International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Prevalence and Clinical Spectrum of Vitamin B-12 Deficiency

Rohit Avasthi[1], Dr. Bhartendra Sharma[2], Giriraj Prasad Soni[3]

[1]PHD Scholar, Mahatma Gandhi Nursing College, Sitapura, Jaipur, India

[2]Professor (Research Guide) Mahatma Gandhi Nursing College, Sitapura, Jaipur, India

[3]Dean & Principal, Mahatma Gandhi Nursing College, Sitapura, Jaipur, India
Email Address: *ra25031989[at]gmail.com*

Abstract: ***Introduction: Vitamin B12 is an important nutrient that the body uses to serve as a cofactor in many main cell reactions. Cobalamin, in combination with folate, is necessary for DNA synthesis in cells that undergo rapid turnover, such as haematopoietic and enteric lining cells. Increased homocysteine, reduced methionine, and impaired tetrahydrofolate formation are the physiological effects of either of the above nutrients deficiency. Material & Methods: Quantitative research approach will be adopted in current research study, Non experimental descriptive research design will be used in this study. Research study for this study was Neurological OPD and hospitalize patient in bansur hospital, Bansur. Sample size was 40 patient at Bansur Hospital OPD. Result: The results obtained were considered statistically significant at 5 percent level of significance ($p \leq 0.05$). Data was presented in the form of tables, graphs and diagrams. Discussion: Present studies assess the prevalence and clinical spectrum of vitamin b-12 deficiency in a cohort of patient presenting with neurological disorders in tertiary care hospital of Rajasthan.***

Keywords: Prevalence, Clinical Spectrum, Vitamin B-12 Deficiency, Neurological Disorders

1. Introduction

The only dietary source of vitamin B12 is animal products. Vitamin B12 deficiency is a well-known risk factor for vegetarians. Pernicious anemia and malabsorption are two other significant etiological factors to consider. The treatment consists of simply supplementing the body's vitamin supply with extremely satisfying outcomes at minimal cost and risk.2

Vitamin B12 deficiency is a reversible cause of bone marrow failure and demyelinating nervous system disease, so early detection and treatment are important. Microorganisms produce vitamin B12 (cobalamin), which is used in trace quantities mainly in animal-based foods. Intrinsic factor, which is produced by gastric parietal cells, and the “cubam receptor” in the distal ileum are responsible for uptake in the gastrointestinal tract. Even though many patients present with mostly neurologic symptoms, the most common cause of serious vitamin B12 deficiency is a lack of intrinsic factor due to autoimmune atrophic gastritis3, also known as "pernicious anemia. " Vitamin B12 is needed for the normal functioning of the central nervous system, as well as its production and initial myelination. Demyelination of the cervical and thoracic dorsal and lateral columns of the spinal cord, as well as cranial and peripheral nerve demyelination and brain white matter demyelination5. Owing to the loss and swelling of myelin sheaths, pathological examination shows a "spongy degeneration" that can be seen on magnetic resonance imaging. The magnitude of megaloblastic anaemia is inversely associated with the degree of neurologic dysfunction for unknown causes. Glossitis, malabsorption, miscarriage, and thrombosis are some of the less common symptoms of vitamin B12 deficiency. The marked hyperhomocysteinemia seen in extreme cases of vitamin B12 deficiency has been linked to thrombosis; patients can also experience hyperpigmentation, which resolves withtreatment.3

In order to determine the prevalence of Vitamin B12 deficiency in north India, a retrospective analysis was performed. Electronic medical reports were used to gather data in Jind, Haryana. The study enrolled a total of 11913 participants. This search yielded 378 people with diabetes, 92 people with prediabetes, and 285 people who went to the endocrine OPD for causes other than diabetes or prediabetes. Another 267-person dataset was obtained from the archives of KVL abs. 'Onaregularbasis, it maintains camps for preventive health screenings including urine and blood investigations in a tier 3 district. The prevalence of vitamin B12 deficiency (Vitamin B12 levels 200 pg/ml) in tier 3 cities was 47.19 percent (n = 267), according to the findings. Vitamin B12 deficiency was seen in 37.76 percent of pre-diabetics (n = 92), 31.23 percent of people with endocrine disorders other than diabetes and pre-diabetes (n = 285), and 18.25 percent of diabetics (n= 378). Vitamin B12 levels in Tier 3 community residents were slightly lower than those in metropolitan areas who visited an endocrine clinic. When contrasted to people with other endocrine conditions, people with diabetes had slightly higher vitamin B12 levels.7

Barney AM et al (2020) conducted a study to determine the estimate prevalence of vitamin B12 deficiency and contributing risk factors among pregnant women. The study was performed in community of south India. A total of 120 multigravida women were recruited with consecutive sampling who were ≤ 20 weeks of pregnancy at mobile clinic of Kaniyambadi Block, Vellore. Data were collected through structured questionnaire and blood samples. The result has shown that prevalence of Vitamin B12 deficiency (<200 pgm/ml) and anemia (Hb ≤10.5 g/dL) was 55% and 17.5%, respectively. Only 11.7% were B12 deficient and anemic. Past history of abortion (odds ratio [OR] = 0.5), fatigue (OR = 0.4), and low B12 intake (OR = 2) was associated only in the bivariate analysis. First trimester (OR = 3.9) and obesity (OR = 9.6) were found to be independent risk factors of Vitamin B12 deficiency.[15]

Soh Y et al (2020) conducted a correlation study to determine the relationship between vitamin B12 levels and cognitive function among elderly patients at multicenter. There was also a difference according to the education period. Those people who had undergone education for longer were more likely to have sufficient B12 levels, to a statistically significant level (P <.003). Besides, there were statistical differences between those with diabetes and different vitamin D levels (P <.001, respectively). The cognitive function analysis based on the B12 levels. In the t test analysis, the sufficient group better performed in the MMSE-KC, World list-memory, World list-recall, TMT-A test, digit span test, and FAB. This was statistically significant (P <.05). Likewise, participants with sufficient B12 in the unadjusted linear regression model had better cognitive functions in the MMSE-KC, TMT-A test, world catalog memory, world catalog recall, TMT-A test, numerical range test, and FAB. However, in a fully adjusted linear regression model, these associations wereattenuated.[17]

2. Material & Methods

Research Approach: Quantitative research approach will be adopted in current research study.

Research Design: Non experimental descriptive research design will be used in this study.

Research Setting: Bansur Hospital, Bansur

Population: All patients who was visited at and hospitalized at Bansur Hospital, Bansur

Samples: **Sampling Technique:** Sample size will be calculated with appropriate statistical method after pilot study and purposive sampling technique

Sample Size: 40

Data Collection Method: Pre designed self-structured demographic profile, Personal profile, Check list of vitamins B12 deficiency, Assessment of neurological disorders during physical and neurological examination, Lab investigation of Patient, Interview Observation technique. Bio-physical methods.

3. Results

Table 1: Severity distribution of vitamin B12 deficiency

Vitamin B12 deficiency based on clinical features	N = 89	In %
No deficiency	49	55.06%
Mild deficiency	14	15.73%
Moderate deficiency	16	17.98%
Severe deficiency	10	11.24%

Total subject 89 investigated, out of this 40 subjects were vitamin B12 deficiency, so proportion of vitamin B12 deficiency is 44.94% (40/89*100 = 44.94%)

Table 2: Severity distribution of neurological disorders

Neurological disorders	n-40	In %
Mild	4	10.00%
Moderate	27	67.50%
Severe	9	22.50%

Table 3: Assessment of neurological disorders during physical and neurological examination due to vitamin B12 deficiency

S. No.	Assessment of neurological disorders	n = 40	In %
1	Depression or mood impairment	19	47.50%
2	Irritability	20	50.00%
3	Insomnia	21	52.50%
4	Cognitive slowing	21	52.50%
5	Forgetfulness	23	57.50%
6	Visual disturbances, which may be associated with optic atrophy	19	47.50%
7	Peripheral sensory deficits	27	67.50%
8	Weakness, which may progress to paraplegia	21	52.50%
9	Impaired position sense	25	62.50%
10	Impaired vibration sense	25	62.50%
11	Lhermitte's sign, a shock-like sensation that radiates to the feet during neck flexion	25	62.50%
12	Ataxia or positive Romberg test	24	60.00%
13	Abnormal deep tendon reflexes	26	65.00%
14	Extrapyramidal signs (eg, dystonia, dysarthria, rigidity)	19	47.50%
15	Restless legs syndrome	25	62.50%

4. Discussion

In order to determine the prevalence of Vitamin B12 deficiency study conducted to identify the level and prevalence of vitamin B 12 Deficiency in the patients who was visited and admitted at bansur hospital, Bansur.

5. Conclusion

It is concluded that the prevalence of Vitamin B12 deficiency is so proportion of vitamin B12 deficiency was 44.94% percent in the area of Alwar. Mild Neurological disorder is 10%, moderate 67.50 and severe neurological disorder was 22.50% was found in this study.

References

[1] "Leary F, Samman S. Vitamin B12 in health and disease. Nutrients.2010 Mar; 2 (3): 299-316.
[2] National Institutes of Health. Vitamin B12 fact sheet for health professionals.2016.
[3] Briani C, Dalla Torre C, Citton V, Manara R, Pompanin S, Binotto G, Adami F. Cobalamin deficiency: clinical picture and radiological findings. Nutrients.2013 Nov; 5 (11): 4521-39.
[4] Serin HM, Arslan EA. Neurological symptoms of vitamin B12 deficiency: analysis of pediatric patients. Acta ClinicaCroatica.2019 Jun 1; 58 (2.): 295-301.
[5] Barney AM, Abraham VJ, Danda S, Cherian AG, Vanitha S. Prevalence of Vitamin B12 deficiency and its associated risk factors among pregnant women of rural South India: A community-based cross-sectional study. Indian Journal of Community Medicine.2020 Oct1; 45 (4): 399.
[6] Soh Y, Do Hun Lee CW. Association between Vitamin B12 levels and cognitive function in the elderly Korean population. Medicine.2020 Jul24; 99 (30).