Original Article

# VITAMIN B12 STATUS IN A TERTIARY CARE CENTER IN CENTRAL GUJARAT

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## ABSTRACT

**Introduction:** Vitamin B12 deficiency usually presents with pernicious anemia or various neuropsychiatric manifestations such as neuropathy, myelopathy, dementia, cerebellar ataxia, optic atrophy, pscyhosis and mood disorders. Hence vitamin B12 deficiency should be identified. The local population in our area mainly comprises of vegetarians, this study was initiated with a view to assess their B12 status early, to rule out its deficiency and help to prevent further complications.

**Methodology:** We analyzed serum B12 levels in 396 cases by competitive chemiluminescent immunometric method using Immulite instrument.

**Result:** It was found that B12 levels were significantly low in 260(65.6%) patients (P<0.000). Majority 225 (86.5%) of the deficient patients were vegetarians and the deficiency was found less in non vegetarians (P<0.000). The B12 deficiency was evident more in patients below 50years (199 out of 396 i.e. 76.5%) of age as compared to those who are above 51 years of age (60 out of 396 i.e. 23.4%), with a P value <0.000. The deficiency was prevalent more in females 179 (68.8%) in comparison to males 81(31.1%) and the P<0.000. Our study found that B12 deficiency is quiet prevalent in local population (65.6%), the condition being worse in females. And it was also noticed that deficiency was relatively more in vegetarians.

**Conclusion:** The early detection of B12 deficiency could help in warding off the resultant complications.

**Key words:** Vitamin B12 levels, Vegetarians

## INTRODUCTION

Vitamin B12 (cobalamin) plays an important role in DNA synthesis and neurological function. The deficiency can lead to a wide spectrum of hematological and neuropsychiatric disorders that can often be reversed by early diagnosis and prompt treatment [1-6]. Vitamin B12 is obtained primarily from animal sources (i.e. red meat, poultry, fish, eggs and dairy), while plants and vegetables lack the vitamin unless they have been contaminated by soil microorganisms [1, 6]. An elevated homocysteine level is considered an independent risk factor for cardiovascular and cerebrovascular diseases and vitamin B12

deficiency is one known treatable cause of it [5]. The interest in the vitamin has been renewed because of the recognition that cobalamin deficiency occurs in 3 to 40% of general population [1, 5]. The B12 deficiency should be ruled out, when typical complaints of aging such as fatigue, weakness, loss of memory and depression occur in elderly [1]. Estimation of B12 in patient's serum could help us to find out the deficiency status.

## MATERIALS AND METHODS

This was a cross sectional study done from December 2004 to August 2006 (21 months). During this period we studied 396 patients, who were advised to test their B12 status by the clinicians at the Clinical Biochemistry laboratory of Shree Krishna Hospital and Pramukhswami Medical College, Karamsad. Blood samples were collected in plain vials, separated and analyzed for serum vitamin B12 levels. It was estimated by solid-phase, competitive chemiluminescent immunometric assay [7] on Immulite instrument. The normal value of serum vitamin B12 by Immulite kit leaflets is 174-878 pg/ml [8]. The goal was to screen for vitamin B12 status for an early diagnosis and management to prevent further complications.

**Statistical Analysis:**

The data were analyzed with the help of computer statistical software packages, SPSS software version 15.0. Chi square tests were used to find significance. Significant when $P<0.05$

## RESULT

A total of 396 patients were studied for their serum vitamin B12 levels and it was found that 260 (65.6%) were deficient, 101(25.5%) were normal and 35 (8.83%) showed values exceeding 1200 pg/ml. Among the 396 patients studied 260 (65.6%) were vegetarians and 136 (34.4%) were non vegetarians (taking red meat, poultry, fish, eggs and dairy) (Table: 1). The Patients taking vegetarian diet i.e. 225 (86.5%) were found to be deficient in serum vitamin B12 levels while only 35 (13.4%) non vegetarian patients were found to be deficient (Table:1). As depicted in Table: 1 among the 260 deficient patients 199(76.5%) were below 50yrs of age and 61 (23.4%) were above 51years of age. The data also shows the incidence of deficiency was more in females 179 (68.8%) than in males 81 (31.1%).

**Table 1: Comparison of demographic data with vitamin B12 deficient and vitamin B12 normal cases**

| Variable | Deficient (n= 260) | Normal (n=136) | Total (n=396) |
|---|---|---|---|
| **Sex** | | | |
| Male | 81(31.1) | 77(56.6) | 158(39.8) |
| Female | 179(68.8) | 59(43.3) | 238(60.1) |
| **Age group** | | | |
| < 50yrs | 199(76.5) | 134(98.5) | 333(84.1) |
| > 51yrs | 61(23.4) | 2(2.5) | 63(15.9) |
| **Diet** | | | |
| Vegetarian | 225(86.5) | 35(25.7) | 260(65.6) |
| Non veg. | 35(13.4) | 101(74.2) | 136(34.3) |
| **Religion** | | | |
| Hindu | 226(86.9) | 35(25.7) | 261(65.9) |
| Muslim | 26(10.0) | 81(59.5) | 107(27.0) |
| Christian | 08(3.0) | 20(14.7) | 28(7.0) |

Figure in parenthesis indicate percentage
P values for all group are <0.05, significant

**Table 2: Serum vitamin B12 deficiency in comparison to different religion, age group and sex**

| Variable | Male (%) | Female (%) | Total (%) |
|---|---|---|---|
| **Religion** | | | |
| Hindu | 69(30.5) | 157(69.4) | 226(86.9) |
| Muslim | 10(38.4) | 16(61.5) | 26(10.0) |
| Christian | 02(25.0) | 06(75.0) | 08(3.0) |
| **Age group** | | | |
| Below 50yrs | 64(24.6) | 135(51.9) | 199(76.5) |
| Above 51yrs | 17(6.5) | 44(16.9) | 61(23.4) |

## DISCUSSION

Vitamin B12 deficiency was seen in 65.6% of patients which is much higher than other studies[1,9]. In our study all the patients belonged to the Gujarati community and from the table: 1 it seems that the deficiency of vitamin B12 is maximum in the Hindu community, which could be due to a vegetarian diet [9]. As the deficiency was found lower in Muslim and Christian people, it could be because the number of people taking non vegetarian diet was more in those religions. Our study is in agreement with other studies [9.10.11], majority of the vegetarians showing vitamin B12 deficiency. Out of the 226 deficient Hindu patients 157(69.4%) were females.

Many studies have proved that vitamin B12 deficiency is most commonly seen in elders above 50yrs of age, due to food bound cobalamin malabsorption, which usually arises from atrophic gastritis and hypochlorhydria, which interferes with the cleavage of B12 from dietary proteins before absorption [12, 13]. But our study was in contrast to most studies [13, 14, 15] showing vitamin B12 deficiency in patients below 50 yrs of age in comparison to patients above 51yrs of age. Studies have shown that in the developing countries, the deficiency is much more common, starting in the early life and persisting throughout the life span. Inadequate intake, due to low consumption of animal food, is the main cause of low serum vitamin B12 in younger adults and is likely the main cause in poor population worldwide [12]. In our study in the age group of below 50 yrs of age, 135 (51.9%) females are showing B12 deficiency. Studies have shown that it frequently occurs in elderly people although it may also be present in young, particularly women. Some studies have showed no difference in vitamin B12 status between males and females[16].

## CONCLUSION

Screening of B12 level helps in the early detection of the deficiency and necessary preventive measures.

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