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Original Article

Prevalence of Depression and Anxiety Symptoms among Patients with Hypothyroidism in a Tertiary Care Centre

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Abstract

Background
The correlation between depression, anxiety and thyroid function is widely recognized. These conditions exhibit numerous similar symptoms, which complicates the process of diagnosing and treating them. The aim of this study is to determine the frequency of anxiety symptoms in individuals with hypothyroidism at a specialized medical facility.

Materials and Methods
A comprehensive assessment was conducted on 100 individuals who had been diagnosed with hypothyroidism. The evaluation involved the utilization of the Hamilton Depression Rating Scale (HDRS) and the Hamilton Anxiety Scale (HAM-A). The study included participants of all genders, ranging in age from 18 to 45 years, who had confirmed diagnoses of hypothyroidism and provided their explicit written consent.

Results
Out of the participants, 73% were females and 27% were males. Among the total sample, 63% displayed different levels of depression based on the HDR Scale, while 65% exhibited varying degrees of anxiety according to the HAM-A scales. When considering males, the most prevalent symptoms in line with the HDR scales were feelings of depression (74.07%) and anxiety (85.18%). Conversely, among females, the most frequent symptoms were somatic symptoms related to the gastrointestinal system (69.86%). Analyzing the HAM-A scales, the primary symptom for males was depressed mood (92.59%), whereas for females, it was anxious mood (93.15%).

Conclusion
There is significant prevalence of depression and anxiety among the patients with hypothyroidism in our set up as compared to other similar studies.

Keywords: *Depression and anxiety disorders, Hypothyroidism, Mental disorders*

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Introduction

Thyroid hormone plays a crucial role in adult brain function, and dysfunction can cause, disrupted emotions, and cognitive disruptions, often associated with coexisting depression [1]. Doctors often conduct thyroid function tests before prescribing antidepressant medication [2]. Patients with depression show significant disruptions in thyroid function [3]. Additionally, patients with thyroid dysfunction have a higher prevalence of mood and anxiety disorders [4]. A study revealed that 20.5% of individuals with hypothyroidism experienced depression [5].

In cases of hypothyroidism, symptoms initially manifest as anxiety, memory problems, progressive cognitive slowing [6]. Acute hypothyroidism is associated with anxiety disorders in approximately 30-40% of patients [7]. Patients with subclinical hypothyroidism may experience anxiety, irritability, concentration difficulties [8]. Hypothyroidism impacts mood, potentially resembling melancholic depression. Treatment of both overt and subclinical hypothyroidism can improve neuropsychiatric symptoms [9]. Thyroid function tests guide treatment of depression, with thyroid hormones being effective in treating resistant depression [10]. Thyroid hormones (TH) significantly impact serotonin release by desensitizing the 5-HT1A autoreceptor in raphe nuclei [11, 12]. Some hypotheses suggest TH modulates beta adrenergic receptors and serotonin receptors, causing decreased 5-HT levels [13, 14].

Thyroid disorders are linked to psychiatric conditions and mood disorders, affecting TSH and T4 levels [15, 16]. The hypothalamic-pituitary-thyroid (HPT) axis is linked to depression, with, but normal thyroid hormone levels remain during episodes [17]. Hypothyroidism in adults can lead to behavioral issues, depression, anxiety, learning difficulties, and memory issues due to impaired neurotransmission in the brain, particularly in the hippocampus [18].

Therefore, the objective of this study was to determine the frequency of anxiety and depressive symptoms in individuals diagnosed with hypothyroidism.

Materials and Methods

The cross-sectional study was conducted in Nobel Medical College, Teaching Hospital, Biratnagar between May 17th, 2022, and April 31st, 2023, following ethical clearance granted on May 16th, 2022, by the Institutional Review Committee of Nobel Medical College Teaching Hospital (NMCTH) in Biratnagar. Patients who provided written informed consent, patient of both genders, aged between 18 and 45 years, patients with a confirmed diagnosis of hypothyroidism were enrolled in this study. Patients with a pre-existing history of depressive disorder or anxiety disorder prior to the diagnosis of hypothyroidism, patients with a history of substance dependence, psychotic disorders, any other major axis I psychiatric disorders, or epilepsy, patients with coexisting chronic medical conditions, except for hypothyroidism, patients with organic disorders such as dementia and delirium, patients with cognitive impairment, patients with an educational level below primary education, were excluded. 100 individuals who had been diagnosed with hypothyroidism were included in the study. Convenience sampling method was used.

The formula $n=Z^2pq/d^2$ was used to determine the sample size, where n is the minimum required sample size, Z is 1.96 at 95% Confidence Interval (CI), p is the prevalence, which was taken to be 63% [1] of the population, q is 1-p, and d is the 10% margin of error. Ninety was the estimated sample size. Nonetheless, during the research period, 100 sample were taken into account.

The patients were provided with a detailed explanation of the study's objectives. Every patient provided written agreement and consent. The assessment of patients involved the utilization of the following tools: A semi-structured pro-forma specifically designed for the study was employed to gather socio-demographic information from the patients. The severity of depression was assessed by employing the Hamilton Depression Rating Scale (HDRS). The HDRS, also known as the HAM-D, is a widely utilized questionnaire consisting of multiple items. It is considered the "gold standard" for measuring depression in clinical research. The questionnaire contains 17 items (HDRS 17), which assess the presence and intensity of depressive symptoms experienced during the previous week. Trained clinicians administered the questionnaire, which typically takes approximately 20-30 minutes to complete. The scale is designed for adult patients and examines various aspects such as mood, feelings of guilt, suicidal ideation, insomnia, agitation or retardation, anxiety, weight loss, and somatic symptoms. Each item on the questionnaire is scored on a 3 or 5 point scale, depending on the specific item. It's important to note that this scale should not be used as a diagnostic tool [19, 20].

The Hamilton Anxiety Rating Scale (HAM-A) was utilized to evaluate the level of anxiety. The HAM-A was one of the earliest rating scales developed specifically to assess anxiety symptoms in

adults, adolescents, and children. The scale comprises 14 items, each characterized by a set of symptoms. It measures both psychological anxiety (mental restlessness and psychological distress) and somatic anxiety (physical complaints associated with anxiety). This scale is administered by clinicians and typically takes around 10-15 minutes to complete. It consists of 14 items designed to assess the severity of anxiety in patients. Each item contains a range of symptoms, and each group of symptoms is rated on a scale of 0-4, with four indicating the highest level of severity. The scores from all 14 items are combined to generate an overall score, which indicates the individual's anxiety severity. Both assessment tools were administered in the English language [21].

Data entry was done using Microsoft Excel and statistical analysis was done by using Statistical Packages of Social Sciences Version 16.0. Point estimate at 95% Confidence Interval was calculated along with frequency and percentage.

Results

Table 1: Socio-demographic data of the sample

Character		Male	Female	Total
Ages in Years	18-25	4	14	18
	26-35	14	32	46
	36-45	9	27	36
Marital Status	Single	7	23	30
	Married	20	50	70
Education Status	Class 10	6	14	20
	Class 12	5	35	40
	Graduate	12	18	30
	Post Graduate	4	6	10
Family type	Nuclear	11	26	37
	Joint	16	47	63
Locality	Rural	19	42	61
	Urban	8	31	39

Table 2: Grading of Hamilton depression rating scale Table 2

Grading	Score	Male (%)	Female (%)	Total
Normal	=6	12(44.44)	25 (34.25)	37 (37.00)
Mild	7-17	8 (29.63)	30 (41.10)	38 (38.00)
Moderate	18-23	5 (18.52)	11 (15.07)	16 (16.00)
Severe	=24	2 (7.41)	7 (9.59)	9 (9.00)

Table 2 displays the grading of depression based on the Hamilton Depression Rating Scale (HDRS).

Table 3: Grading of Hamilton anxiety rating scale Table 3:

Grading	Score	Male (%)	Female (%)	Total
Normal	=6	11 (40.74)	24 (32.87)	35 (35.00)
Mild	7-17	7 (25.92)	31 (42.46)	38 (38.00)
Moderate	18-23	6 (22.22)	12 (16.43)	18 (18.00)
Severe	=24	3 (11.11)	6 (8.21)	9 (9.00)

Table 3 illustrates the grading of anxiety based on the Hamilton Anxiety Rating Scale (HAM-A).

Table 4: Distribution of Hamilton depression rating scale symptoms and their comparison between males and females

Items of HDRS	Males (n=27) (%)	Females (n=73) (%)
Depression Mood	20 (74.07)	45 (61.64)
Feeling of Guilt	6 (22.22)	32 (43.83)
Suicide	5 (18.51)	28 (38.35)
Insomnia	11 (40.74)	30 (41.09)
Work and activities	6 (22.22)	26 (35.61)
Anxiety	23 (85.18)	38 (52.05)
Somatic symptoms gastrointestinal	10 (37.09)	51 (69.86)
Somatic symptoms general	12 (44.44)	37 (50.68)
Genital Symptoms	22 (81.48)	10 (13.69)
Hypochondriasis	13 (48.14)	49 (67.12)
Loss of weight	5 (18.51)	7 (9.58)

Table 4 presents the distribution of symptoms assessed by the Hamilton Depression Rating Scale (HDRS) among the male and female groups.

Table 5: Distribution of Hamilton anxiety rating scale symptoms and their comparison between males and females

Items of HAM-A	Males (n=30) (%)	Females (n=70) (%)
Anxious mood	15 (55)	68 (93.15)
Tension	12 (44.44)	46 (63.01)
Fears	15 (55.55)	43 (58.90)
Insomnia	19 (70.37)	35 (47.94)
Depressed mood	25 (92.59)	47 (64.38)
Somatic (muscular)	7 (25.92)	50 (68.49)
Somatic (sensory)	9 (33.33)	56 (76.71)
Respiratory symptoms	4 (14.81)	3 (4.11)
Gastrointestinal symptoms	15 (55.55)	54 (73.97)
Genitourinary symptoms	22 (81.48)	25 (34.24)
Autonomic symptoms	12 (44.44)	40 (54.79)

Table 5 presents the distribution of symptoms assessed by the Hamilton Anxiety Rating Scale (HAM-A)among the male and female groups.

Discussion

In our study, the largest proportion of patients (n = 46) fell into the age group of 26-35 years, with 32 females and 14 males. This indicates a higher

prevalence of hypothyroidism among females in the older age group. These findings align with previous studies conducted by Redmond in 2002 [22]. The chosen age group for the sample was limited to 45 years to exclude patients who may have had endogenous depression or psychological symptoms related to menopause. Among the 73 female patients included in the study, the largest group (n = 30) had mild depression according to the HDRS score (7-17). This was followed by 11 patients classified as having moderate depression (18-22), and finally, 7 patients with severe depression (scores above 24). In the case of male patients, the highest number (n = 8) fell into the mild depression category, followed by 5 patients with moderate depression and 2 patients with severe depression. These findings are consistent with previous studies by Pies in 1995 [23] which reported similar prevalence rates of depression ranging from 28% to 50% and 63% of the sample size, respectively. However, Saltevo et al [24] suggested a lower prevalence of depression in this population, with rates of 12.5% for males and 17.5% for females. Several authors have also indicated a link between hypothyroidism and depression, as individuals with hypothyroidism are at a higher risk of developing depressive symptoms [25], Consequently, our study aligns with previous data, indicating a comorbidity rate of 63% between depression and hypothyroidism.

Out of the 73 female patients, the largest number of patients (n=31) were classified as having mild anxiety according to the HAMA score (7–17), followed by 12 patients with moderate anxiety (18–22), and 6 patients with severe anxiety (above 24). Among males, the highest number of patients (n=7) were categorized as having mild anxiety, followed by 6 patients with moderate anxiety, and 3 patients with severe anxiety. These findings differ from previous research, which indicated that the prevalence of anxiety symptoms in individuals with hypothyroidism ranged from 30% to 40% [7]. However, our study shows a higher prevalence of 65%. Ittermann et al.[26] and Benseñor et al.[28] suggested that individuals with hypothyroidism have an increased risk of developing anxiety, while Cosci et al. [27] argued that anxiety is not commonly found alongside medical disorders.

Based on the HDRS symptoms, prevalent symptoms in males included feelings of sadness (74.07%), anxiety along with genital issues (81.48%), difficulty sleeping (40.74%), and general physical discomfort (44.44%). However, their study also identified gastrointestinal symptoms as commonly occurring, unlike ours. Additionally, they noted that 50% of male patients experienced genital symptoms, while our study found this to be the case for 81.48% of males.

Based on the HAM A symptoms, the most prevalent symptoms in males were genitourinary symptoms (81.48%), anxious mood (55%), tension (44.44%), fears (55.55), gastrointestinal symptoms (55.55%), and autonomic symptoms (44. 44.%). Our study found that symptoms such as sensory somatic symptoms (76.71) and gastrointestinal symptoms (73.97%) were more prevalent among females. Interestingly, our study contradicts the results of a study by Krysiak et al. [29], which suggests that both thyroid dysfunction and depression contribute to female sexual dysfunction, as we found that genitourinary symptoms, including sexual functions, were more common in males.

For endocrinologists: It is important to screen patients with hypothyroidism who are not showing improvement or are unable to return to their previous level of functioning despite treatment. Screening should involve assessing for symptoms of depression and anxiety using appropriate rating scales, and managing the patients accordingly based on the results. Proper management may involve addressing both the thyroid condition and any comorbid mental health issues. It is crucial to screen for and address depression and anxiety to optimize patient outcomes and help them regain their previous lifestyle.

For psychiatrists: It is recommended to screen patients who are seeking treatment for depression or anxiety and are not responding to standard medication dosages, or require higher than usual dosages of psychotropic drugs, for thyroid status. Even if patients have normal thyroid function (euthyroid status), they can still be considered for augmentation with thyroxine. In the case of a depressed patient with a single isolated elevated thyroid-stimulating hormone (TSH) level, a rational approach should be taken for treatment decisions [30].

The findings of Thvilum et al.'s [31], study indicate that individuals with hypothyroidism have a higher likelihood of being diagnosed with psychiatric disorders both before and after their hypothyroidism diagnosis. These patients are also more likely to receive treatment with antidepressants, antipsychotics, and anxiolytics. Kalra and Balhara [32] proposed that using thyroxine replacement alone may not achieve complete remission. In the STAR*D trial, it was suggested that if standard treatments fail, adding thyroid

augmentation to antidepressants could be considered [33]. Therefore, a comprehensive biopsychosocial intervention, as recommended by Brown et al [34], should be employed when treating patients with hypothyroidism.

The limitation of the study was that the sample size was small and study sample was taken from single health center. The generalization of the study cannot be applied to another demographic region as it is a small-scale study.

Conclusion

Thus, depression and anxiety were quite common in patients with hypothyroidism. Depression and anxiety were nearly equally prevalent in our study population.

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Conflict of interest: None

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