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AN OBSERVATIONAL STUDY OF CO-MORBIDITIES ASSOCIATED WITH HYPOTHYROIDISM AMONG PATIENTS IN A TERTIARY CARE HOSPITAL, SALEM

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Abstract

Hypothyroidism has a high degree of prevalence in India and is also associated with many comorbidities. The current study was planned to find out the incidence, knowledge, awareness, manifestations, and comorbidities in hypothyroid patients.

A community-based cross-sectional observational study was conducted in Vinayaka mission's Kirupananda Variyar medical college and hospital. This includes a study population of 100 consecutive hypothyroid patients. Detailed information regarding, age, family history, habits, knowledge of hypothyroidism and its manifestations along with comorbid conditions were collected and statistically analysed to determine differences in the gender, symptoms, and comorbidities between the two groups of the study population.

It was observed from the results that the incidence of hypothyroidism was high in females (71%) than males 29%. Most of the hypothyroid patients were found to be in the age of 31-40 years (36%). Hair loss was found to be the most common symptom present in both genders. Obesity was the major comorbidity in women (56.33%) and sleep apnoea (75.86%) in male patients (75.86%) respectively. Family history of hypothyroidism was high in female patients (67.50%) than in male 3(2.50%) patients. Knowledge and awareness about hypothyroidism were more in female than male patients.

High prevalence was observed in female patients and had more awareness about hypothyroidism than male patients It was highly recommended that early screening tests for diabetes, obesity hypertension, asthma, and other hematologic tests will helpful for the early diagnosis and management of comorbidities associated with hypothyroidism.

Key words: Thyroid hormones; Hypothyroidism; Comorbidities.

Introduction

Hypothyroidism is a common endocrine disorder resulting from a deficiency of *thyroid* hormone. It is the inability of the thyroid gland to produce sufficient thyroid hormones. In more populous countries like India, these type of diseases goes unnoticed.[1] Approximately 3.9 percent of the adult population in India was affected by hypothyroidism. The incidence of this disease is higher in middle-aged women than in men.[2]

Numerous lasting or transitory conditions can decrease thyroid hormone production and cause hypothyroidism. About 95% of hypothyroidism cases happen from issues that start in the thyroid organ, called primary hypothyroidism. Secondary and tertiary hypothyroidism is brought about by problems of the pituitary gland and hypothalamus respectively. Just 5% of hypothyroid cases experience the ill effects of secondary and tertiary hypothyroidism.[3]

The two most basic reasons for primary hypothyroidism are (a) Hashimoto's thyroiditis which is an immune system condition and (b) overtreatment of hyperthyroidism (an overactive thyroid). Primary hypothyroidism may happen because of the lack of iodine in the body (endemic goitre). In iodine-loaded networks, the predominance of unconstrained hypothyroidism is between 1 % and 2 %, and it is more normal in older women and multiple times more normal in women than in men. Hypothalamic and pituitary hypothyroidism or central hypothyroidism results from high thyroid-stimulating hormone (TSH) synthesis, secretion, and biologic activity. The most pervasive reason for primary hypothyroidism, including secondary and tertiary subtypes, is an imbalance of pituitary hormone, while deformities of pituitary and hypothalamic peptides and their receptors just infrequently have been recognized as the reason for central congenital hypothyroidism.[4-5]

There is a statistically significant association between hypothyroidism and comorbidities in both men and women.[6] Hypothyroidism can cause many co-morbidities such as diabetes, hypertension, dyslipidemia, PCOD, and other conditions. Thyroid hormone insufficiency lowers intestinal glucose absorption and increases insulin resistance. Diabetes mellitus may develop as a result of this sooner or later[7]. Thyroid hormone deficiency causes the arteries to become less elastic, which might raise blood pressure and increase the chances of hypertension.[8]

Hypothyroidism additionally influences the manner of lipolysis and hepatic elimination of cholesterol. This could lead to dyslipidemia.[9]Cold intolerance, slow speech, constipation, myalgia, etc. are the main manifestations that a hypothyroid patient is affected with. Hypothyroidism has associated with excess mortality and reduced quality of life, especially when there are comorbidities. Patients with multi-morbidity (2 or more chronic conditions) have a worse quality of life, disability, more complex clinical care, and increased mortality. The present study aims to discover the prevalence of comorbidities amongst hypothyroid sufferers and to create consciousness inside the society regarding the comorbidities of hypothyroidism.[10]

Hypothyroidism can occur at any age and is most common in the age group 31 to 50 years. There is a significant burden of hypothyroidism in India.it has been estimated that about 11% of people suffer from hypothyroidism. In that 7.2% of women and 3.8% of men were affected respectively. Hypothyroidism may lead to comorbidities like diabetes mellitus, hypertension, polycystic ovarian disease, etc. Untreated hypothyroidism can lead to many health problems peripheral neuropathy, mental health issues such as depression, infertility, and myxedema.

Methods

A community-based cross-sectional observational study was conducted in Vinayaka mission's Kirupananda Variyar medical college and hospital. This includes a study population of 100 consecutive hypothyroid patients. The majority of patients were enrolled from the outpatients (OP) who were diagnosed with hypothyroidism, were screened for enrolment in the study during October 2019 to March 2020 of Vinayaka missions' Kirupananda Variyar medical college and hospital, Salem, Tamilnadu. The study protocol was approved by the ethical committee of our institute. Both male and female patients were included in this study. The

patients who were taking treatment for hypothyroidism were also included in our study. Patients who had undergone thyroidectomy, and had cancer were excluded from this study. Written informed consent was obtained from 100 patients. The demographic and clinical data obtained from the patients were recorded and were used to assess the age, family history, duration of disease, habits, major manifestations, and comorbidities respectively. The patients were included only after the consensual opinion of themselves and the physician. The patients were examined by at least two physicians.

The data were collected and statistically analysed using MINITAB version 19. A Chi-square test was used to compare and analyse the differences in gender, Comorbidities, and symptoms between the two groups of the study population. The P-value was calculated at a confidence interval of 95% with an α value of 0.05. The P-value is significant at ≤0.05, highly significant at P≤0.01, and very highly significant at P≤0.001.

Results

The total number of patients enrolled in the study was 100. Out of which 71 were women and 29 were men. The age-wise distribution for hypothyroidism was studied. The results of the study showed that the number of patients in the age groups 11-20,21-30 and 31-40,41-50,51-60, and 61-70 were found to be 2,14,36,25,18 and,5 respectively. The results show that the highest number of patients affected with hypothyroidism was found to be within the age category 31-40 years 36%,41-50 years 25%, and 51-60 years 18% respectively.

It was found that 67.50% of female and 32.50% of male patients had a family history of hypothyroidism.

60% of the population had no knowledge about hypothyroidism and 40% had known about it. Of this 40%, 27 were female and 13 were male indicating that females have more knowledge and awareness.

84% of the population were non-alcoholic and 16% were alcoholic and were male. Similarly, 21% of males were smokers and 71% of the population were non-smokers.

The patients were assessed based on symptoms associated with hypothyroidism. 46 (64.78%) females and 13 (44.82%) had symptoms of cold intolerance. Weight gain was found in 62 (87.32%) females and 25 (86.20%) males. It was found that about 34 (47.88%) females and 15 (51.72%) males had dry skin. 20 (28.16%) females and 15 (51.72%) males were affected with slow speech. 40 (56.33%) females and 11 (37.93%) males had constipation. 45 (63.28%) females and 14 (48.27%) males were affected with Myalgia. About 51(71.83%) females were affected with heavy/irregular menstrual flow. 39 (54.92%) females and 12 (41.37%) males had poor memory. Bradycardia was found in 27 (38.02%) females and 15 (51.72%) males. Hypohidrosis was seen in 20 (28.16%) female and 8 (27.58%) male patients. About 64 (90.14%) females and 26 (89.65%) males had hair loss. It was observed that about 12 (16.90%) females and 9 (31.03%) males had a hoarse voice. In the case of a puffy face, it was found that 24 (33.80%) females and 9 (31.03%) males were affected. During the assessment, 49 (69.01%) females and males 17 (58.62%) had shown fatigue. In this study, the most common symptom that was present in both females and males was hair loss and the least common symptom present in females was the hoarse voice and in males were Hypohidrosis. The Symptoms were compared and calculated using the Chi square test. The statistical significance between Gender and all the symptoms is shown in Table No.1. The P-value of 0.025 showed a significant prevalence in slow speech.

The patients were analysed based on the comorbidities associated with hypothyroidism. 28 (39.4%) females and 18 (62.06%) males were suffering from type 2 diabetes mellitus. 28 (39.4%) females and 20 (68.96%) males were affected with systemic hypertension. About 23 (32.43%) females and 16 (55.17%) males were suffering from depression. Sleep apnea was low in 39 (54.92%) females and high in 22 (75.86%) males. 31 (43.66%) females and males 11 (37.93%) were affected by Anaemia. 27 (38.02%) females were suffering from the polycystic ovarian disease. Bronchial asthma was high in 11 (15.49%) females and low in 4 (13.79%) males. 12 (16.9%) females and 8 (27.58%) males were found to be affected with Dyslipidaemia and 4 (5.63%) females were diagnosed with epilepsy.

During the assessment, 13 (18.3%) females and 12 (41.37%) males were affected with Gastrointestinal diseases. The most common comorbidity associated with hypothyroidism in female subjects was obesity (56.33%), and sleep apnoea in male patients (75.86%). The least common comorbidity associated with hypothyroidism in female and male patients was epilepsy. Chi-square analysis was done to compare the prevalence of comorbidities in male and female patients and the P-value shows significant prevalence in comorbidities including Hypertension, Depression, Obesity, PCOD, GI disorders in female patients were shown in Table No.2. All the patients were treated with T. Levothyroxine. It was assessed that during the treatment the patients experienced no ADRs in our study population

Discussion

A community-based cross-sectional observational study was conducted in Vinayaka mission's Kirupananda Variyar medical college and hospital to find out the incidence, knowledge, awareness, manifestations, and comorbidities in hypothyroid patients. The results of the study show that among the 100 patients, 29 (29%) patients were male and 71 (71%) patients were female, indicating that the female population is more prone to hypothyroidism than the male population. The most predominantly affected age group with hypothyroidism was found to be between 31-60 years respectively. This was in accordance with the study of *Leng, Owain et al* (11). Similarly, 27 female and 13 male patients had a family history of hypothyroidism, indicating family history as a risk factor for developing hypothyroidism. from the study, it was found that females had more knowledge and awareness regarding hypothyroidism as compared to males. Among the population, the majority of the males are alcoholics and smokers, while women were non-alcoholic and non-smokers. The symptoms associated with hypothyroidism were assessed and found that hair loss was the most commonly found symptom in both the male and female patients. These results were similar to the reports of *Vincent, Maya et al.*[16] Among the comorbidities, sleep apnoea was found in most of the patients (61%) followed by obesity, hypertension, diabetes mellitus, anaemia, depression, PCOD, gastrointestinal disorders, dyslipidaemia, bronchial asthma, and epilepsy. Our results correlate with the report of *Sanyal, Debmalya et al.*[18] The comorbidities were significantly prevalent in female patients such as Type 2 diabetes mellitus (P-value =0.039), Hypertension (P-value =0.007), Depression (P-value =0.034), Obesity (P-value = 0.022) and GI disorders (P-value = 0.016) respectively and the P-value shows significant prevalence in comorbidities including Hypertension, Depression, Obesity, PCOD, GI disorders in Female patients.

It was concluded from the study that female patients were more prone to hypothyroidism and had more awareness about hypothyroidism than male patients. Diabetes mellitus, hypertension, anaemia, obesity, sleep apnoea, PCOD, dyslipidaemia, depression, bronchial asthma, epilepsy, and gastrointestinal disorders were the comorbidities associated with hypothyroid patients. sleep apnoea, Diabetes mellitus, hypertension, anaemia, obesity, and PCOD were the most commonly found comorbidities in the study population. In accordance with our study, it was recommended that hypothyroidism patients should undergo early screening tests for diabetes, hypertension, obesity, asthma, PCOD, and other haematological tests. It will be helpful for the early diagnosis and management of comorbidities associated with hypothyroidism.

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Symptoms	No. of female patients	Percentage of female patients	No. of male patients	Percentageof male patients	Chi-square test	P-value
Cold intolerance	46	64.78%	13	44.82%	3.39	0.066
Weight gain	62	87.32%	25	86.20%	0.02	0.880
Dry skin	34	47.88%	15	51.72%	0.12	0.728
Slow speech	20	28.16%	15	51.72%	5.02	0.025
Constipation	40	56.33%	11	37.93%	2.79	0.095
Myalgia	45	63.38%	14	48.27%	1.94	0.163
Heavy /irregular menses	51	71.83%	0	0	34.8	0.00
Poor memory	39	54.92%	12	41.37%	1.51	0.219
Bradycardia	27	38.02%	15	51.72%	1.58	0.208
Hypohidrosis	20	28.16%	8	27.58%	0.003	0.953
Hair loss	64	90.14%	26	89.65%	0.005	0.941
Hoarse voice	12	16.90%	9	31.03%	2.47	0.115
Puffy face	24	33.80%	9	31.03%	0.071	0.789
Fatigue	49	69.01%	17	58.62%	0.99	0.319

Table 1: Evaluation of hypothyroidism based on symptoms

Comorbidities	No. of female Patients	Percentage of female patients	No. of male patients	Percentage of male patients	Chi-square test	P-value
T2DM	28	39.43%	18	62.06%	4.24	0.039
SHTN	28	39.43%	20	68.96%	7.19	0.007
Depression	23	33.39%	16	55.17%	4.49	0.034
Sleep apnea	39	54.92%	22	75.86%	3.79	0.051
Obesity	40	56.33%	9	31.03%	5.27	0.022
Anemia	31	43..66%	11	37.93%	0.27	0.598
PCOD	27	38.02%	0	0	-	-
BA	11	15.49%	4	13.79%	0.04	0.829
Dyslipidemia	12	16.9%	8	27.58%	1.46	0.225
Epilepsy	4	5.6%	0	0	1.702	0.192
GI disorders	13	18.3%	12	41.37%	5.84	0.016

Table 2: Evaluation of comorbidities associated with hypothyroidism