Association between Thyroid Dysfunction and Common Mental Disorders (Anxiety and Depression): A university hospital-based cross-sectional study

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ABSTRACT

Background

Anxiety and depression have been frequently reported to be associated with thyroid dysfunctions. Many symptoms of anxiety and depression overlap with thyroid disorders sometimes masking the diagnosis.

Objective

To look for association between thyroid diseases and newly diagnosed case of anxiety or depression in out-patient department.

Method

It was a hospital based descriptive, cross-sectional study conducted in a period of six months after ethical approval from institutional review committee with participants aged 18-65 years, who wished to give consent for the study and investigations. Cases of anxiety and depression was diagnosed as per the International Classification of Diseases-10, clinical description and diagnostic guideline and self-administered proforma was used for demographic profile. Sample analysis and comparison of different groups in the study was done using chi-square test; p-value < 0.05 was considered for statistical significance.

Result

Anxiety disorders was higher in individuals with normal thyroid function (54.5%), and depression appeared to be more common among individuals with abnormal thyroid function (60.9%); it did not have any statistical significance.

Conclusion

Depressive disorders were common among thyroid disorder patients. Further study is needed to examine the relationship between thyroid disorder and common mental disorders to help improve mental health outcomes.

KEY WORDS

Anxiety, Common mental disorders, Depression, Thyroid diseases

INTRODUCTION

Common mental disorders (CMDs) are a group of mental health conditions that commonly present with symptoms like anxiety and depression.[1,2] Anxiety and depression are common mental illnesses that have significant impairments in an individuals' social and psychological functioning.[3] It is also seen to decrease their quality of life, with a prevalence of 11.7% and 22.7%, respectively.[4] There are numerous studies that have shown comorbidity between anxiety, depression and thyroid related disorders.[4-10]

Patients diagnosed with depression are frequently observed to have hypothyroidism and evidence to support the use of thyroid hormones to enhance the effectiveness of antidepressants treatments have been found.[11] Another study has found to have altered thyroid function in case of anxiety disorder.[12] Similarly, participants diagnosed with thyroid disorders are prone to comorbid with anxiety and depression.[13-15] Symptoms between anxiety and hyperthyroidism, such as nervousness, restlessness, irritability, palpitations, tremors, and insomnia may also overlap.[16] Similarly, symptoms of depression such as lack of energy, poor concentration, memory impairment, sleep disturbances are frequently seen in patients with hypothyroidism.[17,18]

Thyroid disorders are usually diagnosed on the basis of serum hormonal levels of thyroid stimulating hormone (TSH), tri-iodothyronine (T3), and tetra-iodothyronine (T4). Emerging evidence suggests a strong association between abnormalities in thyroid hormones levels and the prevalence of common mental disorders, particularly anxiety and depression.[10,12-18] In resource limited settings like Nepal, where both thyroid dysfunction and psychiatric illness often go undiagnosed or untreated, these comorbidities not only complicate clinical presentation but may also influence disease progression, treatment compliance and adherence which directly impacts overall quality of life. While several international studies have explored this association, limited study from our part of the world leaves significant gaps in understanding the prevalence of thyroid disorders in common mental disorders. Considering this knowledge gap in mind, we intend to conduct a study that will assess relationship between thyroid disorder and common mental disorders in a University Hospital.

METHODS

This hospital based, descriptive, cross-sectional study was conducted among individuals who presented to the outpatient department (OPD) of the Psychiatry, Kathmandu University Hospital, Dhulikhel Hospital over a period of six months. Sample size of 145 participants were enrolled using convenient sampling method. Individuals' aged 18-65 who were not prior diagnosed with any psychiatric illnesses or thyroid disorders were taken into consideration after fulfilling the diagnosis of anxiety or depression. Sample collection was done after approval obtained from the Institutional Research Committee (IRC) of Kathmandu University Hospital (Approval number: 352/24). New cases of Anxiety or Depression who fulfilled the inclusion criteria and diagnosed by consultant Psychiatrist as per International Classification of Diseases-10th revision Diagnostic criteria for research (ICD-10) were included in the study.[19] Whereas, patients having cognitive impairment in the form of delirium due to any cause, known case of thyroid dysfunction, substance use, and other psychiatric illnesses such as psychosis were excluded from the study.

Education status were divided into two groups, illiterate; which included participants who did not attend school or any form of formal education and literate; which included primary, secondary and above secondary level of education. Occupation status were differentiated into eight groups. Unemployed population included homemaker, unemployed and other occupation except farmer, laborer, business, student and service.

Common mental disorders (anxiety and depression) were further arranged into a group of diagnosis that included; mixed anxiety and depressive disorder, generalized anxiety disorder, panic disorder, and phobia were all categorized into anxiety disorders and diagnosis of recurrent depressive disorder, severity of depression of mild, moderate and severe all were categorized into depressive disorders. After the diagnosis, the patient were requested for thyroid function test; free T3, free T4 and thyroid stimulating hormones (fT3, fT4, TSH).

Normal laboratory values of thyroid function test were: fT3= 2.2- 4.2 pg/mL, fT4= 0.8-1.7 ng/dL, TSH= 0.3- 3.6 mIU/L using Chemiluminescent Immunoassay (CLIA) method. Thyroid function test reports from Dhulikhel Hospital were only included to avoid selection bias.

Structured questionnaire was used by the investigators that included personal and demographic characteristics (age, gender, residence, education status, marital status and occupation status) and illness related parameters (history of known psychiatric and medical illnesses). Interview was conducted in Nepali language after informed and written consent were taken. Written informed consent was designed in both Nepali and English and were taken from all the individuals after explaining the details mentioned in the proforma. Analysis of data was carried out using SPSS (Statistical Package for Social Sciences) version 23.0. Group comparison for categorical variables was done by using chi square test with p-value < 0.05 for statistical significance.

RESULTS

Total 145 individuals Mean (± SD): 38 (± 13.7), were enrolled in the study where, table 1 shows the socio-demographic data of the study population. The age of the participants ranged from 18-65 years with Mean (± SD): 38 (± 13.7).

Table 1. Socio-demographic variables of the patients (N=145).

Socio-demographic Variables		Number (%)
Age (in years)	≤ 38	74(51)
	> 38	71(49)
Gender	Male	52(35.9)
	Female	93(64.1)
Marital Status	Married	103(71)
	Single	42(29)
Residence	Rural	81(55.9)
	Urban	64(44.1)
Family Type	Joint	57(39.3)
	Nuclear	88(60.7)
Religion	Hindu	122(84.1)
	Others	23(15.9)
Education status	Illiterate	36(24.8)
	Literate	109(75.2)
Occupation status	Employed	88(60.7)
	Unemployed	57(39.3)
Yearly income	Below five Lakhs	96(66.2)
	Above five Lakhs	49(33.8)

Majority were Female (64.1%), married (71%), residing in rural area (55.9%) in a nuclear family (60.7%) and Hindu (84.1%). Majority of participants were educated (75.2%). Here, greater part of the participants were employed (60.7%) with annual income of below five lakhs (66.2%).

More than half (55.6%) of individuals aged ≤ 38 years had normal thyroid status and 44.4% belonged to age group more than 38. Similarly, 46.6% of individuals in age group ≤ 38 had abnormal thyroid status in compared to 53.4% of individuals more than 38.

Majority of female had abnormal thyroid status (68.5%). Among the occupation, more than half (70.8%) of the employed individuals had normal thyroid status. Majority were literate individuals with normal thyroid status (79.2%). More than half who had abnormal thyroid status were married (75.3%) and Hindu (84.9%). Majority of the individuals who had income up to five lakhs had abnormal thyroid status (71.2%). Individuals with no underlying medical illnesses and living in a nuclear family had normal thyroid status (73.6%) and (62.5%) respectively. Majority of individuals who didn't have family history of thyroid disorders or psychiatric illness in family had abnormal thyroid function (90.4%) and (78.1%) respectively.

Table 2 shows the association between common mental disorders and thyroid status. Although the prevalence of anxiety was higher in individuals with normal thyroid function, the association between thyroid status and anxiety was not significant (χ^2 = 2.985, p= 0.08). In contrast, depression appeared to be more common among individuals with abnormal thyroid function (60.9%) compared to those with normal function (39.1%).

Table 2. Association between common mental disorders and thyroid status (N=145)

Common mental disorders (CMD)	Thyroid Status		χ^2 Value	df	p-value
	Normal (n=72) Number (%)	Abnormal (n=73) Number (%)			
Anxiety (n)%	54(54.5%)	45(45.5%)	2.985	1	0.08
Depression (n)%	18(39.1%)	28(60.9%)			

DISCUSSIONS

Thyroid dysfunction has been considered potential contributor to the development and severity of common mental disorders, particularly anxiety and depression. This hypothesis is supported by numerous international research that suggests a biological interplay between thyroid hormones and neuropsychiatric symptoms. However, despite the global interest in this association, there remains a notable gap in region specific data, especially within South-East Asia. In our part of the world, studies examining the relationship between thyroid disorders and mental health conditions are few, and even fewer have focused specifically on individuals who are newly diagnosed with anxiety and depressive disorders. This lack of localized research presents a critical need for investigation as various factors such as, personal, social, biological, environmental factors may influence both the prevalence and presentation of these conditions. Our study was designed to address this gap by exploring the association of thyroid dysfunction with anxiety and depression in a newly diagnosed patients. By doing so, we aim to contribute meaningful insights to the existing literature, while also providing insight in treatment strategies tailored to our clinical settings.

Many conventional studies have linked anxiety with thyroid dysfunction, while our study shows anxiety disorder in 45.5% individuals with abnormal thyroid status suggesting no significance between thyroid status and anxiety disorders. This unexpected pattern suggests that anxiety may be more prevalent in the general population, independent of thyroid status, and raises important questions about the specificity of thyroid dysfunction as a contributing factor to anxiety disorders. The lack of a statistically significant difference between the two groups implies that thyroid status alone may not be a reliable predictor of anxiety and other biopsychosocial factors could play a more prominent role. Similar finding was seen in a study done in China.[20]

Thyroid disorders are often accompanied by a group of symptoms that closely resemble anxiety disorders, including irritability, restlessness, palpitations and excessive sweating. These manifestations can mimic clinical anxiety like symptoms, even in the absence of a formal psychiatric diagnosis. Hyperthyroidism, in particular is known to produce physiological arousal that overlaps with anxiety like presentations, making differential diagnosis challenging in clinical practice. Despite the symptomatic

overlap, the relationship between thyroid dysfunction and anxiety disorders remain inconsistent across the literature. While several studies have reported elevated rates of anxiety among individuals with thyroid dysfunction, others have failed to find a statistically significant association.

A study done in a large, unselected population, found no statistical association between thyroid dysfunction, and the presence of anxiety or depressive disorder.[21] A study in Turkey showed underline thyroid abnormalities increased the anxiety symptoms.[22]

Prevalence of depressive symptoms is close to 60.9% in participants with abnormal thyroid function. This marks a significant relationship between thyroid dysfunction and mood disorders, particularly depression. This finding is consistent with several studies that have documented elevated rates of depressive symptoms among individuals with various forms of thyroid abnormalities including hypothyroidism, subclinical hypothyroidism and hyperthyroidism.[23] A similar study conducted in Nepal further supports this association, concluding that thyroid dysfunction is commonly observed among the patients diagnosed with depression.[24] Another study from Nepal shows anxiety and depression are highly prevalent among thyroid disorder patients.[25] This regional corroboration is particularly important as it suggests that the relationship between thyroid status and depressive symptoms may be consistent across diverse population and health care settings. It also highlights the potential value of integrating thyroid screening into routine psychiatric assessments, especially in contexts where depressive symptoms are prevalent but may be underdiagnosed or misattributed to psychosocial stressors alone. Similarly, a cross section study in India showed that nearly half of the patient with thyroid disorders have at least one psychiatric illness, with depression and anxiety being the most common.[26]

A population based study showed few significant between thyroid abnormalities and depressive disorders.[27] In contrast to our study, a meta-analysis shows results with thyroid dysfunction having no connecting with depression. However, on the same study, thyroid abnormalities is linked to depression in younger age than older in age group analysis.[28] Similar study has shown a need of possible future studies to show the relationship between thyroid abnormalities and psychiatric illnesses.[29]

A cohort study from UK shows, anxiety and depression exposure is associated with subsequent risk of thyroid diseases, the more severe the depression and anxiety, the greater the associated risk. Furthermore, adding any level of depression and anxiety should be taken into consideration in thyroid disease risk prediction and prevention.[30] Another study shows that diagnosed untreated thyroid disorders are associated with depression and anxiety.[31]

Many studies have shown relationship of depressive and anxiety symptoms with thyroid disorders and the importance of integrating mental health screening into routine management of thyroid conditions, particularly among the individuals' with high prevalence of common mental disorders.[22-25]

The investigation was conducted over a short duration and involved a small sample size which may limit our findings. The absence of randomization in the selection of the participants causes potential selection bias and we were unable to categorize the specific types of thyroid abnormalities (hypothyroidism, hyperthyroidism, sub-clinical state), which limited the depth of our study. Although we assessed individuals diagnosed with anxiety or depression who had thyroid dysfunction, the study did not incorporate a structured follow-up to monitor symptom improvement following thyroid medications. Despite these limitations, the study pins the importance of integrating mental health screening into clinical management of thyroid disorders, particularly in high risk groups. By focusing on these findings, future research should aim for larger, randomized samples, longer follow-ups periods and more specific classification of thyroid disorders to better evaluate the complex relation between thyroid dysfunction and common mental disorders. In future, these findings could inform clinical guidelines and promote a more holistic approach to patient care that bridges Endocrinology and Psychiatry together.

CONCLUSION

The aim of the study was to access the association between thyroid dysfunction and common mental disorders. We identified anxiety disorders to be higher in individuals with normal thyroid functions and depression to be more common among individuals with abnormal thyroid functions with no statistical significance, in participants' presenting to a University Hospital. The finding helps us understand the importance of routine thyroid function screening in individuals' presenting with psychiatric symptoms, as undiagnosed or untreated thyroid disorders may contribute to the exacerbation of psychological problems. This study helps us to focus on early diagnosis and holistic management. However, the study was limited by a relatively small sample size which may constrain the generalizability of its findings. Further in future, longitudinal studies are recommended to see the directionality of this relationship and evaluate the impact of thyroid hormones on mental health.

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