

# Role of Gender and Food Habit in Cases of Vitamin B12 Deficiency -A Cross Sectional Study on A Small Cohort

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## **Abstract:**

**Background:** Vitamin B12 deficiency is associated with haematological, neurological, and cardiovascular consequences. Epidemiologic data on these related illnesses indicate gender differences as well as diet habit (veg/ non-veg). This survey is made to test the same.

**Methods:** A small cross-sectional study was done on group of 100 people of both genders to examine gender differences in vitamin B12 deficiency among a healthy population. Data were collected from healthy individuals aged from 15–90 yrs, who were provided with a routine medical evaluation during the year of 2024. Individuals with background illnesses and those who had used medications or nutritional supplements were excluded. Vitamin B12 deficiency was defined by 2 cutoff values (206 and 140 pg/ml) for female and male respectively as per Bio. Ref. Interval.

**Results:** In all, 100 individuals met the inclusion criteria. Serum vitamin B12 mean levels were 206 and 140 pg/ml for women and men respectively. Deficiency prevalence was almost same for men (42%) and women (45%). More deficiency seen in non-vegetarians (48%) in compare to vegetarians (42%).

**Conclusions:** Among the healthy population, men and women both are susceptible to vitamin B12 deficiency and this can be neither explained by diet habits<sup>1,2</sup>. Genetic variations and many other causes are therefore hypothesized to play a role.

**Keywords:** vitamin B12, Gender, food habit.

## **INTRODUCTION:**

Vitamin B-12 (cobalamin) plays an essential role in red blood cell formation, cell metabolism, nerve function and the production of DNA, the molecules inside cells that carry genetic information. Vitamin B12 is a water-soluble vitamin that is naturally present in some foods, added to others, and available as a dietary supplement and a prescription medication<sup>3</sup>. Vitamin B12 is required for the development, myelination, and function of the central nervous system; healthy red blood cell formation; and DNA synthesis. Vitamin B12 status is typically assessed by measurements of serum or plasma vitamin B12 levels. The cutoff between normal vitamin B12 levels and deficiency varies by method and laboratory, but most laboratories define subnormal serum or plasma values as those lower than 200 or 250 pg/MI<sup>3</sup>. The Dietary Guidelines for Americans describes a healthy dietary pattern as one that Includes a variety of vegetables; fruits; grains (at least half whole grains); fat-free and low-fat milk, yogurt, and cheese; and oils. Milk and milk products are good sources of vitamin B12. Many ready-to-eat breakfast cereals are fortified with vitamin B12. Includes a variety of protein foods such as lean meats; poultry; eggs; seafood; beans, peas, and lentils; nuts and seeds; and soy products. Fish and red meat are excellent sources of vitamin B12. Poultry and eggs also contain vitamin B12. Limits foods and beverages higher in added sugars, saturated fat, and sodium. Limits alcoholic beverages<sup>3</sup>.

The body absorbs vitamin B12 from food through a multi-step process that involves the stomach, pancreas, and small intestine. Vitamin deficiency is mainly due to inadequate dietary intake in vegans, and B12 malabsorption is related to digestive diseases. This review explores the physiology of vitamin B12 absorption and the mechanisms and diseases that produce malabsorption. The main causes of B12 malabsorption include

inherited disorders (Intrinsic factor deficiency, Addison's pernicious anaemia, obesity, bariatric surgery and gastrostomies, pancreatic insufficiency, obstructive Jaundice, tropical sprue and celiac disease, bacterial overgrowth, parasitic infestations, Zollinger-Ellison syndrome, inflammatory bowel diseases, chronic radiation enteritis of the distal ileum and short bowel and many more.

## MATERIALS AND METHODS

**Study design:** It was a cross-sectional small cohort-based study, which involves group of 100 people of both gender of veg/ non-veg food habit aged 15 yrs to 90 yrs of same district during the period of January to June year of 2024.

**Including criteria:** healthy individuals aged from 15–90 yrs, who were provided with a routine medical evaluation during the month of January to June 2024.

**Excluding criteria:** people who had used medications or nutritional supplements were excluded.

## RESULT

All these subject medical reports were analysed for the serum B12 and the result is shown in tables: Table 1 & 2 shows the male/female ratio & vegetarian /non-vegetarian ratio of the samples respectively.

Table 1

Male	Female	Total
7	53	100

Table 2

Veg	Non-veg	Total
73	27	100

Table 3 shows the no. of subjects according to age groups and 4 shows no of subjects falling under the serum vitamin B12 range.

Table 3

Age group	No of pt
10 TO 20	4
21 TO 30	10
31 TO 40	21
41 TO 50	27
51 TO 60	17
61 TO 70	12
71 TO 80	7
81 TO 90	2
TOTAL	100

Table 4

B12 RANGE	NO OF PT
> 100	13
101-150	20
151-200	11
201-250	15
251-300	8
301-350	8
351-400	4
401-450	1
451-500	6
500-1000	10

< 1000	3
< 2000	1
<b>TOTAL</b>	<b>100</b>

Table no 5 gives information regarding the no of male & female subjects with their B12 profile.

<b>B12 RANGE</b>	<b>GENDER</b>	
	MALE	FEMALE
> 100-200	20	24
200 -300	10	13
300 -400	6	6
400 – 500	5	2
500 -1000	5	5
1000 -2000	1	3
<b>TOTAL</b>	<b>47</b>	<b>53</b>

Table no 6 gives information about serum B12 and subject's food habit.

<b>B12 RANGE</b>	<b>MALE</b>		<b>FEMALE</b>	
	<b>VEG</b>	<b>NON-VEG</b>	<b>VEG</b>	<b>NON-VEG</b>
> 100-200	14	6	17	7
200 -300	8	2	12	1
300 -400	5	1	3	3
400 – 500	5	0	0	2
500 -1000	3	2	3	2
1000 -2000	1	0	2	1
<b>TOTAL</b>	<b>36</b>	<b>11</b>	<b>37</b>	<b>16</b>

## DISCUSSION

There was a survey of 100 people for serum vitamin B12 in particular town. Random sampling done. 100 samples of both genders, of different age groups and of both vegetarian & non vegetarian people are taken into consideration.

Out of 100 samples 53 are of female & 47 are of male. Among these 100 subjects, 73 subjects are vegetarian & 27 are of non-vegetarian. Out of 53 female subjects 37 are vegetarians and 16 are non-vegetarians, while out of 47 males 36 are vegetarian and 11 are non-vegetarian.

There are different age groups ranging from 15 yrs to 90 yrs of subjects. All sample serum B12 results were analyzed. 4 samples are of between 10-20 yrs of age groups. 2 samples are from 81-90 yrs of age group. Maximum no of samples is 27 and they from 41-50 yrs age group. 21 samples are belonging from 31-40 yrs of age group as shown in the table no. 3

It is found that among the 100 samples 13 subjects having below 100 Serum B12 and one subject having more than 2000 serum B12. 3 subjects are having more than 1000 B12 & 10 subjects are having between 500-1000. Total 26 subjects having B12 between 150-250 range and 16 subjects having between 250-350 range. After the gender wise analysis, it is found that 45% female subjects and 42% male subjects having B12 between 100-200. 21% male and 24% females are having B12 between 200-300. 12% male & 11% female having B12 between 300-400 range. And similarly, between the range of 500-1000, 10% males & 0.09% females are there. Another observation is related for vegetarian and non-vegetarian subjects B12 results. Out of 100 subjects 73 are vegetarians & 27 are non-vegetarians. Total 44 subjects having B12 between 100-200 range from these 31 are vegetarians & 13 are nonvegetarians but on the contrary out of 23 subjects having B12 ranges from 200-300 only 3 subjects are nonvegetarians while 20 are vegetarians. There are 12 subjects having B12 from 300-

400 is considered to be under good range, 8 subjects are vegetarians and only 4 are non-vegetarians. 3 subjects are vegetarians whose B12 ranges from 1000-2000.

## CONCLUSION

This survey highly supports the hypothesis of no any relation between B12 & gender variations. This survey does not support the theory of role of estrogen in B12 deficiency. Also, it is observed that the hypothesis of “non-veg is the highest source of B12 & so vegetarians are at the risk of deficiency of vitamin B12 “is not true here. Some vegetables like broccoli, nuts, dairy products, any many more from vegetarian food are the good source of vitamin B12. Genetic factors, malabsorption in intestine and many more reason can be the reason for low B12 value in non-vegetarians.

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