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STATUS OF VITAMIN B12 DEFICIENCY IN NORTHERN INDIA: A CLINICAL STUDY

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ABSTRACT

Background: Paucity of studies reporting vitamin B12 status in sub Himalayan region has led to the present study of estimating the proportion of vitamin B12 deficiency in people attending general OPD in sub-himalayan region of northern India and evaluating their clinical profile. **Method:** This prospective study was a conducted at secondary care hospital in northern India for the period of 6 months. All suspected cases of vitamin B12 deficiency of either sex or age attending general OPD were were investigated for anaemia and vitamin B12 deficiency. **Results:** Prevalence of vitamin B12 deficiency was 38.4%. Maximum cases 25 (36.7%) were reported from the age group > 60years, and the lowest cases 5 (29.41%) from age less than 20 years. Prevalence of vitamin B12 deficiency was observed more in females. Prevalence of vitamin B12 deficiency in female and males was 41.6% and 28.2% respectively. Prevalence of B12 deficiency in vegetarian and non-vegetarian were 43.6% and 27.7 % respectively. Most prevalent hematological finding was anaemia 106 out of 164 cases (64.3%). **Conclusion:** Estimated prevalence of vitamin B12 deficiency in north Indian population is 38% which is considerably high. Higher pravelance of vitamin B12 deficiency was found in female patients. High prevalence of vitamin B12 deficiency among vegetarians makes its introduction essential, either through supplements or fortified foods as plant based diet is scarce in vitamin B12.

KEYWORDS: Vitamin B12 Deficiency, Vegetarian, Diabetes.

INTRODUCTION

Vitamin B12, also known as cobalamin, is an important water-soluble vitamin which is required for the development, myelination, and function of the central nervous system and DNA synthesis. Vitamin B12 also acts as a coenzyme in folate synthesis, therefore it plays crucial role in erythropoiesis. Vitamin B12 is naturally present in foods of animal origin, including fish, meat, poultry, eggs, and dairy products.[1] Because of its scarce presence in plant based food and low consumption of foods of animal origin, vitamin B12 deficiency is quite common among vegetarians and vegans.

Its deficiency is associated with hematologic, neurologic, psychiatric, cutaneous, gastrointestinal, and cardiovascular disorders. B12 deficiency manifests as macrocytic anaemia and presenting symptoms often include signs of anemia, such as fatigue and visible pallor. Other presenting complaints may include peripheral neuropathy, glossitis, stomatitis, hair changes, diarrhea, headaches, and neuropsychiatric disturbances.

Because of diversity in sign and symptoms of vitamin B12 deficiency it is often overlooked and misdiagnosed in clinical practice. Vitamin B12 deficiency is quite prevalent in India as a majority of the population is vegetarian.Prevalence in the general population varies from 3% to 5%, and from 5% to 20% among people older than 65.[2-5]

Limited documenting data on vitamin B12 status in sub Himalayan region of India has led to the present study to fills this lacuna in literature and estimating the prevalence of vitamin B12 deficiency in general population northern India.

AIM AND OBJECTIVE

Objective of the current study is to report prevalence of vitamin B12 levels in general population in northern India.

MATERIAL AND METHOD

This prospective study was a conducted at secondary care hospital in northern India for the period of 6 months from January 2023 to June 2023 at Civil Hospital

Taunidevi, district Hamirpur, Himachal Pradesh. All cases of suspected vitamin B12 deficiency of either sex or age attending general OPD were enrolled in this study. After thorough history taking and examination clinically suspected cases of vitamin b12 deficiency were investigated for anaemia and vitamin B12 deficiency. Detailed history including demographics, clinical features, dietary history, associated co-morbidities and drug history was undertaken. Patients who received parenteral supplementation of vitamin B12 in past 3 months were excluded from the study. Patients having history of surgical intervention of gastrointestinal tract or suffering from acute illness were also excluded from the study. 2ml of venous blood sample obtained under aseptic conditions were sent for complete hemogram and vitamin B12 levels. The biochemical vitamin B12 deficiency was defined at a concentration below a concentration below <180 ng/L estimated by Automated Analysers. Patients with B12 levels between 180-210 ng/L are considered borderline and a serum B12 levels above 210 ng/L is interpreted as normal. Due to financial constraints peripheral blood smears and bone marrow examination was deferred.

RESULTS

In our study prevalence of vitamin B12 deficiency was 38.4%. Of total 164 patients, serum vitamin B12 levels <180 ng/L was found in 63 patients (38.42%) whereas levels between 180-210 ng/L were found in 19 patients (11.58%) (table 1)

Table 1: Distribution of serum vitamin B12 levels

Vitamin B12 level range(ng/L)	No. of patients(n=164)	Percentage (%)
<180	63	38.42%
180-210	19	11.58%
>210	82	50.00%

Prevalence of B12 deficiency in age group <20 years, 21-40 years, 41-60 years and >60 years were 29.41%, 36.3%, 36.7%, 42.85% respectively. Maximum cases 25 (36.7%) were reported from the age group > 60years, and the lowest cases 5 (29.41%) from age less than 20 years. Older population is relatively more vitamin B12 deficient as compared to young population. (table 2).

Table 2: Distribution of serum vitamin B12 level according to age.

Age	Serum vitamin b12 <180ng/L	Serum vitamin b12 180-210ng/	Serum vitamin b12 >210ng/L
<20years (n=17)	5	1	11
20-40years (n=44)	16	2	26
40-60years (n=68)	26	10	32
>60years (n-35)	16	6	13

Out of 164 cases 76.2% cases were females, with male and female ratio of 3.2:1. Prevalence of vitamin B12 deficiency was observed more in females. Prevalence of vitamin B12 deficiency in female and males was 41.6% and 28.2% respectively. (table 3)

Table 3: Distribution of vitamin B12 level according to sex.

Vitamin B12 level range	Total patients (n=164)	Male (n=39)	Female N=125
<180	63	11 (28.20%)	52 (41.6%)
180-210	19	3 (7.69%)	16 (12.8%)
>210	82	25 (64.10%)	57 (45.6%)

In our study majority were strict vegetarian (67%). Prevalence of B12 deficiency in vegetarian and non-vegetarian were 43.6% and 27.7 % respectively. (table 4)

Table 4: Distribution of serum vitamin B12 levels according to dietary habits.

Dietary habit	Serum vitamin b12 <180ng/L 63	Serum vitamin b12 180-210ng/L 19	Serum vitamin b12 >210ng/L 82
Vegetarian (n=110)	48	11	51
Non-vegetarian(n=54)	15	8	31

Most prevalent hematological finding was anaemia 106 out of 164 cases (64.3%).Macrocytosis (MCV >100 fL) was found in 112 (68.3%) cases.

DISCUSSION

The prevalence of Vitamin B12 deficiency is reported 3 to 5% in the general population while 5 to 20% among older people of more than 65 years.[6-7] Current study estimate of prevalence of vitamin B12 deficiency at 38.42% which was very high as compared to reported prevalence of 3-5% in general population. It could be attributed to fact that studied population is largely vegetarian by food habits. In a similar study Singla et al. estimated the prevalence of vitamin B12deficiency at 47.19% in north Indian population.[8] Prevalence of vitamin B12 deficiency in female and males was 41.6% and 28.2% respectively.

Maximum cases of vitaminB12 deficiency (36.7%) were reported from the age group >60years, and the lowest cases 5 (29.41%) from age less than 20 years. We concluded that prevalence was more in older adults than young person.

Most prevalent hematological finding was anaemia 106 out of 164 cases (64.3%) Macrocytosis (MCV >100 fL) was found in 112 (68.3%) cases. In a similar study by Singh j et al. anemia was revealed in 87.73% of cases with 88.64% macrocytosis in patients with vitamin B12 deficiency.[9]

Among co-morbidities, most common was diabetes and most patients were on metformin alone or in combination. Followed by dyspepsia and patients were taking either proton pump inhibitors or H2 receptor blockers.

Prevalence of vitamin B12 deficiency was found more in vegetarians than in non-vegetarian. Estimated prevalence of B12 deficiency in vegetarian and non-vegetarian were 43.6% and 27.7 % respectively. 67% of the studied population was strict vegetarian. Besides economic constraints in India, vegetarianism is deeply rooted in culture and religion. Vegetarian dietary habit is considered a notable risk factor for vitamin B12 deficiency Similar results were found in a study by Gurpreet Singh et al where prevalence of B12 deficiency in vegetarian and non-vegetarian were 35.5% and 9.5% respectively.[10]

CONCLUSION

This study assesses the prevalence of vitamin B12 deficiency in north Indian population. Estimated prevalence of vitamin B12 deficiency in north Indian population is 38%.Whereas 11.5% have levels between 180-210 ng/L which is considered to be borderline deficient. Higher prevalence of vitamin B12 deficiency was found in female patients. The increased prevalence of B12 deficiency found among elderly patients as compared to young population. High prevalence of vitamin B12 deficiency in vegetarians makes its introduction essential, either through supplements or fortified foods.

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