

RESEARCH ARTICLE

Thyroid Profile of Psychiatric Patients at a Tertiary Care Hospital in Khulna, Bangladesh

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Abstract

Background: The thyroid gland and its hormones are vital in organ development and physiological regulation across vertebrates. Thyroid disorders often manifest neuropsychiatric symptoms like depression and anxiety. Understanding the thyroid profile of psychiatric patients is crucial for accurate diagnosis and treatment. Studies suggest a significant association between psychiatric disorders and thyroid dysfunction, with higher prevalence in individuals with conditions like depression, schizophrenia, and bipolar disorder.

Aim of the Study: The aim of our study was to investigate the thyroid status and determine the prevalence of thyroid disorder among psychiatric patients in a specific area of Bangladesh.

Methods: A retrospective study conducted at Gazi Medical College and Hospital in Bangladesh from January 2021 to December 2023 involved 320 psychiatric patients. Blood samples for thyroid profile assessment were taken after an overnight fast and analyzed using specified reference ranges. Thyroid disorders were categorized based on hormone levels. Statistical analysis focused on data from patients completing a six-month follow-up, analyzed using SPSS software.

Results: Most participants are aged 21-30, with a mean age of 26.85 years. Males represent 52.5% of the population, females 45.31%, and others 2.19%. Unemployment at 29.38%, with 30.00% being students and 16.56% homemakers. Educational levels vary, with 40.00% below primary education and 17.50% being graduates. Thyroid levels vary widely, with mean FT3 levels at 1.66 ± 1.47 ng/ml, FT4 at 9.93 ± 3.84 μ g/dL, and TSH at 5.88 ± 3.87 μ g/dL. Hypothyroidism affects 77.41% of participants, hyperthyroidism 17.64%, and subclinical hypothyroidism 4.95%.

Conclusion: The prevalence of thyroid disorders among these patients is significant, with hyperthyroidism being the most common condition observed, followed by hypothyroidism and subclinical hypothyroidism.

Keywords: Thyroid Profile, Psychiatric Patients, FT3, FT4, TSH.

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1. Introduction

The thyroid gland and its releasing hormones triiodothyronine and thyroxine are involved in many aspects of organ development and the homeostatic regulation of fundamental physiological processes in all vertebrates, including body growth and energy expenditure [1]. Thyroid disorders are commonly associated with various neuropsychiatric symptoms, such as affective and cognitive disturbances. Symptoms of depression, mood liability, anxiety, and sleep disturbances are usually associated with thyrotoxicosis or hyperthyroidism [2]. Understanding the thyroid profile of psychiatric patients not only sheds light on the potential physiological underpinnings of psychiatric disorders but also holds significant implications for diagnostic accuracy, treatment efficacy, and patient outcomes. Thyroid problems and psychiatric disorders are known to be associated. However, overt psychiatric disorders are said to occur in approximately 10% of the patients [3,4]. Most of the studies were conducted on the relationship between thyroid functions and depressive disorders, and less attention was given to any association between thyroid disorders. Findings from a study in China indicated that patients with depression tend to attempt suicide and have thyroid problems [5]. Another study revealed that patients with schizophrenia spectrum disorder and mood disorders exhibited thyroid dysfunction. In contrast, patients with schizophrenia-spectrum disorders showed a higher prevalence of autoimmune thyroid disease in comparison to those with mood disorders [6]. The prevalence of thyroid disorders was higher in individuals with psychiatric disease, and there were no distinctions observed between children and adults, as concluded by Mirghani et al. (2021) [5]. Other research found that before a suicide attempt, there might be dysregulation in certain hormones involving prolactin and thyroid hormone [7]. Overall, thyroid dysfunction is frequent in major psychiatric disorders such as acute psychosis, depressive disorder, cognitive disorders, bipolar disorder, and schizophrenia-spectrum disorders [6,8]. Increased thyroxine (FT4) levels, reduced tri-iodothyronine (FT3), lower thyroid stimulating hormone (TSH) response to thyrotropin-releasing hormone activation, and lack of the nocturnal TSH surge are commonly reported problems in psychiatric patients [8]. Psychiatric patients must undergo thyroid screening to identify potential contributing factors to their symptoms [9]. Additionally, thyroid status is pivotal in determining the response to treatment in psychiatric disorders [6]. However, limited studies have been

done on observing the thyroid status of psychiatric patients in Bangladesh. Our study aimed to investigate thyroid status and determine the prevalence of thyroid disorders among psychiatric patients in a specific area of Bangladesh.

2. Methodology and Materials

This retrospective study was carried out at the Department of Psychiatry in Gazi Medical College and Hospital in Khulna, Bangladesh, over three years, from January 2021 to December 2023. Three hundred twenty patients were actively enrolled and subjected to a thorough examination. A semi-structured questionnaire was carefully developed to gather pertinent socio-demographic information. Before collecting data, a consent form was taken from every participant.

2.1 Inclusion criteria

1. Patients underwent psychiatric treatment.
2. Psychiatric OPD patients who had thyroid function test.
3. Participants experienced psychiatric condition for a minimum duration of six months.

2.2 Exclusion criteria

1. Participants with history of chronic medical illness
2. Pregnant women.

After an overnight fast, blood samples were procured in the morning (8-11 am) after an overnight quickly and sent to the laboratory for thyroid profile assessment (FT3, FT4, and TSH). The laboratory employed the reference range: FT3 (2.3-4.2 pg/ml), FT4 (0.89-1.76 ng/dl), and TSH (0.35-5.5 uIU/ml) for sample analysis.

The definitions of thyroid disorders were categorized as follows

1. Hyperthyroidism: Elevated levels of T3 and T4 and reduced TSH within the normal range [10].
2. Hypothyroidism: Lower levels of T3 and T4 and increased TSH beyond the normal range [11].
3. Subclinical hypothyroidism: Normal T3, T4 and higher TSH level from normal range [12].

Statistical analysis focused solely on data from patients who completed the six-month follow-up. All data were meticulously organized into tables or graphs based on significance, with detailed descriptions for clarity. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) program on the Windows platform. Mean±SD

was used to present continuous parameters, while frequency and percentage were employed to express categorical parameters.

3. Results

In this retrospective study, a total of 320 patients were actively enrolled and subjected to a thorough examination. The age distribution of the study is shown in Table 1, where 113(35.31%) patients were aged under 21-30 years, and the 2nd most 105(32.81%) patients were aged 11-30 years, respectively. The cohort’s mean age is reported at 26.85 years with a standard deviation of 11.98 (Table 1). Figure 1 illustrates the gender distribution of the study population. Most patients identified as male (52.5%), while females accounted for 45.31%. A smaller proportion identified as belonging to another gender category, comprising 2.19% of the total population. Table 2 delineates the socio-demographic characteristics of the study population, shedding light on their occupation and educational status. Regarding occupation, a substantial proportion of 30.00% were student, 29.38% participants were unemployed, and 16.56% were homemakers respectively. Examining educational status, a notable 40.00% have educational attainment below the primary level, while 14.06% are under S.S.C., and 17.19% have completed the S.S.C.

level. Additionally, 17.50% of the participants were graduates. Table 3 provides a detailed overview of the thyroid status within the study population. The mean±SD for FT3 (Triiodothyronine) is 1.66±1.47ng/ml, with a range spanning from 0.5-1.85ng/ml. For FT4 (Thyroxine), the mean±SD is 9.93±3.84µg/dL, exhibiting variability across the range of 1.0-12.50µg/dL. Furthermore, TSH displays a mean±SD of 5.88±3.87µg/dL, with values ranging from 0.5-12.50µg/dL. In Table 4, the psychiatric disorders within the study population are outlined. Among these, depressive disorder stands out as the most prevalent condition, affecting 37.81% of the total sample. Obsessive-compulsive disorder closely follows at 38.13%, with 109 individuals (34.06%) experiencing anxiety disorder. Schizophrenia, while fewer in occurrence, is noted in 70 cases (21.88%). Bipolar mood disorder and panic disorder show lower percentages, at 4.06% and 25.94%, respectively. Conversion disorder is observed in 90 patients, making up 28.13% of the population under study. Figure 2 illustrates the prevalence of thyroid disorders within the study population; hyperthyroidism emerges as the predominant thyroid disorder, affecting 77.41% of the participants. Hypothyroidism is observed in 17.64% of the population, while a smaller percentage, 4.95%, exhibits subclinical hypothyroidism.

Table 1. Age distribution of the study population (N=320).

Age group (in years)	Frequency (n)	Percentage (%)
0-10	7	2.19
11-21	105	32.81
21-30	113	35.31
31-40	57	17.81
41-50	26	8.13
>50	12	3.75
Total	320	100.00
Mean±SD	26.85±11.98	

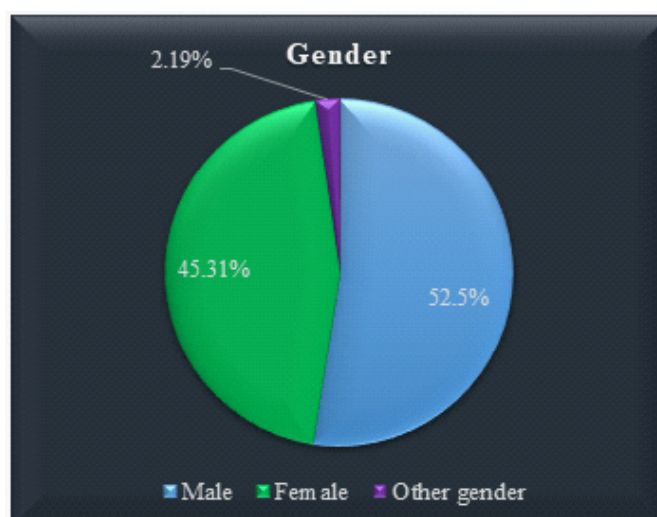


Figure 1. Gender distribution of the study population (N=320).

Table 2. Socio-demographical status of the study population (N=320)

Variables	Frequency (n)	Percentage (%)
Occupation		
Self-employed	94	29.38
Student	96	30.00
Housewife	53	16.56
Job holder	45	14.06
Farmer	8	2.50
Others	24	7.50
Educational status		
Below primary	128	40.00
Under S.S.C	45	14.06
SSC	55	17.19
HSC	33	10.31
Graduate	56	17.50
Others	3	0.94

Table 3. Thyroid status of the study population.

Variables	Mean±SD	(Min-max)
FT3 (ng/ml)	1.66±1.47	0.5-1.85
FT4 (µg/dL)	9.93±3.84	1.0-12.50
TSH (µg/dL)	5.88±3.87	0.5-12.50

Table 4. Psychiatric disorder of the study population.

Disorder	Frequency (n)	Percentage (%)
Depressive disorder	121	37.81
Schizophrenia	70	21.88
Bipolar mood disorder	13	4.06
Anxiety disorder	109	34.06
Conversion disorder	90	28.13
Panic disorder	83	25.94
OCD	122	38.13

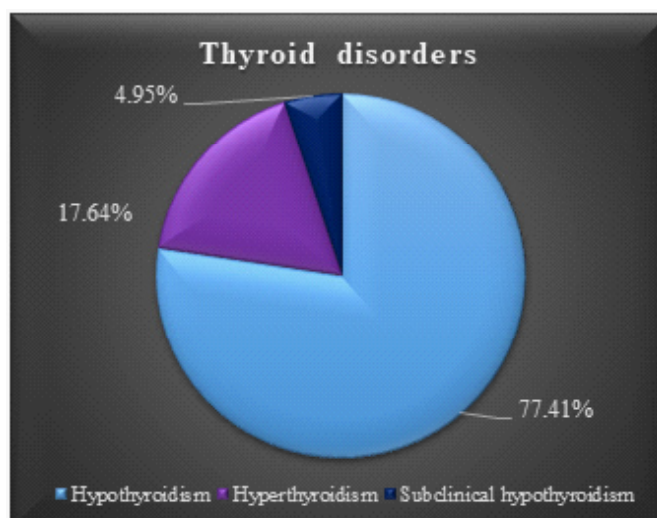


Figure 2. Distribution of thyroid disorders.

4. Discussion

This study involved the prospective evaluation of 320 psychiatric patients. The average age of the participants

was 26.85 years, with the majority falling between the ages of 11 and 30 years (68.12%). Comparable to our findings, a case-control study conducted in India

reported a mean age of 24.88 years for their study group [13]. Consistent with many previous studies, our research indicated that more than 50% of psychiatric patients were males [13,14]. Among the 320 cases examined, at least one of three analyzed hormone measures fell outside the reference range, with the majority of these cases classified as hyperthyroidism, hypothyroidism, or subclinical hypothyroidism. In our study, the level of FT3 in psychiatric patients was measured at 1.66 ± 1.47 ng/ml. This aligns closely with findings from a study by Kamble et al., which reported a similar level of FT3 [15]. However, another study conducted in India reported slightly higher levels of FT3 in their study group (3.58 ± 2.79) [13]. Our study also found the average level of FT4 to be 9.93 ± 3.84 ng/ml among the participants. This observation is consistent with findings reported by Kirkegaard C, Faber J., and Muller and Boning [16,17]. Conversely, Goyal et al. reported a slightly lower average for FT4 [13]. In addition to elevated levels of FT4, decreased levels of total triiodothyronines (T3) in psychiatric patients suggested a potential defect in the conversion of thyroxine (T4) to triiodothyronine (T3) in these individuals, possibly linked to major psychiatric illnesses. Our study revealed a mean standard value of Thyroid Stimulating Hormone (TSH) of 5.88 ± 3.87 ng/ml. It has been documented that alterations in thyroid function are common among patients with psychiatric diseases, including slight elevations in serum T4 levels, blunted TSH responses to TRH stimulation, and loss of the nocturnal TSH rise, all of which may indicate brain hypothyroidism [18]. Some studies have reported lower average TSH values than ours [13,15]. Hypothyroidism is considered a direct or indirect factor in many major psychiatric disorders. For instance, in depression, reduced cerebral alpha- and beta-adrenergic receptors due to hypothyroidism can lead to decreased catecholamines in the brain, partially explaining neuronal hyperreactivity and depressive symptoms [19,20]. Our study delved into the intersection of psychiatric conditions when analyzing comorbidities. Our findings suggest a prevalent association between thyroid dysfunction and depressive disorder, with 37.81% of patients exhibiting both conditions. This aligns closely with a similar study conducted in a hospital sample in South East Asia, where 26.2% of patients with depressive disorder were found to have thyroid dysfunction [21]. In addition, our research revealed that 21.88% of schizophrenia patients also presented with thyroid dysfunction, a finding consistent with a study by Poyraz et al. conducted in 2008 [22]. Among other

notable psychiatric comorbidities observed in our study were obsessive-compulsive disorder (38.13%), anxiety (34.06%), and conversion disorder (28.13%). However, these findings diverge from some previous studies, suggesting that regional variations may play a significant role in such differences [23-25]. Hyperthyroidism has also been identified as a common thyroid disorder among psychiatric patients [26,27], as confirmed by our study, where the majority (77.14%) of the study population suffered from hypothyroidism (Figure 2). The association between hypothyroidism, hyperthyroidism, and neuropsychiatric disorders has long been recognized, either as a cause or consequence [28]. Hyperthyroidism emerged as the second most common thyroid disorder in our study, with a small proportion (4.95%) of the study population experiencing subclinical hypothyroidism. Notably, subclinical hypothyroidism tends to be more prevalent in older psychiatric patients compared to younger ones [29].

Limitation of the study: The study examines the thyroid profile of psychiatric patients in Khulna, Bangladesh, but it has limitations. Its retrospective nature hinders establishing causality between thyroid disorders and psychiatric conditions. Being conducted in a single tertiary care hospital may only partially represent the broader population. Future research should use prospective designs, larger samples, diverse settings, and control groups to address these limitations and provide comprehensive insights into the relationship between thyroid disorders and psychiatric conditions in Bangladesh.

5. Conclusion and Recommendations

In conclusion, this study provides valuable insights into the thyroid profile of psychiatric patients in Khulna, Bangladesh. There is a notable occurrence of thyroid disorders, with hyperthyroidism being the most frequently observed condition, followed by hypothyroidism and subclinical hypothyroidism. The findings underscore the importance of routine thyroid screening in psychiatric patients to identify potential contributing factors to their symptoms and optimize treatment outcomes. Moreover, the study highlights the need for further research to elucidate the complex relationship between thyroid dysfunction and psychiatric disorders, paving the way for more targeted interventions and improved patient care in this population.

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