



ORIGINAL RESEARCH PAPER

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VITAMIN B12 DEFICIENCY AMONG ADULT HUMAN SUBJECTS WITH GASTROINTESTINAL DISORDERS – CASE STUDIES

KEY WORDS: Vitamin B12, Gastrointestinal Tract Disorder, Human Adults

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ABSTRACT

OBJECTIVES Present research work basically deals about case studies done on 6 patients with different gastrointestinal tract disorders having vitamin B12 deficiency. Follow up of the cases was done for 2 months.

METHODS Six GIT patients with vitamin B12 deficiency were selected purposefully from 300 adult subjects who had undergone serum vitamin B12 estimation from a multispecialty hospital setup. The biochemical reports were obtained from hospital records. Other informations were collected using questionnaire and observation schedule method.

RESULT Obtained results showed that mean \pm SD of all subjects was B12 deficient, among them more were females, non working and anemic. Similarly more of them were underweight and overweight with multiple clinical manifestation of B12 deficiency. Improved clinical manifestations, serum vitamin B12 and BMI were observed in all cases after follow up.

SUMMARY Patients with gastrointestinal diseases should be screened and treated for B12 deficiency eventually.

INTRODUCTION

Due to widely prevalent malnutrition Vitamin B12 deficiency is common in India. The preliminary reasons are poor diet, lifestyle, social and cultural issues. Any one of its varied manifestations can occur in isolation and can be coexisting with other co-morbidities (Sasidharan, P. K., 2017). In addition, the symptoms are modified also by the underlying disorder causing its deficiency especially gastrointestinal tract (GIT) disorders. GIT disorders impose great risk on nutritional status particularly of Vitamin B12 deficiency because absorption of this vitamin depends on a sound gastrointestinal system. In spite of being a common disorder, its recognition is delayed or missed because the manifestations are diverse in nature, affecting the systems, and is often subclinical. Vitamin B12 deficiency has number of causes and can affect people of various ages and backgrounds. Its causes can be grouped into categories including, nutritional vitamin B12 deficiency, or malabsorption and age-related gastric atrophy. This causes a decrease in acid and intrinsic factor production leading to vitamin B12 malabsorption. Moreover, conditions such as pernicious anemia and food-bound malabsorption account for less than half of poor vitamin B12 status among the elderly. To see the correlation between serum vitamin B12 deficiency and GIT disorders felt needed. Keeping this view in mind present case studies had been done on 6 patients with different gastrointestinal tract disorders having vitamin B12 deficiency.

METHODOLOGY

The patients were picked up for present study from a sample of 300 randomly selected out patients undergoing voluntary on purpose medical health checkup during a 2 months span study in a multispecialty hospital of Indore. Out of 300 subjects 9 had found to have GIT disorders and among them 6 were found to be vitamin B12 deficient. Informed verbal consent was taken from them prior to collection of data. Their biochemical report of serum vitamin B12 and hemoglobin were obtained from hospital records by maintaining the protocol of the hospital. The cut offs used <203 pg/ml for defining vitamin B12 deficiency (WHO, 2008). Haemoglobin was also characterized as per cut offs used for males and females (WHO, 2011).

A predesigned information schedule had been use for physical examination and to collect demographic information on personal characteristics like age, gender, educational level, occupation, income and marital status. Past history of any disease and prevailing co morbid conditions obtained. Food habits was noted, dietary suggestions and Vitamin B12 supplementations were given to each one specifically and according to their particular need with a follow-up of 2 months. Changes in serum vitamin B12 levels and hemoglobin levels with changes in clinical sign and symptoms were noted.

Furthermore, information regarding clinical signs and symptoms of vitamin B12 deficiency was also obtained and marked + for presence and – for absence of symptoms. Mean and SD of serum vitamin B12 values of both deficient and non deficient cases with gastrointestinal disorders were calculated.

RESULT

Table-1 shows mean \pm SD of vitamin B12 according to demographic backgrounds of the cases with gastrointestinal disorders. Mean value of females, non working, low income group, underweight, obese and anemic were found to vitamin B12 deficient as compared to their counterparts. Furthermore, mean value of serum vitamin B12 was found to be on deficient side of subjects with severe clinical manifestations.

TABLE-1 Socio Demographic Background Of The Deficient And Non Deficient Cases

Variables	Options	n	Mean pg/ml	SD \pm
Age (years)	30-45	5	226.80	136.01
	45-60	4	212.75	135.74
Gender	Male	5	259.25	138.26
	Female	4	189.60	124.09
Education level	Educated	8	238.75	122.99
	Uneducated	1	75	0
Occupation	Working	5	301.40	108.54
	Non working	4	115.75	34.21
Marital status	Married	8	235.62	127.26
	Unmarried	1	100	0
Income group	Low	2	87.5	17.67
	Middle	4	272	147.81
	High	3	240.66	91.27
BMI (kg/m²)	Low (<18.5)	1	142	0
	Normal (18.6-24.9)	4	271.25	152.66
	High (>25)	4	189.50	114.74
Hemoglobin	Anemic	5	195.80	118.60
	Normal	4	251.50	148.98
Food habits	Vegetarian	6	217.67	146.21
	Non vegetarian	3	226.33	106.49
Clinical manifestations	Mild	4	257.75	139.28
	Moderate	2	295.5	147.78
	Severe	3	121	39.88

Table 2 shows the clinical and dietary profile of cases. These cases included two males and four females aged between 30-60 years. Celiac disease was indicated in two cases, GERD, diverticulitis, peptic ulcer and gastritis in one case each. One among them was

illiterate. Equally three of them were working and nonworking respectively. One case reported co morbid conditions with hypothyroidism, hypertension, edema, and lactose intolerance. A total of 5 cases reported deficiency due to vegetarianism (case 1, 2, 3, 5, 6). Of these, 4 were vegetarian (2, 3, 5, 6) and 1 was non vegetarian (case 1). Four cases (case 1, 3, 4, and 5) reported B12

replacement therapy via intramuscular administration as the initial treatment while two cases indicated that oral B12 was given (case 2, 6). Low FODMAP diet was prescribed for one case (case 4). As per ailment dietary suggestions were made and sources of vitamin B12 were explained.

TABLE-2 Clinical And Dietary Profile Of The Cases

Background information	Cases					
	1	2	3	4	5	6
GIT disorder	Celiac disease	GERD	Peptic Ulcer	Diverticulitis	Celiac disease	Gastritis
Age (years) gender	45 Female	55 Female	30 Male	60 Male	39 Female	53 Female
Demographic info	Housewife Educated	Housewife Illiterate	Clerk Educated	Business Educated	Housewife Educated	Professional Educated
Past history	Hysterectomy 5 years back	None	Dengue 1month back	Rheumatoid arthritis	Appendectomy	None
Co morbid conditions	Angular fissures, pellagrous dermatitis, nasolabial dysborrhoea	Acidity	None	Anemia	Hypothyroidism Hypertension, lactose intolerance, oedema	None
Food Habit	Non Vegetarian	Vegetarian	Vegetarian	Non vegetarian	Vegetarian	Vegetarian
Prescription after diagnosis	Methylcobalamin 750 mcg /day for a month.	Vitcofal Injections Twice a week	Methylcobalamin injections twice a week	Intra muscular B12 injections. With Low FODMAP foods	Intra muscular B12 injections twice a week.	Methylcobalmin 1500 mcg.
Dietary suggestions	Gluten free diet with moderate non veg	Normal diet	Normal diet with probiotic food daily	Normal diet	Gluten free, lactose free, low sodium diet.	Normal diet with low fat.

Table-3 shows initial and final observations of BMI, vitamin B12, hemoglobin and clinical findings. Case no 2 and 5 was overweight and obese respectively while three cases (case3, 4, 6) were found to have normal BMI. No major changes in BMI were reported in five cases. One case (case 1) reported low BMI initially but became normal after treatment. The main features of clinical manifestations experienced by cases studied were shortness of breath (cases 1, 2, 4, 5), fatigue, weakness (cases 1, 2, 4, 5) gastric problems (cases 1, 2, 4, 5, 6) and dizziness (cases 1, 2, 5, 6). Furthermore a total of three cases (cases 2, 5, 6) reported tingling numbness, depression (cases 1, 2, 5), sore tongue (cases 2, 3, 5) and weight loss (cases 1, 3, 4). Reduction in majority of clinical findings especially weight loss, dizziness, and fatigue and weakness were reported in follow-up. Serum vitamin B12 levels were also found to be increased in final recordings. Two cases (cases 4, 5) reported low hemoglobin levels both initially and finally. But slight increase in the hemoglobin levels was reported in both the cases. One case (case 5) reported little to no improvement in symptoms and vitamin B12 levels indicate that symptoms are resistant to treatment or due to co morbid conditions not responded to treatment.

Poor concentration and memory	Initial	++	+	-	-	-	-
	Final	+	-	-	-	-	-
Unsteady gait	Initial	-	++	-	-	-	-
	Final	-	+	-	-	-	-
Shortness of breath	Initial	++	++	-	+	++	-
	Final	-	-	-	+	+	-
Pale skin	Initial	-	-	-	+	+	-
	Final	-	-	-	+	+	-
Dizziness	Initial	+	+	-	-	+	+
	Final	-	-	-	-	-	+
Gastric problems	Initial	++	++	-	+	+	+
	Final	+	-	-	+	+	-
Fatigue or weakness	Initial	++	++	-	+	+	-
	Final	+	-	-	-	+	-
Sore tongue	Initial	-	++	++	-	+	-
	Final	-	-	+	-	+	-
Weight loss	Initial	++	-	+	+	-	-
	Final	-	-	-	-	-	-

TABLE-4 Changes In Health Profile Of The Cases

Variables	Level	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
BMI (kg/m ²)	Initial	17.7	26.75	20.56	22.30	33.68	20.34
	Final	18.3	26.70	21.6	22.25	31.5	21.04
Vitamin B12 (pg/ml)	Initial	142	75	110	190	146	185
	Final	350	240	477	250	190	350
Hemoglobin (g/dl)	Initial	12	14.6	11	8.7	9.7	12.6
	Final	11.7	14.4	12.4	10.9	10.0	12.0
Tingling and numbness	Initial	-	++	-	-	++	+
	Final	-	++	-	-	++	-
Depression	Initial	++	++	-	-	+	-
	Final	+	++	-	-	-	-
Brittle nails	Initial	+	-	-	-	+	-
	Final	+	-	-	-	+	-

DISCUSSION

The causes of B12 deficiency can be either due to nutritional deficiency or due to malabsorption. Pawlak, R., (2013) reported that vegans with gastrointestinal disorder are at high risk for deficiency if they do not consume adequate amounts of fortified products or supplements. Similarly, it appears that malabsorption could be a prominent cause of B12 deficiency among young and middle-aged adults. The Dietary Guidelines for Americans currently recommends that individuals aged 50 years and older should take a B12 supplement (McGuire, S., 2011). The findings of these cases indicate that this recommendation may have to be extended to individuals in younger age groups. Rusher, D. R., et al., (2013) revealed that clinical manifestations of B12 deficiency are varied and include variety of signs and symptoms like neurological, psychiatric, and gastric. All these gastrointestinal problems i.e. celiac disease, GERD, peptic ulcer, diverticulitis, gastritis has well accepted and well documented evidences for their link with

vitamin B12 deficiency (Omar, A. M., et al., 2015). Similarly they also exhibited vitamin B12 deficiency clinically. This is also evidently reported (Singh, B. et al., 2010). Individuals with gastrointestinal diseases should be screened for vitamin B12 deficiency at regular intervals. Also a prudent measure would be required for these patients to receive regular vitamin B12 injections or should use supplements.

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