

ORIGINAL ARTICLE

A Population-Based Evaluation of Depression Symptoms and Hypothyroidism

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ABSTRACT

Background: Findings in sub-clinical situations are inconsistent, despite the fact that overt hypothyroidism is often accepted as a primary cause of depression

Material and Methods: In a population-based research of 1298 middle-aged women residing in Peshawar, we looked at the link between hypothyroidism and depressive symptoms

Results: 45.7 percent of the participants had depressed symptoms, and 12.3% had hypothyroidism. Women with TSH>10 mUI/ml had a twofold likelihood of presenting depressive symptoms compared to those with normal TSH levels, according to a multiple logistic regression study that controlled for age, BMI and smoking. The adjusted OR was 8.7 among individuals with clinical hypothyroidism. Conclusion: In the general population, TSH levels over a particular threshold have been related to an increased risk of depression. As a result, depression symptoms should be examined in thyroid dysfunction patients, and sad individuals should have their TSH levels checked.

Keywords: depression, hypothyroidism, TSH level, thyroid, function

INTRODUCTION

There is evidence in the literature that implies a link between thyroid dysfunction and mental problems.(1-3) Hypothyroidism is a known risk factor for depression, as is overt hypothyroidism. (4) The mechanisms through which thyroid malfunction affects the chance of developing depression are unknown, however alterations in the HPT (hypothalamus–pituitary–thyroid) axis' catecholamine system, as well as the serotonergic pathway, may play a role (5) have been suggested as possible links. In spite of the scientific data that points to a probable connection between hypothyroidism and the emergence of depressive disorders, some investigations indicate that there is no connection between these occurrences.

As a result, one of our primary research objectives was to investigate whether or not hypothyroidism is linked to the manifestation of depressive symptoms in a population-based sample.

METHODOLOGY

A cross-sectional research was conducted from Jan 2021 to Jan 2022 in Pak International Medical College [PIMC] Hayatabad Peshawar. Women who were pregnant or lactating, as well as those who had hyperthyroidism (TSH≤ 0.3 mUI/ml), were excluded. The probability sampling was conducted in three distinct stages. First, 100 main sample units were selected randomly from the city. Second, 15 homes from each main sample unit were chosen. Third, one female resident from each family was chosen. 1500 women were sampled. The sample size was estimated using a prevalence of 10% with 5% accuracy and a 20% non-response rate. The sample's precision was 5%.

1298 (86.5%) women participated in this research (with a non-response rate of 13.5%), three biochemical tests were lost, and 46 (3.6%) women were eliminated due to hyperthyroidism. For the purpose of assessing depressive symptoms, an instrument that had been standardized and validated in the past was adapted into a scale. (6)

This instrument's validation showed a sensitivity of 41% and a specificity of 88% that were similar to those observed in the original validation (sensitivity: 57 percent ; specificity: 98 percent) (7). The tool used was derived from Roberts et al mood 's disorders component of the original PRIME-MD (2000). It consists of 12 yes/no questions that measure psychological issues that the respondent experienced on a daily or almost daily basis for the two weeks prior to the interview. Subjects who replied yes to at least

one of the following questions: "Have you felt gloomy, blue, or depressed?" and "Did you lose interest or pleasure in most things?" and who also had four additional signs of depression were classified as "cases." In this research, the internal consistency was good. The data was further evaluated using hypothyroidism diagnostic criteria: euthyroidism (TSH>0.3 ≤ 4 mUI/ml), subclinical hypothyroidism (TSH>4 mUI/l and normal free T4), and clinical hypothyroidism (TSH>4 mUI/l and free T4 < 0.7 ng/dl).

The following aspects of the participants were taken into consideration when conducting the research: their age in years, whether or not they smoked (yes or no), how they perceived their own health, their body mass index, and the presence or absence of any co-morbidities. The individual sample weights were used in all statistical analyses, which took into consideration the influence of the sample design. The results were log-transformed to compare TSH means. Using the statistical software, the relationship between TSH levels/hypothyroidism and the existence of depressive symptoms (YES/NO) was investigated using logistic regression. All participants gave their written informed permission, which was authorized by the institution's Ethics Committee, to participate in the study.

RESULTS

Table 1:

	n	%	P-value
35-44	388	49.2	0.11
45-54	408	46	
55-64	240	44	
>65	213	41.0	0.06
<25	533	42	
25-29.9	399	48	
>30	236	51	0.001
Current smoking			
Yes	295	54.4	
No	254	43.3	0.001
Co-morbidities			
0	453	40.6	
1	429	44.2	0.001
2	240	51.0	
>3	111	57.4	
Self-related health			0.001
Very good	187	22.3	
Good	442	33.1	
Regular	525	59.4	
Poor	95	76.7	

After taking out the women who had hyperthyroidism from the study, the ages of the remaining 1249 women ranged from 35 to 91 years, with the mean age being 53.6 years. 21.8 percent of those surveyed identified themselves as current smokers, whereas 41.1 percent characterized themselves as having a normal state of health. The incidence of depressive symptoms was found to be 45.7%, and 12.3% presented with hypothyroidism (TSH>4 mUI/ml or using medication for hypothyroidism). Regarding TSH levels, 89.8 percent of the cases (>0.3 and 4≤ mUI/ml) were within the normal range, 5.5 percent of the cases (>4 and 6≤ mUI/ml), 2.3 percent of the cases (>6 and 10≤ mUI/ml), and 2.3 percent of the cases (>10 mUI/ml) were within the normal range. As a result, 10.1 percent had TSH levels more than 4 mUI/ml, whereas 2.2 percent

of those with normal TSH levels were on hypothyroidism medication. TSH mean levels grew dramatically as people became aged. Higher TSH mean levels were also detected among women with the highest BMI, current nonsmokers, and those who reported poor self-rated health; however the latter was not statistically significant. TSH mean levels were higher in women with depressive symptoms than in those who were not depressed. There was a statistically significant correlation between age, smoking, co-morbidities, & self-rated health status to depression symptoms (p 0.05). (Table 1).

Within the normal TSH range (>0.3 and 4 mUI/ml), 44.1 percent of those below and 46.6 percent of those over the median value (TSH= 1.5 mUI/ml) had depressive symptoms, respectively.

Table 2 shows:

TSH level	n	%	95%CI	Age-adjusted	OR* (95% CI)	OR** (95% CI)
0.3-4	1126	45.4	1.0	1.0	1.0	1.0
4-6	71	36.1	0.68	0.69	0.78	0.77
6-10	25	61.2	1.90	1.86	202	1.85
>10	27	65.0	2.24	2.49	3.06	2.90
Euthyroidism 0.3-4	1126	45.5	1.0	1.0	1.0	1.0
Sub clinical hypothyroidism	103	43.6	0.93	0.95	1.06	1.02
Clinical hypothyroidism	20	79.2	4.57	4.89	8.70	8.05

Table 2 shows that 66% of individuals with high TSH (>10 mUI/ml) experienced depressed symptoms, compared to 45.4% of those with normal TSH (>0.3 and 4 mUI/ml). TSH>10 mUI/ml is linked to depression in an age-adjusted model. Women with >10 mUI/ml TSH had twice as many depressed symptoms as those with normal TSH.

When comparing women with overt (clinical) hypothyroidism to those with euthyroidism, those with the overt (clinical) manifestation of the condition were 8.70 times more likely to have depressive symptoms (95 percent CI 2.56–29.50). Thyroid illness knowledge was also included in the models, which yielded comparable findings. The occurrence of depressed symptoms was not linked to subclinical hypothyroidism.

DISCUSSION

Even after accounting for preexisting thyroid disorders, this investigation found a statistically significant link between TSH levels >10 mUI/ml and the occurrence of depressive symptoms. Prior to and after adjusting for past thyroid illness information, a substantial link was discovered between clinical hypothyroidism and depressive symptoms. The findings of the research that looked at this connection were mixed: some identified a link between increasing TSH levels and the prevalence of depressive illnesses, while others found no link, others have not shown any association. However, several of these studies have limitations that restrict the generalizability of the findings, such as small sample sizes, assessment of groups solely made up of elderly people, lack of a control group, and lack of correction for confounding factors. Furthermore, the majority of the material on psychological changes in thyroid illness comes from samples of patients with severe disease, rendering the extent of such changes in less severe thyroid diseases unknown. In addition, some research were conducted in a hospital setting. Patients in hospitals are known to have a greater rate of mental illnesses than the general community(4) . The majority of population-based research that looked at this relationship found no link. (1) Regardless of prior awareness of thyroid illness, our research found a link between elevated TSH levels and the occurrence of depressive symptoms. Our results imply that biological links, rather than psychological issues related to a chronic health condition, underlie the relationship between thyroid malfunction and mental health. The high incidence of depressive symptoms discovered might be explained in part by the fact that the research cohort was solely made up of peri-menopause women. Furthermore, in compared to industrialized nations, developing countries seem to have a greater incidence of mental diseases. (8) It may happen because of

feelings of fear and despondency, fast societal changes, and the hazards of violence and physical illness that come with poverty.(9) We grouped the individuals based on a single TSH and T4 assay since we did not have the benefit of doing several thyroid function tests or having information of their clinical histories, which was a methodological limitation of this investigation. Thyroid illness was discovered in fewer than half of mental in-patients with an abnormal T4 or TSH value in a research by Lederbogen et al. (2001).(10)

CONCLUSION

Even after taking into consideration the fact that those with higher TSH levels were more likely to have a history of thyroid disease in the past, the findings of this population-based analysis revealed that people with higher TSH levels had a larger prevalence of depressive symptoms. There was a much stronger link between clinical hypothyroidism and depressed symptoms than the link shown with the subclinical form of the condition; however, there was no link seen with the clinical form of the disease.

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