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Research Article

Is vegetarian young adult male more affected by vitamin B12 deficiency anemia? A hospital based study

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ABSTRACT

Background: Prevalence of B12 deficiency in the general population has not been well established because a universally accepted normal B12 level has not been defined. Aim of the study was to study vegetarian young adult male more affected by vitamin B12 deficiency anemia.
Methods: The study was conducted in 120 patients at the department of medicine, Government medical college, Kota, a tertiary care teaching hospital in Rajasthan, India.
Results: prevalence of B12 deficiency was 19.52%, B12 deficiency in male and female were 18.33% (22) 1nd 15.83% (19) respectively. B12 deficiency in age group <20 years, 21-40 years and >41 years were 3.33%, 29.16% and 1.66% respectively.
Conclusions: Low vitamin B12 concentrations are common in Indian young adult men, particularly in vegetarians. Further studies are needed to confirm these findings in other parts of India.

Keywords: Vitamin B12, Vegetarian, Pancytopenia

INTRODUCTION

Vitamin B_{12} is essential for synthesis of sadenosyl methionine and is involved in the metabolism of proteins, phospholipids and neuro transmitters. Its deficiency leads to several neurological manifestations and affects all age groups.[1] Vitamin B_{12} deficiency may present with fatigue, weakness, numbness, decreased memory, irritability, confusion and depression, although initial symptoms might often be vague.[2-4]

Prevalence of B_{12} deficiency in the general population has not been well established because a universally accepted normal B_{12} level has not been defined.[5,6] Prevalence in the general population varies from 3% to 5%, and from 5% to 20% among people older than 65.[7-10] Vitamin B_{12} deficiency has been reported in certain population groups: in elderly people, in vegetarians and especially the vegans, in patients with intestinal diseases, in patients suffering from primary hypothyroidism.[11-13] At risk are also subjects receiving for long periods certain medications such as: proton pump inhibitors, histamine H2-receptor antagonists, and metformin.[15,16]

The racial, religious, ethnic and socioeconomic heterogeneity of the people in India greatly influences their dietary habits. We aimed to estimate the prevalence of vitamin B12 deficiency and its common risk factors in North Indian population attending the tertiary care hospital, Kota, Rajasthan, India.

METHODS

The study was conducted in the Department of medicine, Government Medical College Kota, Rajasthan, India. A tertiary care teaching hospital in Rajasthan. This was a crossectional study. The study was carried out from October 2015 to March 2016. During this period, Out of

total 210 admission, 120 patients had moderate (Hb 7-9gm/dl) to severe (Hb < 7.0gm/dl) anaemia. The subjects were enrolled on predesigned Performa including detailed clinical, dietary, drug and personal history. All these patients were subjected to hematological, biochemical investigations and other investigations were done according to suspected clinical diagnosis such as serum vitamin B_{12}, serum ferritin, hemoglobin electrophoresis, thyroid profile and bone marrow aspiration. Only those who consumed meat or fish were considered as non-vegetarians. Lacto vegetarians as well as lacto-ovovegetarians were grouped under vegetarians. Patients were included as pancytopenia that having WBC <4000/µL Platelets <1.5 lakh/µL and RBC <4 $\times 10^6$/µL. As per the protocol of our laboratory, blood sample for vitamin B12 was drawn. Serum vitamin B_{12} levels (normal range 211- 946 pg/ml) were estimated by (Automated Chemi Luminescent Immuno Assay ARCHITECT-i1000 PLUS). The biochemical vitamin B_{12} deficiency was defined at a concentration below <197 pg/ml. Data was statistically analyzed using SPSS for windows version 17. Chi-squared test or χ^2 test was used for comparing groups of data. A p value of <0.05 was taken to indicate statistical significance.

RESULTS

Of the 120 people with documented B_{12} levels, 41 (34.16%) had at least one deficient result (≤197 pmol/L). Our more conservative estimate based on all 210 patients indicated that 19.52% (41/210) had at least one deficient result. So over all prevalence of B_{12} deficiency was 19.52% and in case of total anemia patient, prevalence of vitamin B_{12} deficiency was 34.16%.

Table 1: Serum vitamin B12 distribution according to sex.

Sex	B12 <197pg/ml N (%)	B12 >197pg/ml N (%)	Total N (%)
Male	22 (18.33)	30 (25.00)	52 (43.33)
Female	19 (15.83)	49 (40.83)	68 (56.66)
Total	41 (34.16)	79 (65.83)	120 (100)

χ^2= 2.70 P= 0.10

Table 2: Serum vitamin B12 distribution according to diet.

Diet	B12 <197pg/ml N (%)	B12 >197pg/ml N (%)	Total N (%)
Vegetarian	34 (28.33)	50 (41.66)	84 (70.00)
Non vegetarian	7 (5.83)	29 (24.16)	36 (30.00)
Total	41 (34.16)	79 (65.83)	120 (100)

χ^2= 4.95; P= 0.026.

Table 3: Serum vitamin B12 distribution according to age.

Age (years)	B12 <197pg/ml N (%)	B12 >197pg/ml N (%)	Total N (%)
<20	4 (3.33)	19 (15.83)	23 (19.16)
21-40	35 (29.16)	43 (35.83)	78 (65.00)
>41	2 (1.66)	17 (14.16)	19 (15.83)
Total	41 (34.16)	79 (65.83)	120 (100)

χ^2= 11.57; P= 0.003.

Table 4: Serum vitamin B12 distribution according to cytopenias.

	B12 <197pg/ml N (%)	B12 >197pg/ml N (%)	Total N (%)
Pancytopenia	29 (24.16)	35 (28.33)	64 (53.33)
Non pancyopenia	12 (10.00)	44 (36.66)	56 (46.66)
Total	41 (34.00)	79 (65.83)	120 (100)

χ^2 = 7.54 ; P=0.005.

In this study Prevalence of B_{12} deficiency in male and female were 18.33% (22) 1nd 15.83% (19) respectively. B_{12} deficiency was more in male than female, but data was statically not significant (χ^2 = 2.70 P= 0.10) (Table 1). Prevalence of B_{12} deficiency in vegetarian and non-vegetarian were 28.33% and 5.83% respectively. In our study prevalence of B_{12} deficiency was more in vegetarian than non-vegetarian, this data further supported by statics (χ^2 = 4.95 P= 0.026) (Table 2).

Prevalence of B_{12} deficiency in age group <20 years, 21-40 years and >41 years were 3.33%, 29.16% and 1.66%

respectively. In this study young adult (age group 21-40 years) has more prevalence than older people. This data further support by statically analysis (χ^2=11.57 p=0.003) (Table 3). Prevalence of B_{12} deficiency in pancytopenic patients and without pancytopenia was 24.16% and 10.00% respectively. So in this study, patient was having pancytopenia, there was chance of high B_{12} deficiency .this data further supported by statical analysis (χ^2 = 7.54 P=0.005) (Table 4).

DISCUSSION

In present study, prevalence of b12 was 19.52%. This result was almost similar to Gupta AK et al[17] in which B_{12} deficiency was 22%, which was very high compared with estimated rates in the general population (3% to 5%).[7,8]

In this study Prevalence of B12 deficiency in male and female were 18.33% (22) 1nd 15.83% (19) respectively. B_{12} def was more in male than female. But data was statically not significant. In other studies Anil K gupta et al also had rates of B_{12} deficiency were similar in men and women (44%/40%).[17]

Crăciun EC et al [18] showed that serum level of vitamin B_{12} did not differ significantly between female and male subjects. But in Bhawna singh et al showed gender appeared to contribute towards the B_{12} deficiency according to our study, females being more prone to develop B_{12} deficiency (Odds ratio 0.62, 95% confidence interval 0.41 to 0.93 at 200pg/ml, p<0.05 and odds ratio 0.48, 95% confidence interval 0.29 to 0.78, p<0.05 at 350 pg/ml).[19]

Prevalence of b12 deficiency in age group <20 years, 21-40 years and >41 years were 3.33%, 29.16% and 1.66% respectively. In this study young adult (age group 21-40 years) has more prevalence than older people. This study further supported by Singh B et al in which the B_{12} deficient groups (< 200pg/ml as well as <350 pg/ml), majority of the subjects belonged to age groups 21-40 and 41-60 years. About 35 to 45% population belonged to this age group as compared to 15 to 18% of >60 years.[19] We concluded that prevalence was more in young adult than older person.

Prevalence of B_{12} deficiency in vegetarian and non-vegetarian were 28.33% and 5.83% respectively. In our study prevalence of B_{12} deficiency was more in vegetarian than non-vegetarian. Similar result found in Singh B et al showed that Dietary data could be retrieved in 43.6% (184/422) of patients only, out of which 107 (58.2%) were vegetarians and 77 (41.8%) were non vegetarians.[19]

Among the vegetarian group, 59 out of 107 (55%) had vitamin B_{12} level less than 200 pg/ml whereas only 16 of 77 non vegetarians (20.8%) had B_{12} deficiency. Vegetarian dietary habit was found to be a substantial risk factor for B_{12} deficiency (Odds ratio 4.68, 95% confidence interval 2.39 to 9.15, p<0.05) in our population.

Gupta AK et al showed that vegetarianism was found to be a substantial risk factor for B_{12} deficiency (OR 2.14, CI 1.65 to 2.77). A more detailed dietary analysis indicated, however, that even nonvegetarians ate meat only occasionally.[17,20] we found high rates of B_{12} deficiency, even among patients labeled nonvegetarian. Some data in our charts and general knowledge of our population led us to believe that even nonvegetarians ate meat only occasionally.

Prevalence of B_{12} deficiency in pancytopenic patients and without pancytopenia was 24.16% and 10.00% respectively. So in this study, patient was having pancytopenia; there was chance of high B_{12} deficiency this is supported by Premkumar M et al.[21]

CONCLUSION

Low vitamin B12 concentration is common in Indian young adult men, particularly in vegetarians. Further studies are needed to confirm these findings in other parts of India. We therefore believe that there is a compelling reason to include vit-B12 in the supplement regimen to alleviate the disease burden of anemia in Indian population.

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