

ORIGINAL RESEARCH

Prevalence Of Vit B12 Levels In Hypothyroid Patients: A Cross Sectional Study

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Abstract

Background: The prevalence of vitamin B12 deficiency is found to coexist in hypothyroid patients, causing the persistence of symptoms concomitant to both diseases even on adequate thyroxine supplementation.

Aims & Objectives: To assess the prevalence of Vitamin B12 deficiency among hypothyroid patients.

Materials & Methods: A cross sectional study was conducted among 50 patients. Haemoglobin (Hb), mean corpuscular volume (MCV), anti thyroid antibodies, thyroid function tests and vitamin B₁₂ levels were measured. In Mean age was 42.4 years. 36(72%) were females and rest 14 were males. Vit B12 deficiency was seen in 31(62%) patients with mean TSH of 4.3 was seen. 72% of them were already receiving levothyroxine therapy with mean dose of 98.4µg was seen.

Conclusion: There is a high (62%) prevalence of B12 deficiency in hypothyroid patients. Just the symptoms are not a good guide to determining presence of B12 deficiency. Screening for vitamin B12 levels should be undertaken in all hypothyroid patients, irrespective of their thyroid antibody status.

Keywords: Hypothyroid, Vit B12

Introduction

The prevalence of B12 deficiency is 10% to 40% among hypothyroid patients. The prevalence of B12 deficiency is 10% to 40% among hypothyroid patients[1]. Another condition that may coexist with hypothyroidism and can cause B12 deficiency is celiac disease which is an autoimmune disease of the gut that occurs in genetically susceptible individuals due to gluten sensitivity. Twenty-six percent of celiac disease patients have autoimmune thyroid disease (AITD) [2]. Low serum level of vitamin B12 is seen in about 40% of untreated celiac disease patients [3]

Both of them B12 deficiency and hypothyroidism presents with symptoms such as depression, memory impairment, dementia, fatigue, numbness, and paresthesia. Due to the non-specificity of symptoms, B12 deficiency may be overlooked in hypothyroid patients [1]. The early recognition and appropriate treatment of B12 deficiency in hypothyroid patients are crucial because it is a reversible cause of peripheral neuropathy (PN), myelopathy, cognitive defects, anemia, and pancytopenia. However, the significance of B12

deficiency in hypothyroidism and the need to screen hypothyroid patients with serum B12 level measurement is a subject of controversy.

Aims and Objectives

The aim of this study is to assess the prevalence and socio demographic profile of Vitamin B12 deficiency in Hypothyroid patients.

Materials & Methods

Study Design: This study was a prospective study.

Study Area: The study was conducted in Medicine Department OPD of a tertiary care Hospital.

Study period: The study was conducted for a period of one year.

Study population: 50 patients were included for study purpose.

Sampling

Sample size: Sample size is calculated using single proportion sample size formula:

- $X = Z_{\alpha/2}^2 * p * (1-p) / d^2$
- $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$
- MOE is the margin of error; p is the sample proportion.

The sample size will be decided by taking into account

1. Prevalence of hypothyroid is 11%⁴
2. Confidence limit of 95%
3. Margin of sampling error 10%

Sample size came out to be 39. Adding 10 percent of Loss to follow up cases i.e 4. Final sample size came out to be 43. So round off we have taken sample size of 50.

Inclusion criteria

1. All old and newly diagnosed hypothyroid patients attending the medicine OPD or admitted to medicine wards.
2. Age >18 to 65 years of both gender.
3. Cases giving informed consent for participation in the study.

Exclusion criteria

1. Patients on drugs known to interfere with vitamin B12 absorption.
2. Critically ill patients.
3. Those who received blood transfusions within 1 month prior to presentation.
4. Those already on Vitamin B12 supplementations

Cases were included in study after taking informed consent. A detailed history was taken followed by thorough clinical examination was done in all cases. Clinical features including weakness, numbness, diarrhoea, abdominal pain, impairment of memory, parasthesias, dysphagia, dizziness and depression were noted. Presence of pallor, inflammation of tongue, impaired vibration or position sense, reflexes and presence of splenomegaly were recorded. Haemoglobin (Hb), mean corpuscular volume (MCV), anti thyroid antibodies, thyroid function tests and vitamin B₁₂ levels were measured.

Haemoglobin was checked by Coulter counter. Vitamin B₁₂ levels were estimated by RIA (radioimmunoassay) on a gamma counter by the diagnostic product cooperation (DPC), the normal range being 210 to 900 pg/ml. Thyroid antibodies were checked by the haemagglutination method by Remel and positive tests were then diluted and results were reported accordingly.

Anemia is defined as hemoglobin levels lower than 12 g/dl in women and 13 g/dl in men. Normal TSH is taken as 0.39-5.0 μ IU/ml. Vitamin B12 deficiency is defined as serum vitamin B12 levels lower than 210 pg/ml.

Results

A total of 50 patients of hypothyroidism were enrolled for study purpose.

Table 1: Age wise Distribution of Patients

Age in years	No. of patients	Percentage
18-30	2	4%
31-40	11	22%
41-50	19	38%
51-60	14	28%
>60	4	8%
Total	50	100%

Table: 1 shows majority of patients 38% were in age group of 41-50 years, 28% i.e 14 were in age group of 51-60 years, 11 patients were in age group of 31-40years. Only 2 were in age group of 18-30 years. Mean age was 42.4 years.

Graph showing age wise distribution

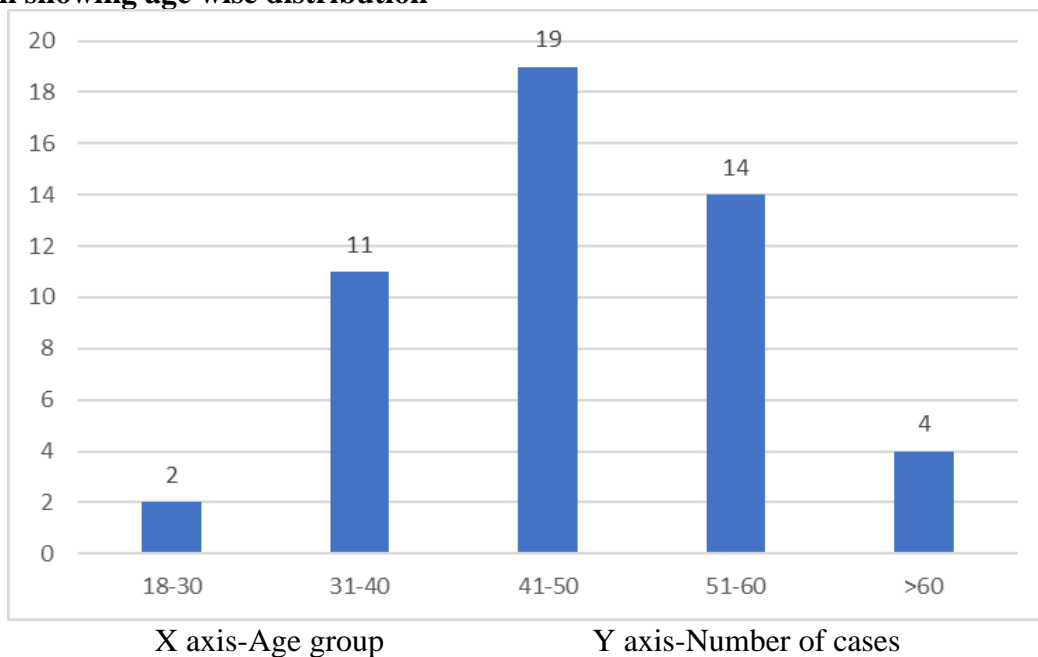
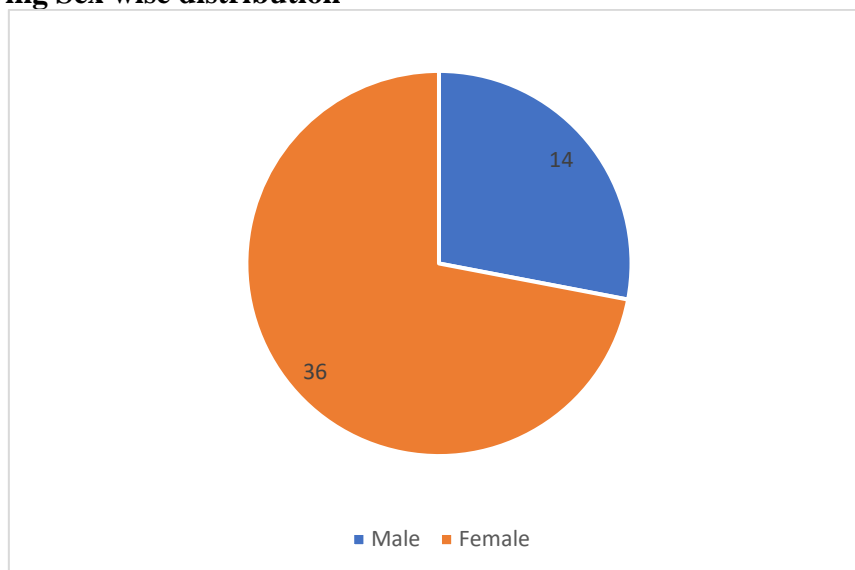


Table 2: Sex wise distribution

Sex	Number of patients	Percentage
Male	14	28%
Female	36	72%
Total	50	100%

Above table shows among 50 cases, majority of patients 36(72%) were females and rest 14(28%) were males.

Graph showing Sex wise distribution**Table 3: B12 deficiency & Thyroid levels**

Parameters	No. of patients	Percentage	P value
Vit B12 deficiency			P=0.00001
<133 pmol/L	31	62%	
>133 p mol/l	19	38%	
Mean Vit B12 value	141p mol/L		
Mean TSH (mIU/L)	4.3		
Patients receiving Levothyroxine therapy	36	72%	
Mean Dose(μ g)	98.4		

Vit B12 deficiency was seen in 31(62%) patients with mean TSH of 4.3 was seen. 72% of them were already receiving levothyroxine therapy with mean dose of 98.4 μ g was seen. Statistically by applying t test on comparing the results of Vit B12 deficiency and Tsh levels p value was 0.00001 which states that the results are statistically significant.

Discussion

In Mean age was 42.4 years. 36(72%) were females and rest 14 were males. Vit B12 deficiency was seen in 31(62%) patients with mean TSH of 4.3 was seen. 72% of them were already receiving levothyroxine therapy with mean dose of 98.4 μ g was seen.

Previous studies investigating the prevalence of B12 deficiency in hypothyroidism have demonstrated varying results. Our results are similar to a study by Jabbar A, Vitamin B12 deficiency common in primary hypothyroidism. There is a high (approx 40%) prevalence of B12 deficiency in hypothyroid patients. Traditional symptoms are not a good guide to determining presence of B12 deficiency. Screening for vitamin B12 levels should be undertaken in all hypothyroid patients, irrespective of their thyroid antibody status.⁵

Another study by Collins AB et al on Prevalence of vitamin B-12 deficiency among patients with thyroid dysfunction found that The prevalence of vitamin B-12 deficiency in hypothyroidism and autoimmune thyroid disease are reflective of the nutrition status of the population. Autoimmune thyroid disease is also associated with the autoimmune disorders pernicious anemia and atrophic gastritis which may lead to malabsorption of vitamin B-12. Vitamin B-12 screening is recommended upon initial diagnosis with autoimmune thyroid disease and then periodically thereafter.⁶

References

1. Aon M, Taha S, Mahfouz K, Ibrahim MM, Aoun AH. Vitamin B12 (Cobalamin) Deficiency in Overt and Subclinical Primary Hypothyroidism. *Clin Med Insights Endocrinol Diabetes*. 2022 Mar 22;15:11795514221086634
2. Ch'ng CL, Jones MK, Kingham JG. Celiac disease and autoimmune thyroid disease. *Clin Med Res*. 2007 Oct;5(3):184-92.
3. Dahele A, Ghosh S. Vitamin B12 deficiency in untreated celiac disease. *Am J Gastroenterol*. 2001 Mar;96(3):745-50.
4. Raju P, Kumar VS. Incidence of vitamin B12 deficiency in patients with hypothyroidism. *J Evid Based Med Healthc* 2021;8(08):415-419.
5. Gupta R, Choudhary S, Chatterjee T. A Study on Vitamin B12 Levels in Hypothyroid Patients Presenting to a Tertiary Care Teaching Hospital. *Cureus*. 2023;15(8):e44197
6. Collins AB, Pawlak R. Prevalence of vitamin B-12 deficiency among patients with thyroid dysfunction. *Asia Pac J Clin Nutr*. 2016;25(2):221-6.