failure in a different study.^[15,21] Because women with infertility and recurrent pregnancy loss made up the sample population in the two prior studies. The sample population for the current study, however, was drawn from a general gynecology clinic, which may have contributed to the lower prevalence.^[22] The investigation on the prevalence of hypothyroidism in women admitted for gynecological problems reported a prevalence of 4.2% among infertile women.^[23]

In the current study, thyroid abnormalities were common in 5.2% of women who experienced pregnancy loss and 2.4% of infertile women. In the current investigation, thyroid dysfunction was found in 30.8% of people overall (selective screening of this population has resulted in a higher yield). This is consistent with other research, which found 36% of women with thyroid problems had menstruation disorder, according to Prentice *et al.*^[24] in their medical management of menorrhagia study. Early hypothyroidism in menorrhagia was found to be prevalent in 22% of patients with thyroid disorders in another study by Wilansky in 1999.^[25]

In their study by Hollowell *et al.* (2002) found an 8.3% prevalence of subclinical hypothyroidism. Thyroxine supplementation in women with subclinical hypothyroidism slows progression, according to enough evidence. Since the sample population for this study was made up of people between the ages of 60 and 97 years. According to surveys of the local population, 8 to 17% of people over 55 may have subclinical hypothyroidism there is strong evidence to back up the claim that treating people with subclinical hypothyroidism whose TSH levels are higher than 5 mIU/L stops the condition from progressing to overt hypothyroidism.^[26] Underestimation of the underlying thyroid condition may be the cause of unsuccessful medical treatment for Dysfunctional Uterine Bleeding .

The menstrual cycle is significantly affected by hypothyroidism, which is found to be highly prevalent in the current study. In order to rule out thyroid disease as a potential etiological factor for menstrual disturbance, it may therefore be advantageous to screen individuals with menstrual disorders for thyroid dysfunction. The prevalence of subclinical hypothyroidism in individuals with menstrual disorders highlights the importance of detecting hypothyroidism at this stage in order to start therapy and slow down the progression to overt disease as part of managing menstrual disorders. Thyroid conditions and irregular uterine bleeding have a strong correlation. It highlights the higher rate of hypothyroidism among women who experience menorrhagia.

Limitations

The study might suffer from sampling bias as it only focuses on women within a specific urban field practice area of Tamil Nadu. This may not be representative of the broader population of women in the region or country, limiting the generalizability of the findings. Higher sample size with representatives of both urban and rural women will add more value, but still this study can be pertaining to urban women in south India.

Conclusions

This cross-sectional descriptive study aimed to determine the prevalence of hypothyroidism among women of reproductive age residing in the urban field practice area of a tertiary care hospital in Tamil Nadu, India. The study revealed that hypothyroidism significantly impacts the menstrual cycle, with 37 (14.8%) of the study respondents diagnosed with hypothyroidism. The findings suggest emphasizing the need for thyroid dysfunction evaluation in the management of menstrual disorders. This highlights the importance of early detection and timely intervention to prevent complications and improve health outcomes for women. So the management of menstrual irregularities should involve thyroid dysfunction evaluation.

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