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The Coexistence of Depressive Syndrome Among Patients with Autoimmune Thyroid Pathology and Vitamin D Deficiency – A Mere Coincidence?

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Abstract:
***Objectives**: Depressive syndrome is commonly observed in patients with autoimmune thyroid diseases, often coexisting with specific endocrine symptoms. This study highlights a higher prevalence of depression in patients from urban environments, potentially influenced by occupational, educational, and psychosocial factors, as well as environmental endocrine disruptors. Depression may develop at any age, with increased frequency among older individuals due to chronic health conditions. Early identification using tools such as the Beck Depression Inventory can support timely intervention and appropriate treatment strategies.*
***Methods**:This paper presents a clinical observational study involving 80 patients with autoimmune thyroid disease from the Dobrogea region, Romania. Participants were divided into two groups: Group 1 with chronic autoimmune thyroiditis (CAT, n=62) and Group 2 with Graves' disease (GD, n=18), reflecting the lower prevalence of GD. Inclusion criteria required confirmed autoimmune thyroid disease and residence in Constanța County. Patients underwent clinical and paraclinical evaluations, including hormonal and antibody testing, as well as vitamin D level assessment. Depression was screened using the Beck Depression Inventory II (BDI-II), a 21-item tool used to assess the presence and severity of depressive symptoms, particularly in relation to vitamin D deficiency.*
***Results**: The study found that depression was more prevalent among GD patients (66.7%) compared to those with CAT (53.2%), with higher incidence in urban areas and among older individuals. Increased depression severity was associated with lower vitamin D levels, higher ATPO and TRAb levels, and suboptimal thyroid function. Mild depression was most common and linked to vitamin D deficiency in both groups. The Beck Depression Inventory-II effectively captured varying depression degrees across clinical and biochemical parameters.*
***Conclusions**: Depression is a common comorbidity in autoimmune thyroid disorders and should be systematically assessed, with a multidisciplinary approach and attention to vitamin D status using cost-effective screening methods.*

***Keywords**: depression; chronic autoimmune thyroiditis; Graves'disease; vitamin D; Beck depression inventory.*

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1. Introduction

Depressive syndrome is frequently observed among patients with autoimmune thyroid disease, and its presence must be individually assessed for each patient. In addition to the specific signs and symptoms of autoimmune thyroid disorders, patients may also exhibit psychiatric symptoms. Identifying and quantifying these can provide clinical benefits in terms of treatment, whether that involves psychotherapy or medication (Siegmann et al., 2018).

Regarding the presence of depressive syndrome among patients with autoimmune thyroid disease and its correlation to the environment of origin, both in the CAT (chronic autoimmune thyroiditis) and GD (Graves' disease) groups, the study observed a higher prevalence of depressive syndrome among patients from urban areas. This tendency may be explained by patients' occupations, education level, marital status, exposure to psychosocial stressors, and environmental endocrine disruptors commonly encountered in urban settings (Jackson-Koku, 2016; Stanić et al., 2023).

Depressive syndrome can appear at any age, with onset influenced by familial predisposition and environmental factors. Typically, depression is more frequent among older patients, likely due to the presence of chronic illnesses that may affect their quality of life (Stanić et al., 2023). The characteristics, severity, progression, and prognosis of depressive syndrome can differ depending on the patient's age (Jackson-Koku, 2016; Stanić et al., 2023).

The presence of depressive symptoms in patients with autoimmune thyroid disease can be easily screened through quick assessments or self-evaluation tools (Mojtabai, Olfson, & Han, 2016). Among these, an accessible and simple option is the Beck Depression Inventory, a 21-question survey used to identify and assess the degree of depression in both the general population and those with associated pathologies (Nguyen, 2023; Button et al., 2015).

2. Materials and Methods

This scientific paper presents a clinical observational study on 80 patients with autoimmune thyroid pathology from the Dobrogea region, Romania. The entire study group (n=80) was divided based on diagnosis into two groups: **Group 1 (CAT),** including 62 patients (77.5%), and **Group 2 (GD),** including 18 patients (22.5%). The disparity in group sizes is due to the lower incidence of GD compared to CAT. Inclusion criteria comprised the presence of autoimmune thyroid disease and residency in Constanța County. Exclusion criteria included lack of informed consent, coexisting autoimmune diseases, or other unrelated pathologies. Evaluation of the patients in the study followed several stages: anamnesis, clinical examination and paraclinical examination which included: hormone dosage – TSH (thyroid stimulating hormone), FT4 (free thyroxine), ATPO (antithyroidperoxidase antibodies), ATG (antithyroglobulin antibodies), TRAb (TSH receptor antibodies) and 25-OH-vitamin D dosage, as well as the classification of patients according to the value obtained (severe deficiency < 10 ng/ml; deficiency: 10-20 ng/ml; insufficiency 21-29 ng/ml; optimal level > 30 ng/ml).

A quick questionnaire was used as well to assess the existence and severity of depressive syndrome, which could be useful in evaluating patient progression. The **Beck Depression Inventory-II (BDI-II)** was used to identify the presence of depression in patients with autoimmune thyroiditis associated with vitamin D deficiency. The test consists of 21 items measuring the severity of depressive symptoms. Each item has 4 response options scored from 0 to 3. The total score ranges from 0 to 63 and is interpreted as follows:

- **0–9**: Normal (no depression)
- **10–15**: Mild depression
- **16–23**: Moderate depression
- **24–63**: Severe depression

The scores from all 21 questions are summed up, and the final score may range from 0 to 63 points. A score between 0–9 points shows a normal state and, implicitly, the absence of depression; a score between 10–15 points indicates a mild depression; a score between 16–23 points indicates

moderate depression; and finally, a score between 24–63 points suggests a severe depression (Jackson-Koku, 2016; Button et al., 2015).

3. Results

In the CAT group, 41.9% (n=26) of patients had mild depression, of which 27.4% came from urban areas; 6.5% (n=4) had moderate depression, of which 4.8% were from urban areas; 4.8% (n=3) had severe depression, all from urban environments. In the GD group, 61.1% (n=11) had mild depression, of which 44.4% came from urban areas; 5.6% (n=1) had moderate depression, coming from a rural area; no patients in the GD group had severe depression (Table 1).

Table 1. Distribution of patients by study groups according to the degree of depression and their environment of origin

Group				Environment		
				Rural	Urban	Total
CAT	Depression score	Normal	Count	5	24	29
			% of Total	8.1%	38.7%	46.8%
		Mild depression	Count	9	17	26
			% of Total	14.5%	27.4%	41.9%
		Moderate depression	Count	1	3	4
			% of Total	1.6%	4.8%	6.5%
		Severe depression	Count	0	3	3
			% of Total	0.0%	4.8%	4.8%
	Total		Count	15	47	62
			% of Total	24.2%	75.8%	100.0%
GD	Depression score	Normal	Count	1	5	6
			% of Total	5.6%	27.8%	33.3%
		Mild depression	Count	3	8	11
			% of Total	16.7%	44.4%	61.1%
		Moderate depression	Count	1	0	1
			% of Total	5.6%	0.0%	5.6%
	Total		Count	5	13	18
			% of Total	27.8%	72.2%	100.0%

For patients with CAT, the average age of those with mild depression was 52.5 years; for moderate depression, the average age was 56.5 years; and for severe depression, the average age was 60.67 years. In the GD study group, the average age of patients with mild depression was 58.45 years, and for those with moderate depression, the average age was 62 years. As a result, patients with GD tended to be older than those with CAT across corresponding levels of depression severity. Additionally, in both groups, the severity of depression was associated with an increase in average patient age (Table 2).

Table 2. Distribution of patients by study groups according to the degree of depression and age

Group	Depression score		N	Minimum	Maximum	Mean	SD
CAT	Normal	Age (years)	29	22.00	58.00	38.21	10.43
	Mild depression	Age (years	26	26.00	75.00	52.50	12.09
	Moderate depression	Age (years	4	45.00	62.00	56.50	7.85
	Severe depression	Age (years	3	54.00	67.00	60.67	6.51
GD	Normal	Age (years	6	31.00	56.00	39.50	8.69
	Mild depression	Age (years	11	40.00	75.00	58.45	11.70
	Moderate depression	Age (years	1	62.00	62.00	62.00	.

In both CAT and GD patients, advancing age appeared to correlate with higher severity of depressive symptomatology. CAT patients with mild depression were predominantly aged between 40 and 60 years, while moderate and severe forms were associated with higher average ages. A similar pattern was observed in the GD group, suggesting that age may be an important factor in the clinical presentation of depressive symptoms among patients with thyroid disorders (Table 3).

Table 3. Distribution of patients by study groups according to the degree of depression and age category

Group				Age categories (years)			Total
				(22-40]	(40-60]	(60-75]	
CAT	Depression score	Normal	Count	17	12	0	29
			% of Total	27.4%	19.4%	0.0%	46.8%
		Mild depression	Count	3	17	6	26
			% of Total	4.8%	27.4%	9.7%	41.9%
		Moderate depression	Count	0	2	2	4
			% of Total	0.0%	3.2%	3.2%	6.5%
		Severe depression	Count	0	1	2	3
			% of Total	0.0%	1.6%	3.2%	4.8%
	Total		Severe depression	20	32	10	62
			% of Total	32.3%	51.6%	16.1%	100.0%
GD	Depression score	Normal	Count	5	1	0	6
			% of Total	27.8%	5.6%	0.0%	33.3%
		Mild depression	Count	1	6	4	11
			% of Total	5.6%	33.3%	22.2%	61.1%
		Moderate depression	Count	0	0	1	1
			% of Total	0.0%	0.0%	5.6%	5.6%
	Total		Count	6	7	5	18
			% of Total	33.3%	38.9%	27.8%	100.0%

Depression was more prevalent in the GD group (66.7%) compared to the CAT group (53.2%). Mild depressive symptoms among male patients were more frequent in the CAT group, with seven cases identified, whereas in the GD group, only one male patient exhibited mild depression. As a result, although overall depression rates were higher in GD, mild depression in males was more characteristic of CAT (Table 4).

Table 4. Distribution of patients by study groups according to the degree of depression and sex

Group				Sex		Total
				F	M	
CAT	Depression score	Normal	Count	24	5	29
			% of Total	38.7%	8.1%	46.8%
		Mild depression	Count	19	7	26
			% of Total	30.6%	11.3%	41.9%
		Moderate depression	Count	4	0	4
			% of Total	6.5%	0.0%	6.5%
		Severe depression	Count	3	0	3
			% of Total	4.8%	0.0%	4.8%
	Total		Count	50	12	62
			% of Total	80.6%	19.4%	100.0%
GD	Depression score	Normal	Count	6	0	6
			% of Total	33.3%	0.0%	33.3%
		Mild depression	Count	10	1	11
			% of Total	55.6%	5.6%	61.1%
		Moderate depression	Count	1	0	1
			% of Total	5.6%	0.0%	5.6%
	Total		Count	17	1	18
			% of Total	94.4%	5.6%	100.0%

In both the CAT and GD groups, higher ATPO levels were associated with the presence and severity of depression. Patients in the CAT group showed higher average levels of ATPO in those with some degree of depression compared to those without depression, as follows: severe depression – 447.63 UI/L ± 337.59 SD, and for no depression – 263.41 UI/L ± 236.14 SD. In the GD study group, patients with normal depression scores had a maximum ATPO value of 531 UI/L, compared to depressed patients: 803 UI/L for mild depression and 600 UI/L for moderate depression (Table 5).

Table 5 – Distribution of patients by study groups according to the degree of depression and serum ATPO level

Group	Depression score		N	Minimum	Maximum	Mean	SD
CAT	Normal	ATPO (UI/mL)	29	11.00	850.00	263.41	236.14
	Mild depression	ATPO (UI/mL)	26	50.00	875.00	335.47	214.92
	Moderate depression	ATPO (UI/mL)	4	217.80	801.50	467.55	246.80
	Severe depression	ATPO (UI/mL)	3	142.00	810.00	447.63	337.59
GD	Normal	ATPO (UI/mL)	6	111.00	531.00	344.68	183.78
	Mild depression	ATPO (UI/mL)	11	10.00	803.00	180.30	240.82
	Depresie moderată	ATPO (UI/mL)	1	600.00	600.00	600.00	.

In the CAT group, patients without depression had higher average ATG levels (382.90 UI/mL ± 269.75 SD) compared to those with mild depression (328.88 UI/mL ± 298.36 SD), moderate depression (149.95 UI/mL ± 183.80 SD) and severe depression (204.33 UI/mL ± 160.13 SD). In contrast, in the GD group, patients with depressive symptoms showed higher ATPO values than those with normal depression scores, with the highest levels observed in patients with mild depression (803 UI/L) (Table 6).

Table 6. Distribution of patients by study groups according to the degree of depression and serum ATG level

Group	Depression score		N	Minimum	Maximum	Mean	SD
CAT	Normal	ATG (UI/mL)	29	15.00	879.00	382.90	269.75
	Mild depression	ATG (UI/mL)	26	17.00	898.00	328.88	298.36
	Moderate depression	ATG (UI/mL)	4	23.00	423.00	149.95	183.80
	Severe depression	ATG (UI/mL)	3	20.00	309.00	204.33	160.13
GD	Normal	ATG (UI/mL)	6	48.00	507.00	297.17	177.61
	Mild depression	ATG (UI/mL)	11	10.00	654.00	290.64	228.14
	Moderate depression	ATG (UI/mL)	1	475.00	475.00	475.00	.

Depression analysis among CAT patients revealed its presence in various degrees (mild, moderate, severe) among 33 patients. Most patients with both types of antibodies (ATPO and ATG)

had mild depression. In the group with GD, depression was found in 6 studied patients, mild and moderate (Table 7).

Table 7 – Distribution of patients by study groups according to the degree of depression and the type of antibodies present

Lot				ATPO/ATG/ATPO+ATG			Total
				ATPO+	ATG+	ATPO/ATG+	
CAT	Depression score	Normal	Count	5	5	19	29
			% of Total	8.1%	8.1%	30.6%	46.8%
		Mild depression	Count	7	1	18	26
			% of Total	11.3%	1.6%	29.0%	41.9%
		Moderate depression	Count	3	0	1	4
			% of Total	4.8%	0.0%	1.6%	6.5%
		Severe depression	Count	1	0	2	3
			% of Total	1.6%	0.0%	3.2%	4.8%
	Total		Count	16	6	40	62
			% of Total	25.8%	9.7%	64.5%	100.0%
GD	Depression score	Normal	Count	1	0	5	6
			% of Total	5.6%	0.0%	27.8%	33.3%
		Mild depression	Count	3	3	5	11
			% of Total	16.7%	16.7%	27.8%	61.1%
		Moderate depression	Count	0	0	1	1
			% of Total	0.0%	0.0%	5.6%	5.6%
	Total		Count	4	3	11	18
			% of Total	22.2%	16.7%	61.1%	100.0%

In the GD group, an increase in TRAb serum levels was observed with greater depression severity, with average values of 16.62 UI/L in patients with mild depression and 21.30 UI/L in those with moderate depression (Table 8).

Table 8. Distribution of GD group patients according to the degree of depression and serum TRAb level

Group	Depression score		N	Minimum	Maximum	Mean	SD
GD	Normal	TRAb (UI/L)	6	3.53	13.34	7.36	3.94
	Mild depression	TRAb (UI/L)	11	6.57	26.18	16.62	5.96
	Moderate depression	TRAb (UI/L)	1	21.30	21.30	21.30	.

The association of TSH levels with depression among patients with CAT showed that patients with mild depression had an average TSH level of 4.44 µUI/ml, those with moderate depression had an average TSH level of 3.55 µUI/ml, and those in the severe depression group had an average TSH level of 3.02 µUI/ml. Among GD patients, the average TSH level was 0.03 µUI/ml for those with mild depression and 0.04 for those with moderate depression (Table 9).

Table 9. Distribution of patients by study groups according to the degree of depression and TSH

Group	Depression score		N	Minimum	Maximum	Mean	SD
CAT	Normal	TSH (uUI/mL)	29	1.14	9.00	4.72	2.66
	Mild depression	TSH (uUI/mL)	26	1.52	9.00	4.44	2.20
	Moderate depression	TSH (uUI/mL)	4	1.51	8.30	3.55	3.20
	Severe depression	TSH (uUI/mL)	3	1.67	4.20	3.02	1.27
GD	Normal	TSH (uUI/mL)	6	.01	.07	.04	.02
	Mild depression	TSH (uUI/mL)	11	.01	.06	.03	.02
	Moderate depression	TSH (uUI/mL)	1	.04	.04	.04	.

The evaluation of thyroid functional status according to depression severity revealed that mild depression was observed in 7 patients with subclinical hypothyroidism and 7 patients with overt hypothyroidism. Moderate depression was identified in 3 patients with euthyroidism and 1 patient with clinical hypothyroidism, while severe depression was associated with 2 patients exhibiting normal thyroid function and 1 patient with subclinical hypothyroidism (Table 10).

Table 10. Distribution of patients by study groups according to the degree of depression and thyroid functional status

Group				Thyroid function				Total
				Euthyroid	Subclinical hypothyroidism	Clinical hypothyroidism	Hyperthyroidism	
CAT	Depression score	Normal	Count	13	10	6		29
			% of Total	21.0%	16.1%	9.7%		46.8%
		Mild depression	Count	12	7	7		26
			% of Total	19.4%	11.3%	11.3%		41.9%
		Moderate depression	Count	3	0	1		4
			% of Total	4.8%	0.0%	1.6%		6.5%
		Severe depression	Count	2	1	0		3
			% of Total	3.2%	1.6%	0.0%		4.8%
	Total		Count	30	18	14		62
			% of Total	48.4%	29.0%	22.6%		100.0%
GD	Depression score	Normal	Count				6	6
			% of Total				33.3%	33.3%
		Mild depression	Count				11	11
			% of Total				61.1%	61.1%
		Moderate depression	Count				1	1
			% of Total				5.6%	5.6%
	Total		Count				18	18
			% of Total				100.0%	100.0%

An analysis of the study groups based on depression severity and serum 25-OH-vitamin D levels showed that, among CAT patients, those with mild depression had an average 25-OH-vitamin D level of 19.53 ng/mL, those with moderate depression presented a mean serum concentration of 23 ng/mL, and those with severe depression exhibited an average level of 14.8 ng/mL (Table 11).

In the CAT group, mild depression was identified in 3 patients with severe vitamin D deficiency, 11 patients with vitamin D deficiency, and 9 patients with insufficient vitamin D levels. Among patients with moderate depression, two patients were diagnosed with vitamin D deficiency and 1 with vitamin D insufficiency. In cases of severe depression, one patient each exhibited severe deficiency, deficiency, or insufficiency of vitamin D. In the GD group, 3 patients with mild depression had severe vitamin D deficiency, while 8 patients had vitamin D deficiency. For moderate depression, vitamin D insufficiency was observed in 1 patient (Table 12).

Table 11. Distribution of patients by study groups according to the degree of depression and serum level of 25-OH-vitamin D

Group	Depression score		N	Minimum	Maximum	Mean	SD
CAT	Normal	25-(OH)-vitamin D (ng/mL)	29	9.20	37.70	20.73	7.55
	Mild depression	25-(OH)-vitamin D (ng/mL)	26	7.00	39.00	19.53	7.65
	Moderate depression	25-(OH)-vitamin D (ng/mL)	4	14.00	38.00	23.00	11.17
	Severe depression	25-(OH)-vitamin D (ng/mL)	3	7.00	26.40	14.80	10.24
GD	Normal	25-(OH)-vitamin D (ng/mL)	6	9.00	21.00	13.58	4.63
	Mild depression	25-(OH)-vitamin D (ng/mL)	11	7.00	18.00	11.76	3.21
	Moderate depression	25-(OH)-vitamin D (ng/mL)	1	28.00	28.00	28.00	.

Table 12. Distribution of patients by study groups according to the degree of depression and vitamin D status

				Vitamin D status				
Group				Severe deficiency	Deficiency	Insufficiency	Optimal level	Total
CAT		Normal	Count	1	13	11	4	29
			% of Total	1.6%	21.0%	17.7%	6.5%	46.8%
		Mild depression	Count	3	11	9	3	26
			% of Total	4.8%	17.7%	14.5%	4.8%	41.9%
		Moderate depression	Count	0	2	1	1	4
			% of Total	0.0%	3.2%	1.6%	1.6%	6.5%
		Severe depression	Count	1	1	1	0	3
	Depression score		% of Total	1.6%	1.6%	1.6%	0.0%	4.8%
	Total		Count	5	27	22	8	62
			% of Total	8.1%	43.5%	35.5%	12.9%	100.0%
GD		Normal	Count	2	3	1		6
			% of Total	11.1%	16.7%	5.6%		33.3%
		Mild depression	Count	3	8	0		11
			% of Total	16.7%	44.4%	0.0%		61.1%
		Moderate depression	Count	0	0	1		1
	Depression score		% of Total	0.0%	0.0%	5.6%		5.6%
	Total		Count	5	11	2		18
			% of Total	27.8%	61.1%	11.1%		100.0%

4. Discussions

In the present study, patients with chronic autoimmune thyroiditis showed a higher average age for the severe depression group (60.67 years) compared to those with moderate (56.5 years) or mild depression (52.5 years). Similarly, among patients with GD, the average age was higher in those with moderate depression (62 years) compared to those with mild depression (58.45 years).

The distribution of age categories among patients with autoimmune thyroiditis indicated that mild depression was primarily observed in individuals aged 40 to 60 years. Moderate depression was equally noted in patients within the 40 to 60 and 60 to 75 year age groups. Severe depression was predominantly found in those aged 60 to 75. In patients with Graves' disease (GD), mild depression was more frequently reported among the 40 to 60 age group, while moderate depression was identified in the 60 to 75 year range.

Concerning the prevalence of depression among women and men, research indicates a significant predominance of depression in women across all age groups (Salk, Hyde, & Abramson, 2017). This occurs despite few differences in symptoms, help-seeking behaviours, or treatment adherence (Zhao et al., 2025). In the study groups examined, depression was notably more common among female patients with autoimmune thyroiditis, with 26 women affected compared to 7 men. Similarly, within the group diagnosed with Graves' disease, the results reflected a clear female predominance among those experiencing depression, with 11 women and just 1 man affected.

Numerous studies have established a connection between thyroid function and the onset of depression (Ittermann et al., 2015). An evaluation of serum levels of thyroid autoantibodies in relation to the severity of depression indicates that there is a 20% prevalence of elevated thyroid antibodies among patients with depression, compared to the general population (Zhao et al., 2025; Pollak et al., 2020; Talaei et al., 2017). In the CAT group, higher average levels of ATPO antibodies were observed in patients with moderate and severe depression. GD patients showed a similar dynamic, with higher ATPO levels in those with mild and moderate depression.

The ATG serum levels in CAT patients did not reveal an association between antibody levels and the severity of depression. In the GD group, mild depression was linked to a reduced ATG titre. Additionally, the simultaneous presence of both ATPO and ATG antithyroid antibodies did not correlate with depression severity in either group. For GD patients, TRAb levels were slightly higher in those with moderate depression (21.2 IU/L) compared to those with mild depression (16.2 IU/L). Depressive symptoms are commonly observed in patients with hypothyroidism, likely due to the effects of thyroid hormone deficiencies on central nervous system function and neurotransmitter regulation (Mikola et al., 2022). In the groups studied, a notable inverse relationship was found between serum TSH levels and the severity of depression in patients with CAT. Conversely, in those with GD, suppressed TSH levels did not show a significant association with the severity of depressive symptoms.

Also, regarding thyroid function, the study found that CAT patients did not present changes in TSH levels, such as subclinical or overt hypothyroidism, related to depression severity. Among GD patients, biochemically confirmed hyperthyroidism was associated with mild depression.

In both study groups, serum 25-OH vitamin D levels were evaluated to examine the correlation between vitamin D deficiency and the severity of depressive symptoms. Numerous studies have suggested that vitamin D supplementation in individuals with concurrent depression and vitamin D deficiency may provide therapeutic benefits and help alleviate depressive syndromes (Parker, Brotchie, & Graham, 2017; Guzek et al., 2023). However, the existing literature remains inconclusive, with several studies yielding conflicting results regarding this association (Park, Ah, & Yu, 2023). Reflecting these uncertainties, the present study did not reveal a statistically significant relationship between serum 25-OH vitamin D concentrations and the severity of depressive symptoms within the investigated population.

In both the CAT and GD groups, a notable trend was observed: patients exhibiting depressive symptoms frequently had reduced serum vitamin D levels. Within the CAT group, the majority of individuals with mild to severe depression displayed either vitamin D deficiency or

insufficiency, indicating a potential link between vitamin D status and the presence of depression. Similarly, the GD group revealed that most patients with mild depression experienced either severe or moderate vitamin D deficiency, while those with moderate depression were often found to have vitamin D insufficiency. These findings lend support to the hypothesis that vitamin D deficiency may play a role in the development or worsening of depressive symptoms in patients with thyroid disorders.

Although vitamin D has been identified as a cerebral neurotransmitter in interneuronal connections (Xie et al., 2022; Vellekkatt & Menon, 2019), the heterogeneity in its serum levels among patients with depression associated with autoimmune disorders raises the question of individual variability in receptor response and therapeutic outcomes following vitamin D supplementation (Gowda et al., 2015). Further studies on larger groups, including patients with depression but without associated thyroid pathology, are needed to clarify the relationship between serum and cerebral vitamin D levels and to determine whether vitamin D can be used as a therapeutic indication in such patients (Kamyshna, 2022).

5. Conclusions

1. The presence of depression should be systematically assessed in patients with autoimmune thyroid disorders, as it is a frequently encountered comorbidity in this patient group.
2. The implementation of quick assessment or even self-assessment tools may bring additional benefits in improving the general condition and quality of life of patients with thyroid disorders.
3. Vitamin D deficiency is present among patients with autoimmune thyroid disorders, but it seems that it is not directly proportional to the severity of depression. While assessing serum vitamin D levels individually in all patients with thyroid disease and depression would be ideal, this approach may be limited by the high cost of testing. As a practical alternative, the use of validated questionnaires to predict the risk of vitamin D deficiency could provide an efficient and cost-effective method for identifying patients who may benefit from further testing and treatment.
4. Further studies are needed to determine a specific therapeutic role for vitamin D in patients with depression associated with autoimmune thyroid disease.
5. A multidisciplinary approach, integrating endocrinological, psychiatric, and nutritional evaluation, may optimise the clinical management of these patients by addressing both endocrine dysfunction and associated mood disturbances.

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