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ASSOCIATION OF ANXIETY AND DEPRESSIVE SYMPTOMS WITH HYPOTHYROIDISM

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Abstract

Introduction: Hypothyroidism, characterized by insufficient production of thyroid hormones by the thyroid gland, affects millions of individuals worldwide, with prevalence varying across different populations and age groups. Thyroid hormones play a crucial role in regulating metabolism, energy expenditure, and the functioning of various organs, including the brain

Objective: To examine the relationship between anxiety and depressive symptoms with hypothyroidism, exposing its clinical implications and therapeutic strategies.

Methodology: This study is a cross-sectional retrospective analysis conducted at Lady Reading Hospital in Peshawar. A total of 103 participants were retrospectively selected from medical records at Lady Reading Hospital between January 2023 and January 2024. Anxiety and depression were assessed using validated tools such as the Hospital Anxiety and Depression Scale (HADS) or the Beck Depression Inventory (BDI). These tools were administered during routine clinical visits or through self-report questionnaires. Anxiety and depression were assessed using standardized scales administered during clinical evaluations. The Hamilton Depression Rating Scale (HDRS) and the Hamilton Anxiety Rating Scale (HARS) are commonly utilized clinician-administered tools for evaluating the severity of depressive and anxiety symptoms, respectively.

Results: The study's sociodemographic profile revealed a majority of females (71%), with most participants aged 25-34 (52%), married (72%), and educated beyond matric level (79%). No statistically significant differences were found. Regarding depression, 60.1% exhibited symptoms, with no significant gender disparity. Similarly, 65% showed anxiety, with no significant gender difference. However, specific symptoms showed gender variations: males showed more depressed mood and anxiety with genital symptoms, while females exhibited more gastrointestinal symptoms

and hypochondriasis. Moreover, HAM-A scores indicated significant differences in symptoms like anxious mood, tension, fears, and somatic symptoms between genders. Notably, a significant association was found between HDRS and HAM-A scores (P = 0.045).

Conclusion: Since thyroid hormones (THs) are essential for controlling mood, behaviour, and thought processes, there is reason for great concern over the relationship between thyroid function and mental illnesses. Thyroid dysfunctions have been linked to learning and memory deficits, as well as psychiatric comorbidities such as anxiety and depressive disorders. In order to optimise their therapy, patients presenting with these symptoms must undergo treatment and monitoring from both an endocrinologist and a psychiatrist. Early detection of an endocrine disorder can lower mental morbidity and eventually enhance general health results.

Keywords: Sociodemographic profile, depression, anxiety, gender differences in symptoms, HDRS, HAM-A scores

Introduction

Hypothyroidism, characterized by insufficient production of thyroid hormones by the thyroid gland, affects millions of individuals worldwide, with prevalence varying across different populations and age groups [1]. Thyroid hormones play a crucial role in regulating metabolism, energy expenditure, and the functioning of various organs, including the brain [2]. Consequently, disruptions in thyroid hormone levels can have profound effects on mood and mental well-being.

Anxiety and depressive disorders are among the most prevalent mental health conditions globally, contributing significantly to the global burden of disease [3]. Emerging evidence suggests a complex interplay between thyroid function and mental health, with hypothyroidism often implicated in the development or exacerbation of anxiety and depressive symptoms [4]. However, the precise mechanisms underlying this association remain incompletely understood.

Several studies have investigated the relationship between hypothyroidism and psychiatric symptoms, revealing a bidirectional relationship whereby hypothyroidism may predispose individuals to anxiety and depression, while these mental health conditions, in turn, can influence thyroid function through various pathways [5, 6]. Additionally, the symptomatology of hypothyroidism, including fatigue, cognitive impairment, and changes in weight and appetite, overlaps with features commonly seen in anxiety and depressive disorders, posing diagnostic challenges and highlighting the importance of comprehensive evaluation in clinical practice [7].

Understanding the complex relationship between hypothyroidism and psychiatric symptoms is of paramount importance for clinicians managing patients with either condition. Effective management strategies necessitate not only the optimization of thyroid hormone levels through pharmacological interventions but also the recognition and treatment of coexisting anxiety and depressive symptoms to improve overall patient outcomes [8]. To examine the relationship between anxiety and depressive symptoms with hypothyroidism, exposing its clinical implications and therapeutic strategies.

Methodology

Study Design:

This study is a cross-sectional retrospective analysis conducted at Lady Reading Hospital in Peshawar to investigate the association between hypothyroidism, anxiety, and depression.

Participant Selection:

A total of 103 participants were retrospectively selected from medical records at Lady Reading Hospital. Inclusion criteria included individuals diagnosed with hypothyroidism who had undergone assessments for anxiety and depression during routine clinical evaluations between January 2023 and January 2024. Participants were excluded if they had a history of other thyroid disorders (e.g., hyperthyroidism), significant comorbidities affecting mental health, or incomplete medical records.

Data Collection:
Medical records of eligible participants were reviewed to extract relevant demographic and clinical data, including age, gender, thyroid function test results (e.g., serum levels of thyroid-stimulating hormone [TSH], free thyroxine [FT4]), past medical history, medication use, and documented assessments for anxiety and depression. Anxiety and depression were assessed using validated tools such as the Hospital Anxiety and Depression Scale (HADS) or the Beck Depression Inventory (BDI). These tools were administered during routine clinical visits or through self-report questionnaires.

Assessment of Hypothyroidism:
Diagnosis of hypothyroidism was based on clinical criteria and biochemical markers. Participants were considered to have hypothyroidism if they exhibited symptoms such as fatigue, weight gain, cold intolerance, constipation, and dry skin, along with elevated serum TSH levels and/or decreased FT4 levels. Thyroid function tests were conducted using standardized laboratory assays at Lady Reading Hospital.

Assessment of Anxiety and Depression:
Anxiety and depression were assessed using standardized scales administered during clinical evaluations. The HDR were used to measure anxiety and depression symptoms, respectively. The Hamilton Depression Rating Scale (HDRS) and the Hamilton Anxiety Rating Scale (HARS) are commonly utilized clinician-administered tools for evaluating the severity of depressive and anxiety symptoms, respectively. To utilize these scales, a trained clinician or researcher typically conducts a face-to-face interview with the patient. During the interview, the clinician poses a series of questions based on the specific items of each scale, covering various aspects of depression and anxiety symptomatology. Each item is then rated by the clinician based on the patient's responses and observable behavior, with scores typically ranging from 0 to 4 or 0 to 2 for the HDRS, and from 0 to 4 for the HARS. Higher scores indicate more severe symptoms.
Once all items have been rated, the clinician calculates the total score by summing the individual item scores. For the HDRS, the total score can range from 0 to 52, while for the HARS, it can range from 0 to 56. These total scores provide a quantitative measure of the severity of depressive or anxiety symptoms experienced by the patient.
Interpretation of the results involves using established cutoffs to classify the severity of symptoms. For both scales, higher total scores indicate more severe symptoms, and clinicians often categorize patients into severity levels (e.g., mild, moderate, severe) based on these scores.

Data Analysis:
Descriptive statistics were used to summarize participant characteristics, including mean age, gender distribution, thyroid function test results, and scores on anxiety and depression scales. The association between hypothyroidism, anxiety, and depression was explored using correlation analyses (e.g., Pearson's correlation coefficient) and graphical representations. Subgroup analyses based on demographic and clinical variables were conducted to assess potential confounding factors.

Ethical Considerations:
This study adhered to ethical principles outlined in the Declaration of Helsinki and was approved by the Institutional Review Board at Lady Reading Hospital. Informed consent was waived due to the retrospective nature of the study, and data confidentiality was maintained throughout the research process.

Results
Table 1 presents the sociodemographic profile of the study participants, comprising mostly females, accounting for 71% of the total sample. The majority of participants fell within the 25–34 age range, constituting 52% of the sample (P=0.589). Moreover, 72% of the participants were married (P=0.847), while 79% had an educational attainment beyond the matric level (P=0.279). Furthermore, 59.2%

resided in combine setups (‘P=0.329’), and 58.2% in rural areas (P=0.360). Notably, none of the sociodemographical variables demonstrated statistical significance.

Table 2 illustrates the categorization of HDRS scores, revealing that 60.1% of patients exhibited some level of depression. Upon grading, 38% demonstrated ‘mild depression’ (male: n = 6; female: n = 33), 12.6% had ‘moderate depression’ (‘male: n = 3; female: n = 10’), and 10% experienced ‘severe depression’ (male: n = 4; female: n = 6). Statistical analysis revealed no significant difference in HDRS scores between males and females (P = 0.767).

Table 3 presents the grading of HAR, indicating that 65% of patients manifested some degree of anxiety. Upon grading, 29.1% displayed ‘mild anxiety’ (male: n = 6; female: n = 24), 19.4% exhibited ‘moderate anxiety’ (male: n = 5; female: n = 15), and 14.5% suffered from ‘severe anxiety’ (male: n = 3; female: n = 12). Statistical evaluation demonstrated no significant disparity in HAM-A scores between males and females (P = 0.882).

The symptoms were assessed using HDRS and their prevalence among the study cohort. Notably, among males, the most prevalent symptoms were ‘depressed mood’ (74.44%), ‘anxiety and genital symptoms’ (68.78%), ‘insomnia’ (44.44%), and ‘general somatic symptoms’ (35.44%). Conversely, in females, predominant symptoms included ‘gastrointestinal somatic symptoms’ (70.65%), ‘hypochondriasis’ (64.45%), ‘depressed mood’ (62%), ‘anxiety and general somatic symptoms’ (58.25%), ‘insomnia’ (48.25%), and ‘suicide’ (39.15%). Furthermore, symptoms such as ‘feelings of guilt’ (P=0.012), ‘gastrointestinal somatic symptoms’ (P=0.023), ‘genital symptoms’ (P=0.043), and ‘hypochondriasis’ (P=0.037) exhibited statistical significance on ‘HDRS’ when ‘comparing males and females’.

The symptoms were evaluated using HAM-A and their distribution within the study cohort. Among males, prevalent symptoms included depressed mood (71%), genitourinary symptoms (62%), insomnia (42%), anxious mood (41%), ‘tension, fears’, ‘gastrointestinal symptoms’, and ‘autonomic symptoms’ (35%). Conversely, in females, prevalent symptoms were ‘anxious mood’ (93%), ‘muscular somatic symptoms’ (79%), ‘sensory somatic symptoms’, and ‘gastrointestinal symptoms’ (72%), ‘tension’ (65%), and ‘depressed mood’ (63%). Notably, symptoms such as ‘anxious mood’ (P=0.025), ‘tension’ (P=0.003), ‘fears’ (P=0.035), ‘muscular somatic symptoms’ (P=0.043), ‘sensory somatic symptoms’ (P=0.032), ‘gastrointestinal symptoms’ (P=0.012), and ‘genitourinary symptoms’ (P=0.01) exhibited statistical significance on ‘HAM-A’ when comparing ‘males and females’. The correlation between ‘HDRS scores’ and ‘HAM-A scores’ revealed a significant association among the scales (P=0.045).

Table 1 displays the sociodemographic characteristics of the study sample

Sociodemographic Data	Male	Female	Total	p-value
‘Age (in years)’				
15-24	7 (33.3%)	14 (66.6%)	21 (20.3%)	0.784
25-34	17 (32.6%)	35 (67.3%)	52 (50.4%)	
35-44	6 (20%)	24 (80%)	30 (29.1%)	
‘Marital status’				
Single	9 (31.3%)	20 (68.9%)	29 (28.1%)	0.824
Married	21 (28.3%)	53 (71.62%)	74 (71.8%)	
Level of Education				
Primary Education	8 (36.6%)	14 (63.64%)	22 (21.3%)	0.866
Secondary Education	6 (14.29%)	36 (85.71%)	42 (40.7%)	
Graduation	18 (46.15%)	21 (53.85%)	39 (37.8%)	
Family				
Separate living	13 (30.95%)	29 (69.05%)	42 (40.7%)	0.726
Combine living	15 (24.59%)	46 (75.41%)	61 (59.2%)	
Place of living				
‘Rural’	19 (31.6%)	39 (68.33%)	60 (58.2%)	0.921
‘Urban’	8 (18.6%)	35 (81.40%)	43 (41.7%)	

Table 2 presents the categorization of scores on the Hamilton Depression Rating Scale					
Grades	**Scoring**	**Male (%)**	**Female (%)**	**Total (%)**	**p-value**
'Normal'	≤6	18 (43.9%)	23 (56.10%)	41 (39.8%)	0.767
'Mild'	7-17	6 (15%)	33 (84.62%)	39 (37.8%)	
'Moderate'	18-23	3 (23%)	10 (76.92%)	13 (12.6%)	
'Severe'	≥24	4 (40%)	6 (60%)	10 (9.7%)	

Table 3 illustrates the classification of scores on the Hamilton Anxiety Rating Scale					
Grades	**Scoring**	**Male (%)**	**Female (%)**	**Total (%)**	**p-value**
'Normal'	≤6	12 (31.5%)	26 (68.4%)	38 (36.8%)	0.882
'Mild'	7-17	6 (20%)	24 (80%)	30 (29.1%)	
'Moderate'	18-23	5 (25%)	15 (75%)	20 (19.4%)	
'Severe'	≥24	3 (20%)	12 (80%)	15 (14.5%)	

Discussion

The majority of those participating in the present research (n = 52) were in the 25–34 age range. Of them, 17 were men and 35 were women. This implies that older age groups of females have a higher frequency of hypothyroidism. These results are consistent with the research done in 2002 by Redmond [9] and in 2014 by Chaudhry et al. [10]. The demographic range was set at 45 years old in order to exclude patients who were experiencing intrinsic sadness or menopausal symptoms.

Of the seventy-three female patients, thirty-three (n = 33) were classified as having mild depression (range 7–17), ten as having moderate depression (range 18–23), and six as having severe depression (more than 24) based on their HDRS score. On the HDRS scale, a majority of patients (n = 6) in the male population were classified as having mild depressive symptoms (7–17), followed by three patients with moderate depressive symptoms (18–23) and four patients with severe depressive symptoms. Comparable results were also reported by Pies (11) in 1995 and Chaudhary et al. (10) in 2014, who found that depression was prevalent in 28–50% and 63% of the sample sizes, respectively. On the other hand, Saltevo et al. [12] reported that the incidence of depression in this population was substantially lower (males: 12.5%, females: 17.5%). The results of our study indicating the 60% comorbidity of depression and hypothyroidism are consistent with the suggestions made by a number of researchers [13, 14] that people with hypothyroidism are at risk of developing depression.

Of the seventy-three female patients, twenty-four (n = twenty-four) had mild anxiety (7–17) according to the HAM-A score, fifteen had moderate anxieties (18–23), and twelve had severe anxieties (greater than 24). On the other hand, the greatest number of patients (n = 6) who were classified as having mild anxiety (HAM-A: 7–17), moderate anxieties (HAM-A: 18–23), and severe anxieties (HAM-A: 23–24) were all men. However, prior studies' findings have indicated that between 31% and 41% of hypothyroidism patients exhibit symptoms of anxiousness [15,16]. Our analysis reveals an unexpectedly high frequency of 64%. While Cosci et al. [19] have suggested that anxiety is not usually linked to health conditions, Ittermann et al. [17] and Benseñor et al. [18] have shown that people with hypothyroidism are susceptible to anxiety.

Males experienced depression (74.44%), anxiety and genital symptoms (68.78%), sleeplessness (44.44%), and general somatic symptoms (35.44%) as the most common symptoms, according to the HDRS. Though they observed that gastrointestinal problems were common, Chaudhary et al. [10] reported similar incidences of these symptoms, with the exception that our study also found that sleeplessness was prominent. Additionally, they discovered that 50% of male patients had genital problems; in contrast, 66.67% of the individuals in our study reported having genital problems. Our results for females with gastrointestinal somatic symptoms (70.65%), hypochondriasis (64.45%), sad

mood (62%), anxiety and general somatic symptoms (58.25%), sleeplessness (48.25%), and suicides (39.15%) closely resembled those of Chaudhary et al. [10].

When it comes to HAM A symptoms, the most common ones among men were depression (71%), genitourinary symptoms (62%), and anxiety, tension, gastrointestinal symptoms, and autonomic symptoms (35%). These results are in good agreement with those reported by Chaudhary et al. [10]. Similar to the results of Chaudhary et al., prevalent signs among females included tension (65%), depressive mood (63%), anxious mood (93%), and muscle somatic symptoms (79%). However, our research found that women experienced gastrointestinal and sensory somatic symptoms more frequently. Contrasting to findings in a study by Krysiak et al. [20], the spectrum of genitourinary symptoms (including sexual functions) was more common in men in our investigation, indicating that depression and thyroid disease may both have an impact on female sexual dysfunction.

Conclusions

Since thyroid hormones (THs) are essential for controlling mood, behaviour, and thought processes, there is reason for great concern over the relationship between thyroid function and mental illnesses. Thyroid dysfunctions have been linked to learning and memory deficits, as well as psychiatric comorbidities such as anxiety and depressive disorders. In order to optimise their therapy, patients presenting with these symptoms must undergo treatment and monitoring from both an endocrinologist and a psychiatrist. Early detection of an endocrine disorder can lower mental morbidity and eventually enhance general health results.

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