

**AFRICAN JOURNAL OF  
MEDICINE**  
and medical sciences

**VOLUME 32, NO 1**

**MARCH 2003**



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ISSN 1116—4077

## A study of psychiatric symptoms in thyrotoxic Nigerians

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### Summary

Psychiatric symptoms suggesting panic, affective, and even schizophrenic disorders have been described in thyrotoxic patients. However, this has not been previously described among Nigerians. We have therefore conducted a cross-sectional study of psychiatric symptoms among thyrotoxic Nigerians. The self-rated General Health Questionnaire (GHQ-30) and the Hospital Anxiety and Depression Scale (HADS) were administered on 8 previously untreated newly diagnosed thyrotoxics. Eight age and sex-matched diabetics and 8 apparently healthy controls were also recruited as controls. 1 subject was a male while 7 were females. Their ages ranged from 29 to 60 years, mean  $44.5 \pm 11.4$  years. Graves' disease was the cause of thyrotoxicosis in 7 subjects while the other had toxic multinodular goiter. Symptoms of thyroid disease had been present in them for a mean of  $9.1 \pm 6.8$  months. Based on GHQ-30 scores, 4 thyrotoxics, 4 diabetics and 2 healthy controls had significant psychiatric symptoms. The HADS identified symptoms of anxiety in 3 thyrotoxics, no diabetic and 2 healthy controls. Symptoms of depression was however present in 2 thyrotoxics, 1 diabetic and no healthy control. The mean GHQ-30, Anxiety and Depression scores were comparable across all subject groups:  $P = 0.489, 0.277,$  and  $0.125$  (ANOVA), respectively. None of the psychiatric symptom ratings significantly correlated with serum T3 levels. Our result does not show prominence of psychiatric symptoms in our thyrotoxic patients. Further, larger studies are required to validate this finding.

**Keywords:** *Psychiatric, symptoms, thyrotoxicosis, Nigerians.*

### Résumé

Les symptômes psychiques suggérant les désordres de panique, d'affection et de schizothrénique ont été décrit pour la première fois chez les patients thyrotoxiques nigériens. Une étude croisée a été conduite parmi les nigériens thyrotoxiques ayant des symptômes psychiques. Le taux unique d'un questionnaire de santé générale (GHQ-30) l'anxiété d'admission et le niveau de dépression (HADS) étaient diagnostiqués chez 8 patients (one male

et sept femelles) thyrotoxiques non-traités d'âge et sexe correspondant ont été recrutées. Les âges variaient entre 29-60 ans avec une moyenne d'âge de  $44.5 \pm 11.4$  ans. La maladie de Graves était la cause de la thyrotoxicité chez 7 patients et le reste des patients avait la goitre multinodulaires toxiques. La durée moyenne des symptômes de la maladie de la thyroïde était présent  $9.9 \pm 6.8$  mois. A base du résultat du GHQ-30, 4 patients thyrotoxique, 4 cas de diabète 2 contrôles sain avait significativement des symptômes psychiques. Les HADS identifiaient les symptômes d'anxiété chez 3 patients thyrotoxique, pas des cas chez les diabetiques et 2 contrôles sain. Les symptômes de dépression était cependant présent chez 2 cas des thyrotoxiques, 1 cas de diabétique et pas aux contrôles. Les résultats du GHQ-30, d'anxiété et de dépression étaient comparées parmi les groupes de  $0.489; 0.277$  et  $0.125$  respectivement (Anova). Il n'y avait aucune variation significative entre les symptômes psychiques et le taux de serum T3. Ces résultats ne montrent pas la sévérité de symptômes psychiques chez les patients thyrotoxiques. Cependant des études sur une large population sont nécessaires pour valider ces données.

### Introduction

Patients with thyrotoxicosis have been observed to have psychiatric symptoms and have been diagnosed as schizophrenic, [1] affective-disordered, [2] or paranoid [3]. In addition, psychiatric symptoms are usually listed as part of the symptoms of thyrotoxicosis [4]. Though it is doubtful if 'thyrotoxic psychosis' is a specific clinical entity, statistical analysis of thyrotoxic patients with concurrent affective psychosis shows an incidence well above chance co-occurrence [5]. It appears also that thyrotoxicosis may be a precipitant of acute affective disorders. A role of psychic stress in precipitating hyperthyroid Graves' disease has also been suggested but the evidence in support of this pathogenetic mechanism is conflicting [6].

Thyrotoxicosis, regardless of its cause, has been reported to be less common in the developing nations of Africa compared with the industrialised nations of Europe and North America [7-9]. The diffuse toxic goiter of Graves' disease (GD) however still appears to be the commonest cause of thyrotoxicosis in Nigeria [9,10]. While a few studies have described the symptomatology of thyrotoxicosis as seen in Nigerians, [9,10] none, to our knowledge, has studied psychiatric and neuropsychological

symptoms specifically. The purpose of our investigation was to describe psychiatric symptoms in Nigerians with untreated thyrotoxicosis using standardised self-rated scales.

### Methods

This cross-sectional, controlled study was conducted at the Endocrinology Clinic of the Obafemi Awolowo University Teaching Hospital, Ile-Ife, Osun-State, South-western Nigeria. The index population consisted of consecutive previously untreated newly diagnosed thyrotoxics seen at the clinic who provided informed consent to participate in the study. Upon recruitment, each subject was evaluated clinically and biochemically to confirm the diagnosis of thyrotoxicosis. Exclusion criteria included pregnancy, other significant comorbid medical or neurological illness or history of psychiatric illness. Thirteen subjects were evaluated in all but 8 satisfied the criteria for inclusion. Eight age and sex matched type 2 diabetics as well as 8 healthy volunteers drawn from the hospital staff were recruited to serve as controls. All subjects were blinded to the ultimate goal of the study to minimise bias.

All subjects completed the previously tested and validated [11] self-rated English version of the 30-item General Health Questionnaire (GHQ-30) [12] as well as the Hospital Anxiety and Depression Scale (HADS)[13]. The GHQ-30 consists of 30 items in which the subject selects the answer that most nearly applies to him/her in the preceding one month. Total scores of 5 or more confers a probability of psychiatric caseness. The HADS consists of seven questions each relating to symptoms of anxiety and depression (14 in all). Subjects are asked to choose one response from the four given for each question. Each answer is scored from 0 to 3, the higher value indicating more of the state described. Anxiety and depression were scored separately as 0 to 7 normal, 8 to 10 borderline abnormal, and 11 to 21 abnormal. Assistance was offered and clarification was made whenever any subject encountered difficulties with the questionnaires.

Data obtained from the three groups were compared using analysis of variance (ANOVA) and Students t test. Interrelationship among serum T3 levels and symptom scores were determined by linear regression analysis. Statistical tests were one-tailed and the level of significance was set at 0.05. Other results are presented as mean  $\pm$  SD and percentages as appropriate.

### Results

Eight subjects fulfilled the criteria for inclusion and were included in the analysis. One was a male while 7 were females, male:female ratio 0:14. The age range for thyrotoxic subjects was 29-60 years, mean  $44.5 \pm 11.4$  years; diabetics 26-59, mean  $43.1 \pm 11.9$  years; and healthy controls 27-62, mean  $42.7 \pm 12.2$  years  $p > 0.05$ . Mean body mass index for thyrotoxic subjects was  $21.3 \pm 2.9$

kg/m<sup>2</sup> (range 17.4 - 27.9). Seven (87.5%) of the thyrotoxic population had Graves disease while 1 (12.5%) had toxic multinodular goiter. Mean duration of disease for thyrotoxic subjects was  $9.1 \pm 6.8$  months (range 3-24 months). All thyrotoxic subjects had biochemical confirmation, mean serum T3 level was  $5.5 \pm 2.3$  nmol/l (normal 1.2 - 2.9), serum T4  $250.1 \pm 85$  nmol/l (normal 60 - 150). The Waynes clinical index score [14] ranged between 22 and 36, mean  $30.6 \pm 4.6$  in thyrotoxic subjects. See table 1.

**Table 1:** Summary of clinical characteristics of thyrotoxic subjects (N = 8).

Parameter	Mean $\pm$ SD	Range
Age (years)	$44.5 \pm 11.4$	29 - 60
Body Mass Index (kg/m <sup>2</sup> )	$21.3 \pm 2.9$	17.4 - 27.4
Diagnosis		
Graves' disease	7	
Toxic Multinodular Goiter	1	
Disease Duration (Months)	$9.1 \pm 6.8$	3 - 24
Serum T3 (Nmol/L)	$5.5 \pm 2.3$	2.9 - 8.8
Serum T4 (Nmol/L)	$250.1 \pm 85$	158 - 386.1
Waynes Score	$30.6 \pm 4.6$	22 - 36

**Table 2:** Comparison between mean symptom scores among thyrotoxics, diabetics and healthy controls (N = 8, mean  $\pm$  SEM).

	Thyrotoxics	Diabetics	Healthy controls	P value
GHQ-30	$7.1 \pm 3.3$	$6.4 \pm 1.9$	$3.3 \pm 1.6$	0.489
Anxiety	$6.0 \pm 1.2$	$3.5 \pm 1$	$5.7 \pm 1.3$	0.277
Depression	$4.6 \pm 1.5$	$5.6 \pm 0.8$	$2.5 \pm 0.6$	0.125

As shown in table 2, the mean GHQ-30 scores for thyrotoxic subjects was  $7.1 \pm 3.3$  (0-23), diabetics  $6.4 \pm 1.9$  (0-15), and healthy controls  $3.3 \pm 1.6$  (0-12)  $p = 0.489$ . Mean HADS anxiety and depression symptom scores were similar across the 3 groups,  $p = 0.277$  and  $p = 0.125$ , respectively. Based on GHQ-30 scores, 4 thyrotoxics and diabetics each as well as 2 healthy controls had symptoms of psychopathy. The HADS identified symptoms of anxiety in 3 thyrotoxics, no diabetic, and 2 healthy controls. Symptoms of depression were however present in 2 thyrotoxics, 1 diabetic and no healthy control.

Though all of the psychiatric symptom ratings positively correlated with serum T3 levels, none reached statistical significance. GHQ-30  $r = 0.14$ ,  $p = 0.9$ ; Anxiety  $r = 0.26$ ,  $p = 0.526$ ; and Depression  $r = 0.1$ ,  $p = 0.8$  (Table 3).

**Table 3:** Correlation values for serum t3 and symptom ratings.

	r Value	p Value
GHQ-30	0.14	0.9
Anxiety	0.26	0.526
Depression	0.1	0.8

## Discussion

We have assessed psychiatric symptoms in untreated thyrotoxicosis using standardised instruments. Though our patients exhibited symptoms suggestive of psychiatric disease, they did not differ from age and sex matched diabetics or healthy controls. Although there is no directly comparable data from Nigeria, several Caucasian studies have noted a high prevalence of psychiatric symptoms and disorders in thyroid diseases [1-3,5,6]. Affective disorders however appear to be the commonest disorders reported among thyrotoxic subjects [1,2,5]. The observation of Matsubayashi among patients with Graves' disease in Japan also corroborates this notion [15]. Differentiating states such as thyrotoxic anxiety from a primary anxiety disorder based upon symptom ratings may however be a confounding factor. The presence of goiter and heat intolerance are helpful physical clues in this regard [16]. Also, concurrent weight loss and a voracious appetite for food unlike in primary major depression accompany hyperthyroid induced depression. Further, the GHQ-30 identifies symptoms referable to psychopathy but does not by itself provide a psychiatric diagnosis. These factors may have influenced our findings.

Correlations between psychiatric symptoms scales and serum T3 showed no trends to suggest any strong association between them. These symptoms are generally reported as associated with thyrotoxicosis regardless of actual thyroid hormone levels [16]. This is also consistent with the broadly accepted lack of relationship between the severity of peripheral thyrotoxic symptoms and the degree of thyroid hormone elevation [17, 18].

Our result does not show prominence of psychiatric symptoms in Nigerian thyrotoxic subjects unlike most Caucasian studies. Methodological and racial differences might in part explain this. Further, larger studies are required to validate this finding.

## Acknowledgements

The authors acknowledge, with thanks, the contributions and suggestions of Dr Celestine Mume, Lecturer/Consultant Psychiatrist, Obafemi Awolowo University, Ile-Ife and Prof. Bode Balogun, Medicine Department, Obafemi Awolowo University, Ile-Ife to this work.

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