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NUTRITIONAL ASSESSMENT IN SEDENTARY LIFESTYLE OF TEACHERS IN A PRIVATE MEDICAL COLLEGE IN KOLKATA

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ABSTRACT

Vitamin B12 deficiency is a common problem worldwide. Aim: To study the nutritional status in individuals of sedentary lifestyle with a special emphasis on Vit B12 deficiency assessment. **Material and methods:** A prospective study conducted in the department of biochemistry and physiology at KPC medical College and hospital Kolkata. Subjects were selected randomly irrespective of age and gender. **Result:** Total number of subjects were12,out of which 8 were male and 4were females, aged between 30- 80 yrs.9subjects were overweight/obese with BMI >23. Hematological parameters were within normal reference range, 2 were type 2 DM their PPBS and HbA1c were increased, Vit B12 was increased in one subject. **Conclusion:** It was concluded that there was no vitamin B12 deficiency in this particular population even in vegetarian.

KEYWORDS: VitB12, HbA1c, BMI.

INTRODUCTION

VitaminB12 also called cobalamine, Cyanocobalimine and hydroxycobalamine are complex cobalt containing compound present in the diet. It is synthesized by the colonic microflora but not absorbed. Vit B12 is a water soluble vitamin which has a key role in normal functioning of the brain and nervous system and the formation of red blood cells. It is involved in the metabolism of every cell of the human body, especially DNA synthesis, fatty acid and aminoacid metabolism.[1] Deficiencyn of Vit B12 is a common problem worldwide and is recognized as a health concern nearly 100 years ago. Deficiency can potentially cause severe and irreversible damage especially to the brain and nervous system .[2]At levels only slightly lower than normal, a range of symptoms such as fatigue depression and poor memory may be experienced.[3]Itcan also cause mania and psychosis.[4,5]

Sources of Vit B12are mainly animal products meat, fish, dairy products.[6] The bioavailability from egg is less than 9%, 40-60% from fish, fowl and meat.[7] Deficiency occur mostly due to low intake, but can also result from malabsorption, certain intestinal disorders, low presence of binding proteins and use of certain medications like metformin, neomycin, H2 antihistaminics, aminosalicylic acid, antibiotics etc. In the elderly, long-term use of medications for co-morbidities can interfere or reduce vitamin B_{12}absorption. Vegetarians are most likely to suffer from Vit B12 deficiency, and infants are at higher risk if they are born to vegetarian mothers. Elderly who have diets with limited meat or animal products are vulnerable as well.

Causes of low Vit B12 levels Table 1[8]

Clinical Manifestation of Vit B12 deficiency Are Hunters glossitis, megaloblastic anaemia, subacute combined degeneration of spinal cord.Non specific symptoms and signs are loss of appetite, diarrhoe, fatigue, weakness, shortness of breath, low blood pressure, confusion, change in mental states. Deficiency of vitamin B12 is seen in elderly.[9]

It is possible that significant proportion of patients who are VitB12 deficiency remain undiagnosed and risk developing irreversible neurological complications. A definitive test of S cobalamin if <148pmol/L is highly sensitive for diagnosis.[8]

Table1: Showing causes of Vitamin B 12 deficiency

Cause Particulars	
Inadequate intake	Alcohol consumption Vegetarian diet
Malabsorption	Lack of intrinsic factor or parietal cells Pernicious anemia Atrophic gastritis Post-gastrectomy Ileal malabsorption Ileal resection Crohn's disease
Bacterial overgrowth	
Defective transport Transcobalamin deficiency	

MATERIALS AND METHOD

A prospective study was done in Kallipada Chaudhury Medical College, Kolkata. A total of 12 subjects, the teaching faculty in physiology and biochemistry were included in our study. The subjects were selected randomly irrespective of all age group and both sex. All sedentary adults with good nutritional status and their inform consent was taken.

A detailed haematological parameters Hb, MCH, MCHC, MCV, RBC, WBC, platelets were analysed by full auto haematological analyzer, Mindray BC- 5380.

Serum vitamin B12 was analysed by chemiluminescence method in Advia Centaur- CP Seimens. HbA1C analysed by Bio-rad D-10.

RESULTS

The study constituted total of 12 subjects, out of which 8 were males and 4females aged between 30 to 80 years.

3subjects (2 males and 1 female) BMI was less than 23. 9subjects (6 males and 3females) BMI was more than 23. 75% were either over weight or obese.

VitaminB12- All 11 subjects are with in the normal reference range (150-500pg/ml). One subject had a high value of more than 600 pg/ml.

HbA1Cand PPBS: 2 subjects have blood sugar more than 200 mg/dl and HbA1C >6.5%.

And all other haematological parameters were within normal reference range

Table 2 showing BMI

SI No.	Age (yrs)	Sex	Height (cm)	Weight (kg)	BMI Ht x wt
1	70	M	164	67	26
2	69	M	167	63	22
3	54	F	154	90	38
4	30	F	155	73	30
5	35	M	170	76	27
6	37	M	189	124	35
7	33	M	152	65	27
8	59	M	162	72	27
9	69	M	166	59	22
10	43	M	172	83	27
11	43	F	150	45	20
12.	49	F	160	72	28

Underweight <18.5, Healthy 18.5 - 22.9, Over weight 23 – 26.9, Obese ≥27.

Table3: showing haematological parameters

Subject	B12 pg/ml	Sugar mg/dl	HbA1 C %	TSH µIu/ml	Hb g/dl	MCV fL	MCH pg	MCHC g/dl	RBC $x10^6$/µl	WBC $x0^3$/µl	PLT lac/µl
1	342	200	5.7	-	12.6	99.5	33.3	33.5	3.78	5.33	0.61
2	417	436	12.3	3.49	14.7	94.4	29.3	31.0	5.02	5.18	1
3	279	83	5.4	-	12.7	85.1	27.1	31.8	4.69	6.92	2.14
4	223	80	5.1	-	12.6	91.8	29.5	32.1	4.27	7.79	2.43
5	267	75	4.8	-	14.8	90.0	29	32.2	5.10	5.75	1.53
6	211	93	5.3	-	14.8	91.6	28.3	30.9	5.23	7.87	2.07
7	198	84	5.7	-	15.4	88	28.1	31.9	5.49	7.69	1.90
8	235	98	5.5	-	13	91.7	29.6	32.3	4.39	5.90	1.88
9	232	82	5	-	13.5	92.6	29.2	31.5	4.63	5.53	1.09

10	236	94	5.7	-	15.6	91.3	30	32.9	5.20	9.07	2.09
11	624	90	5.6	5.36	12	90.2	28	32.0	4.89	6.78	2.30
12	222	98	5.4		14	90.4	28.2	32.7	4.98	7.94	2.78
Normal	**200-500**	**70-140**	**6%**	**0.36-6.0**	**13-17**	**80-100**	**27-32**	**31.5-34.5**	**4.5-5.5**	**4000- 10,000**	**1.5-4lakh**

DISCUSSION

Deficiency of Vitamin B12 is a health concern, sedentary way of working, vegetarian, stress, poor diet may be possible to cause B 12deficiency.

In our study serum vitamin B12 were all within normal limits, hence the additional confirmatory tests i.e homocysteine and methyl malonicacid levels were not analysed. Moreover, these tests are more expensive, not readily available and reference levels are not standardized. Currently the initial test for vitamin B12 deficiency is to access serum vitamin B12 levels only when there is low normal level.[10,11]

In our study two of our subjects were Type 2 DM, on oral medication of metformin and other glycaemic drugs. Their blood sugar were high but their vitamin B12 was normal. According to According to De Jage et al, Andres E et al and Gillian M studies have stated metformin may reduce serum folic acid and vitamin B12 levels on long term(>5 years) and substantially increases the risk of B12 deficiency and hyper homocysteinemia which is an independent risk factor for cardiovascular disease especially among individual with Type 2 diabetes as metformin retards intestinal absorption of glucose and Vit B12.[12,13,14] The general clinical significance of metformin upon B12 levels is as yet unknown.[15]

All 11 subjects are non vegetarian who either consume meat, fish or egg have their B12 level normal. Many studies have shown that vegetarianism are at higher risk for B12deficiency compared to those consuming mixed diet.[13,14] In our study one subject who is pure vegetarian has B12 level > 600pg/ml, the cause for elevated plasma B12 level in the absence of supplementation maybe a diagnostic sign of serious disease. The cause for elevated B12is general liver disease since hepatic cytolysis releases B12 and the effected liver shows decreased cobalamin clearance. Thus acute hepatitis, cirrhosis, hepatocellular carcinoma and metastatic liver disease can also be accompanied by increase in circulating cobalamin.[16] Another cause may be due to enhanced production of the plasma B12 transporter haptocorrin and transcobalaminII.[17]

Another study states that altogether it can be concluded that an observed elevation of cobalamin in blood merits a full diagnostic work up to assist the presence of disease.[18]

BMI was calculated and found that 75% of our subjects were over weight or obese, may be because of sedentary life style and good nutritional status

CONCLUSION

There is no precise or gold standard test to diagnose vitamin B12deficiency. Diagnosis is usually based on identifying a low level of serum B12 with clinical evidence of deficiency. Vitamin B12 is prevalent in sedentary elderly with comorbidities and on medication. Our study did not show any deficiency of Vitamin B12 and the hematological parameters were normal with in the reference limit. Hence it shows that the nutritional status of this particular population is rich in Vitamin B12. This is our preliminary finding which needs validation in good trial before wide spread acceptance. Limitations of our study were: The number is too small to make any conclusion with these results, we did not analyse other biochemical makers such as homocysteine and methyl malonic acid levels as it was not available and expensive, blood smear, other metabolite tests were not done to confirm the increase level for vitamin B12.

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