iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** VII **Month of publication:** July 2018

DOI: http://doi.org/10.22214/ijraset.2018.7030

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue VII, July 2018- Available at www.ijraset.com

Frequency of Vitamin B_{12} Deficiency in apparently Healthy Elderly in Sudan

Maha Zakaria Daffalla[1], Amira Humeid[2], Safa A. Wdidi[3], Suzan S. Kamel[4]
[1, 4]*Alneelain University, faculty of medical laboratory science-hematology department*
[2]*Alneelain University, faculty of Medicine.*
[3]*Omdurman Friendship hospital. Hematology laboratory department*

Abstract:
Background
Vitamin B12 is one of the important vitamins in human body, its store in liver and mainly can be obtained from animal resource food, so vegetarians always should have replacement as it role in cell formation and nerves as well. Decreased B12 absorption could be due to malabsorption which occurs with pancreatic insufficient and courseany surgery, intestinal disease and trophic gastritis, which increases with so that is why elder populations normally develop low absorption and decline in many organs function with time, so this study aimed to evaluate B12 status among apparently healthy elder people in Khartoum-Sudan.
Material and method
Apparently health elderly 100 subjects voluntarily enrolled and gave permission of blood collection and measuring of plasma level of B12 by means of chemiluminescent immunoassay (CLIA) . Hemoglobin (Hb) concentration also measured in the process by means of hematology analyzer Mindray BC300.
Result
The data obtained, revealed that B12 inversely correlated with age and there was no different in its levels according to gender.
Conclusion
So apparent healthy could be deceptive as B12 level low didn't present with obvious symptoms yet or missed, it recommended to set routine analysis for elder population include B12 and replacement for low level to avoid predicted damage due to its deficiency in the body.
Keyword: B12, Sudan, Hb, of chemiluminescent immunoassay, CLIA

I. INTRODUCTION

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. Vitamin B12 exists in several forms and contains the mineral cobalt [1-2], so compounds with vitamin B12 activity are collectively called "cobalamins". Methylcobalamin and 5-deoxyadenosylcobalamin are the forms of vitamin B12 that are active in human metabolism[3]. It is a dietary essential[4], required for proper red blood cell formation, neurological function, and DNA synthesis [1-3]. Vitamin B12 functions as a cofactor for methionine synthase and L-methylmalonyl-CoA mutase. Methionine synthase catalyzes the conversion of homocysteine to methionine [3-5]. Methionine is required for the formation of S-adenosylmethionine, a universal methyl donor for almost 100 different substrates, including DNA, RNA, hormones, proteins, and lipids. L-methylmalonyl-CoA mutase converts L-methylmalonyl-CoA to succinyl-CoA in the degradation of propionate [3-5-6]. A deficiency of vitamin B12 impairs DNA synthesis in any cell in which chromosomal replication and division are taking place [7]. Vitamin B12 (cobalamin) deficiencies are no longer a rare disease but a relatively common disease, whose prevalence increases with aging[8-9] 3-4. Vitamin B12 deficiency is a common problem worldwide, 5 an early sign of deficiency of these vitamins is megaloblastic anemia. The main storage site for vitamin B12 is the liver. Deficiencies in vitamin B12 can occur due to the lack of intrinsic factor (pernicious anemia), malabsorption of vitamin B12, deficiencies in the diet, or metabolism of vitamin B12 by intestinal parasites. The diagnosis of vitamin B12 deficiency is confirmed by a low plasma concentration of this vitamin. Prompt replacement of vitamin B12 is indicated in patients who are found to be deficient [7]. Vitamin B12 deficiency symptoms include fatigue, weakness, constipation, loss of appetite, and weight loss beside anemia [1-6-10]. Neurological changes, such as numbness and tingling in the hands and feet, can also occur [3-11], also difficulty maintaining balance, depression, confusion, dementia, poor memory, and soreness of the mouth or tongue [12]. The neurological symptoms of vitamin B12 deficiency can occur without anemia, so early diagnosis and intervention is important to avoid irreversible damage [5]. In higher-income countries, the

©IJRASET: All Rights are Reserved

major risk factor for developing B12 deficiency is the well-characterized autoimmune disease [13-14-15]. In addition, important risk factors are gastrointestinal surgery, such as gastric bypass or removal of the terminal ileum, which compromise the absorption of B12. In low-income countries, B12 deficiency is largely due to a low intake of B12 rich foods of animal origin, but possibly also to gastrointestinal infections and infestations, and host–microbiota interactions[16]. Contributing risk factors include Helicobacter pylori infection, intestinal bacterial overgrowth, poor food intake, alcoholism, smoking and long-term use of drugs, such as proton pump inhibitors, histamine H2 receptor antagonists and metformin. Various disorders, including malaria, HIV infection and tuberculosis [17].

Nutrition is an important determinant of health in elderly patients. Over the past decade, the importance of nutritional status has been increasingly recognized in a variety of morbid conditions including cancer, heart disease, and dementia in persons over the age of 65 [18-19-20-21-22], there is no uniformly accepted definition of malnutrition in the elderly but some common indicators include involuntary weight loss, abnormal body mass index, specific vitamin deficiencies, and decreased dietary intake [23]. Malnutrition in older patients is regularly underdiagnosed [24].

II. MATERIAL AND METHOD

This cross sectional study enrolled among one hundred (100) elderly subjects, who were apparently healthy, whole blood samples were collected under hygienic conditions in ethylene diamin tetra acetic acid (EDTA) for Hb measurement, which conducted by means of hematology analyzer Mindray BC 300, which works with principle of electric impedance and light scatter. And heparinized blood containers, plasma later collected and preserved at -20C^0 till time of analysis, which performed at Alneelain University-faculty of medical laboratory science by means of chemiluminescent immunoassay (CLIA), which is a competitive binding immunoenzymetic assay with automated sample pretreatment to determine the level of B12, chemiluminescence immunoanalyzer and analysis conducted according to the manufacturer (Mindray trademark-China). Data analysis was conducted using statistical package of social science (SPSS) program version 21.

III. RESULT

100 elderly subjects were involved in this study, their age mean±SD was 71.7+6.92 years, they were 66 male and 34 females, hemoglobin concentration mean±SD was11.39+26g/dl as in table 1

Table (1) mean of age and Hb among study group

Variables	Minimum	Maximum	Mean±SD
Age	60.00	89.00	71.7±6.92
Hb	4.00	15.70	11.39±2.26

Considering normal range of B12, 56 % of subjects presented normal levels of B12, while 44% were considered at deficient level of B12 as in table 2

Table (2) prevalence of B12 deficiency among study group

Variable	Frequency	Percentage (%)
Normal	56	56.0
Deficiency	44	44.0
Total	100	100.0

Gender distribution for B12 levels, 36 (54%) of males were with normal levels and 30 (45%) were with deficient levels, females were 20 (58.8%) normal levels and 14 (41.2%) with deficiency of B12 as in table 3.

Table (3) distribution of B12 deficiency in older subject according to gender

Gender	B12 Status		Total
	Normal	Deficiency	
Male	36 (54.5%)	30 (45.5%)	66 (100.0%)
Female	20 (58.8%)	14 (41.2%)	34 (100.0%)
Total	56 (56.0%)	44 (44.0%)	100 (100.0%)
P-value	0.424		

©IJRASET: All Rights are Reserved

Elder subjects were sorted to age range 60-75 years (75 subjects), 48 of them with normal levels of B12 and 27 subjects with deficient and 76-90 years (25 subjects), 8 have normal B12 level and 17 with deficiency levels. As in table 4

Table (4) distribution of B12 deficiency in older subject according to age

Age	B12 Status		Total
	Normal	Deficiency	
60-75 Years	48 (48.0%)	27 (27.0%)	75 (75.0%)
76-90 Years	8 (8.0%)	17 (17.0%)	25 (25.0%)
Total	56 (56.0%)	44 (44.0%)	100 (100.0%)
P-value	0.005		

Comparison levels of B12 among male and females elderly people did not give a significant difference as in table 5

Table (5): comparison of B12 levels among genders

Gender	Mean±SD	*P-value*
Male	181.53±24.79	0.916
Female	182.29±48.79	

Significant difference p value <0.05

B12 level, when compared between age ranges, 60 -70 years and more than 70 years, it brought significant difference as p value was 0.007 as in table 6

Table (6): range of elder age comparison

Age	Mean±SD	*P-value*
60-70 Years	191.24±36.05	0.007
More than 70 Years	172.71±30.83	

Significant difference p value <0.05

Considering hemoglobin concentration among elders, they divided to 3 levels, all of them presented with normal mean of B 12 levels and no significant difference obtained as in table 7.

Table (7): levels of Hb and B12 concentration among elders.

Hb	Mean±SD	*P-value*
4-9 g/dl	185.25±18.11	
9-12 g/dl	182.45±29.02	0.901
>12 g/dl	193.80±57.27	0.715

Significant difference p value <0.05

Correlation of Hb and age, revealed a negative one, as with aging, levels of hemoglobin decline , R= -0.102 and no significant difference as p value > than 0.05, as in figure 1.

©IJRASET: All Rights are Reserved

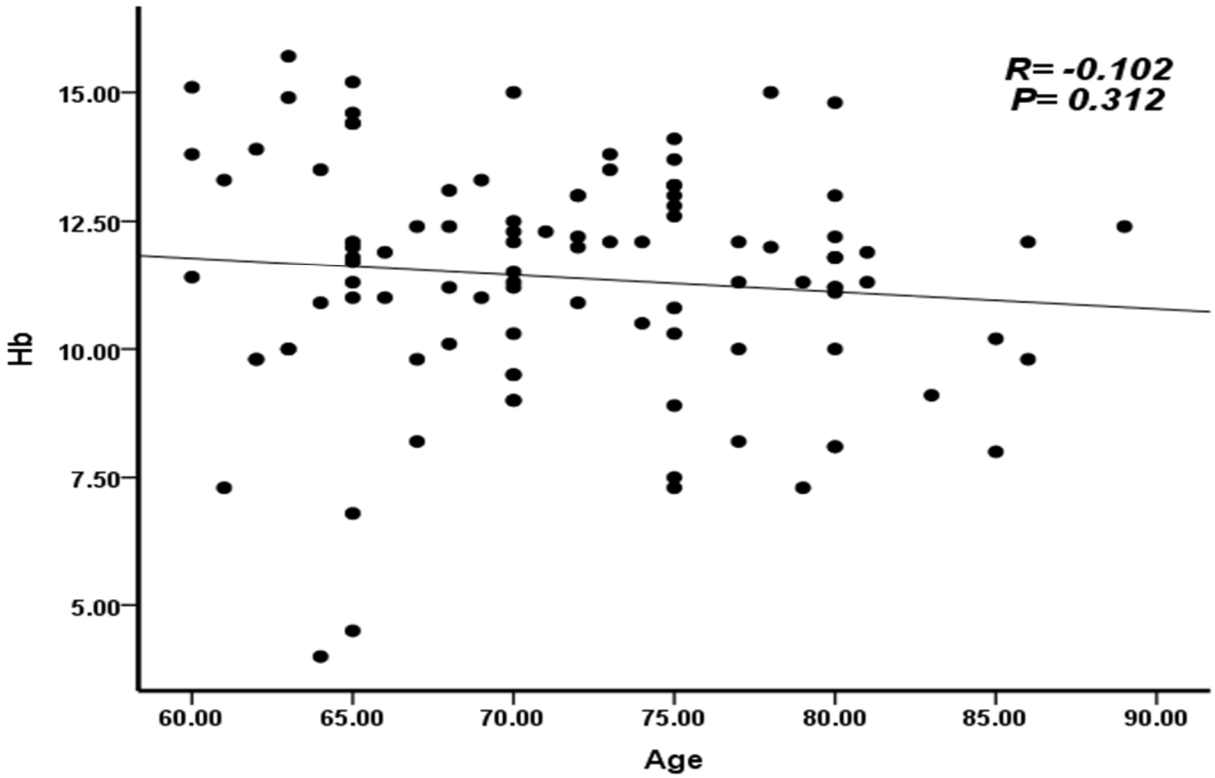


Figure (1) correlation between age and Hb level

Consider age of subjects, B12 level was inversely correlated with age (R=-0.412, P-value 0.002) this indicates that an increasing in age will lead to decrease in B12 level as in figure 2

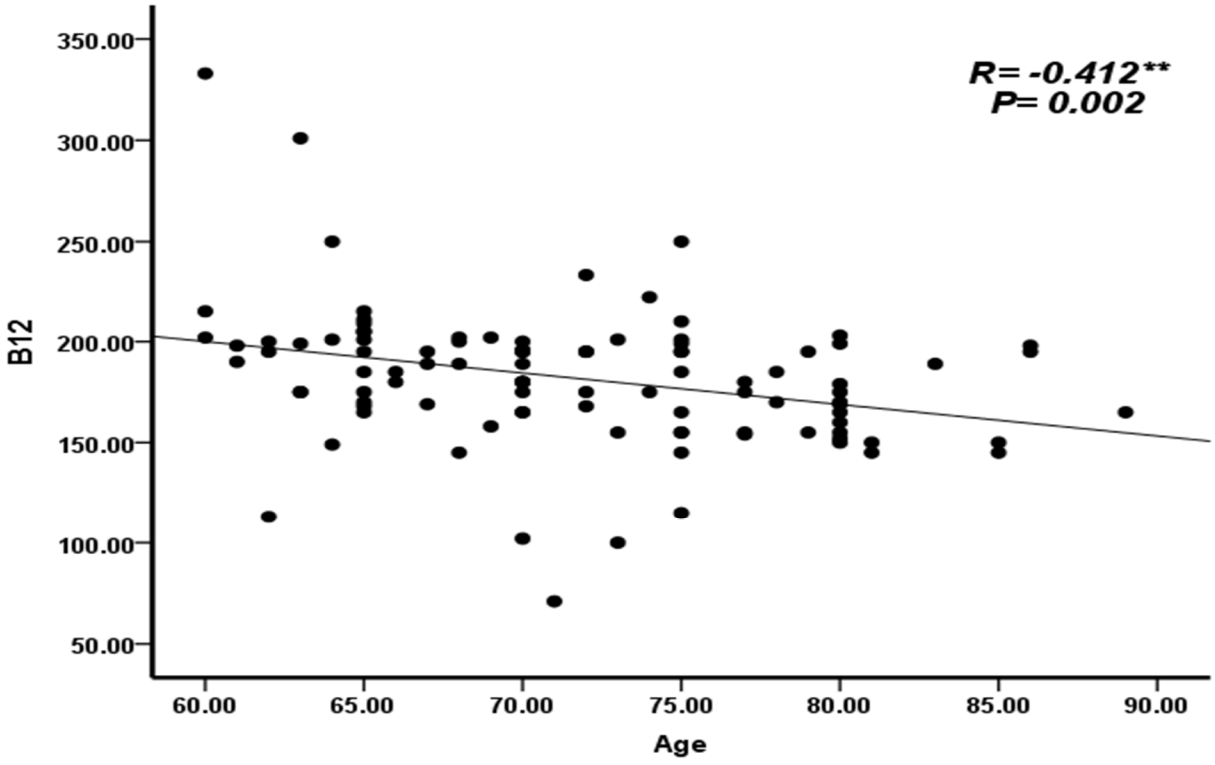


Figure (2) correlation between age and b12 level

©IJRASET: All Rights are Reserved

Positive correlation obtained between B12 level and hemoglobin levels as in figure 3

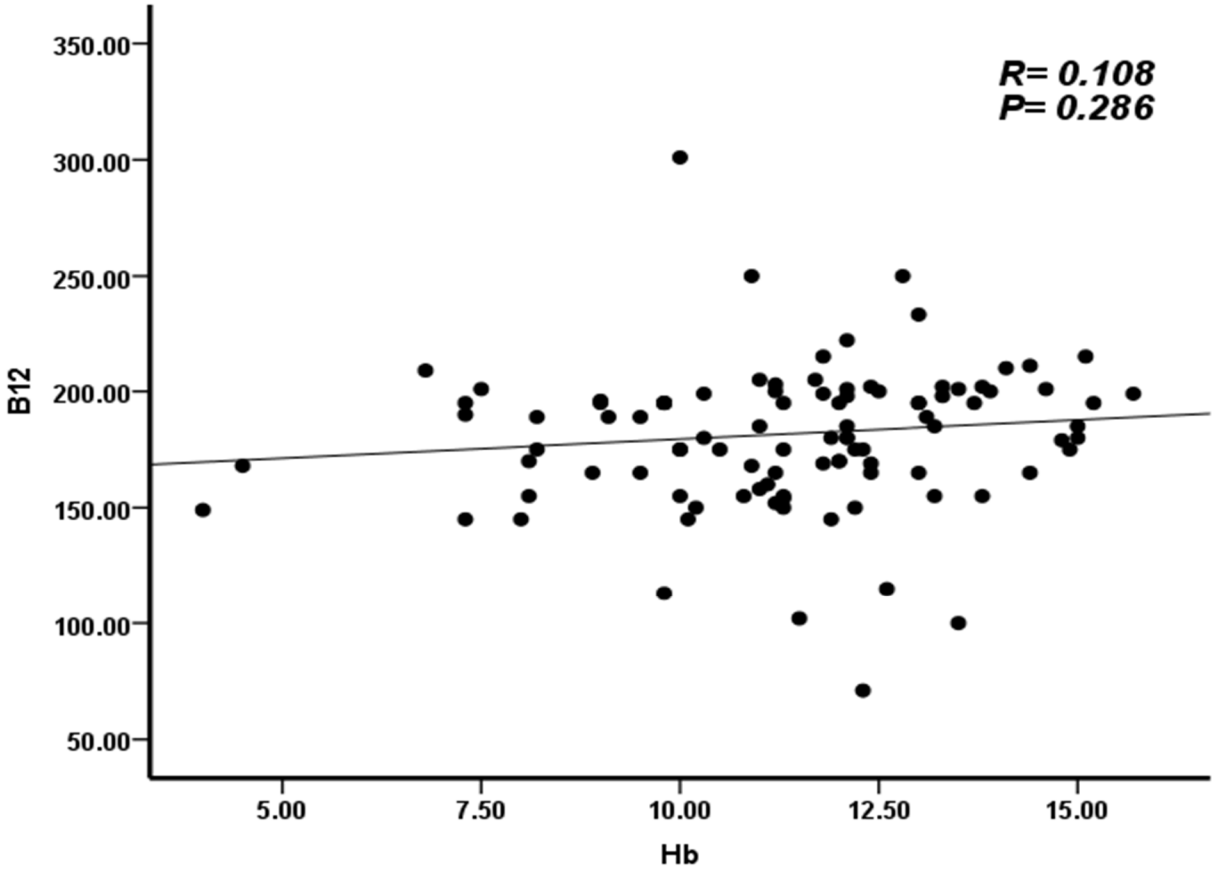


Figure (3) correlation between Hb and b12 level

IV. DISCUSSION

This study was conducted to assess vitamin B12 among apparently healthy elderly individuals in order to evaluate their health status though B12 levels, even with absence of symptoms specific to deficiency if it occurs. Around the world the elder people always under focus to maintain them healthy to live long enough without complication of aging, nutritional side always a gate to achieve that goal, as with aging, subjects normally tend to lose their appetites and normal physiological functions in body systems. Study in new Mexico involved. Equal numbers of male and female were healthy elder population, who were voluntarily enrolled and they were assessed for vitamin B12 level, which was low among ale than females and no signs or symptoms of B12 deficiency were presented though [25], these partially in agreement with our study, goal and process, but differs in findings of B12 levels among males and females, as no significant difference was obtained. In this study also low B12 found among 44% of involved elder subjects, and 54% were presented normal levels of B12, these in agreement of an Australian study concerned about elder health and assessed B12 among other parameters, low serum B12 was found in 22.9% [26]. Considering life cycle, B12 levels differs thought this study, as age sorting to range of 60-70 years and above 70 years brought significant difference, which in agreement of the review conducted concerned about old adults and vitamin B12 concentrations, it revealed the difference of levels among difference life cycle [27.] Age and B12 levels were reversely correlated in this study, which in agreement of study conducted though subjects ranged between 22 and 93 years, the lowest levels of vitamin B12 found the elder contributors of the study [28]. Hemoglobin level positively correlated vitamin B12 levels, this similar of findings of many studies as well [29-30].

V. CONCLUSION AND RECOMMENDATION

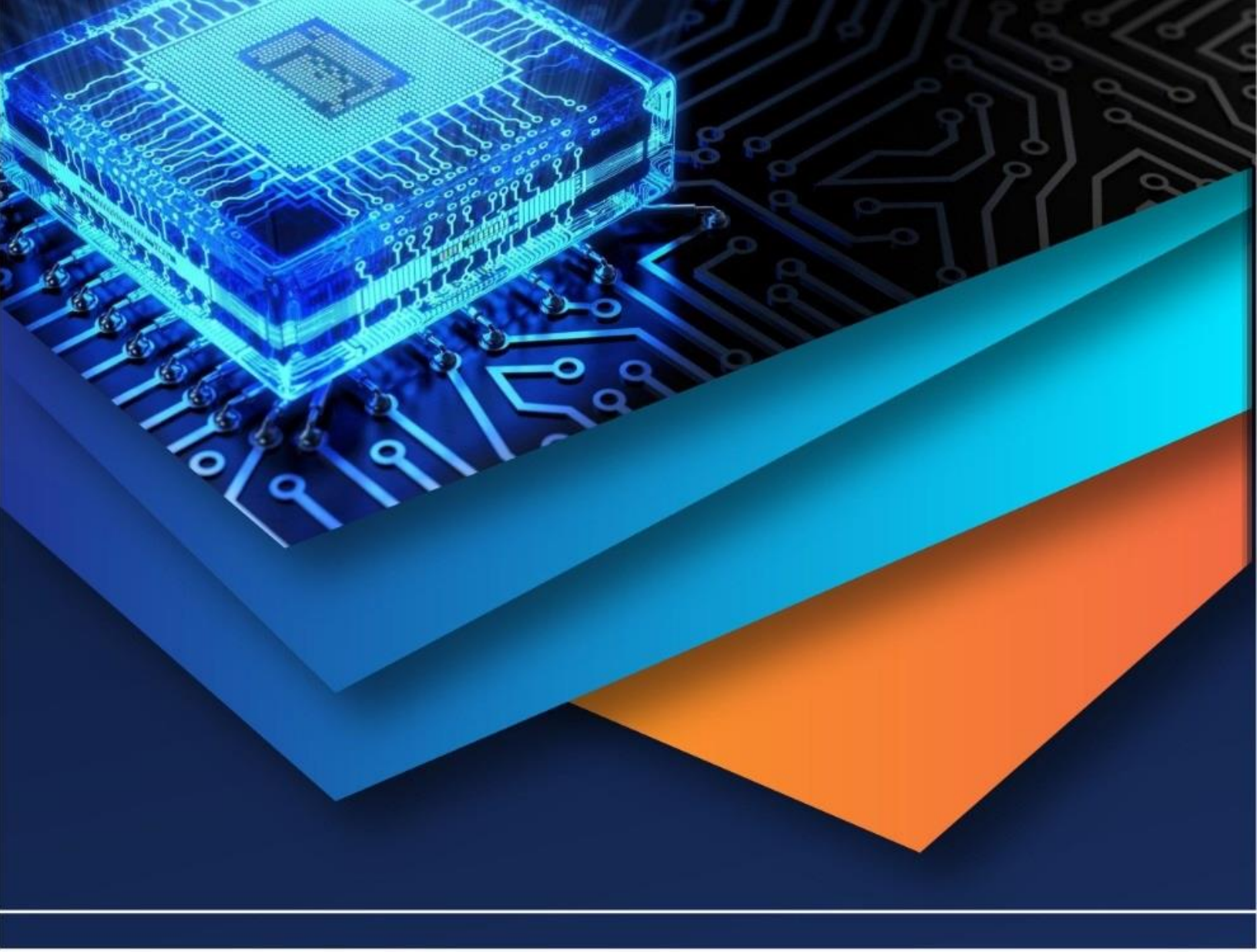
Apparently health status can't be exclude low levels of vitamin B12 and more concern about elder population should be a base plan to maintain them healthy as much as it could be achieved to avoid extra suffering beside the physiological changes bound to aging though time.

©IJRASET: All Rights are Reserved

REFERENCE

[1] Herbert V. Vitamin B12 in Present Knowledge in Nutrition. 17th ed. Washington, DC: International Life Sciences Institute Press, 1996
[2] Zittoun J, Zittoun R. Modern clinical testing strategies in cobalamin and folate deficiency. Sem Hematol 1999;36:35-46.
[3] Institute of Medicine. Food and Nutrition Board. Dietary Reference Intakes: Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline. Washington, DC: National Academy Press, 1998
[4] Varela-Moreiras G, Murphy MM, Scott JM. Cobalamin, folic acid, and homocysteine. Nutr Rev 2009; 67 Suppl 1: S69-72.
[5] Clarke R. B-vitamins and prevention of dementia. Proc Nutr Soc 2008;67:75-81
[6] Combs G. Vitamin B12 in The Vitamins. New York: Academic Press, Inc., 1992.
[7] Melmon KL, Morelli, Hoffman BB, Nierenberg DW Eds. Melmon and Morelli's Clinical Pharmacology, Basic Principles in Therapeutics. Third edition. New York: McGraw-Hill; 1992. P. 554-45
[8] Dali-Youcef, N. and Andres, E. (2009) An Update on Cobalamin Deficiency in Adults. Quarterly Journal of Medicine, 102, 17-28.
[9] Loikas, S., Koskinen, P., Irjala, K., Lopponen, M., Isoaho, R., Kivela, S.L., et al. (2007) Vitamin B12 Deficiency in the Aged: A Population-Based Study. Age and Ageing, 36, 177-183.
[10] Bernard MA, Nakonezny PA, Kashner TM. The effect of vitamin B12 deficiency on older veterans and its relationship to health. J Am Geriatr Soc 1998;46:1199-206.
[11] Healton EB, Savage DG, Brust JC, Garrett TF, Lindenbaum J. Neurological aspects of cobalamin deficiency. Medicine 1991;70:229-44
[12] Bottiglieri T. Folate, vitamin B12, and neuropsychiatric disorders. Nutr Rev 1996;54:382-90.
[13] Green, R. & Miller, J. W. in Handbook of Vitamins 5th edn (eds Zempleni, J. et al.) 447–489 (Taylor & Francis, 2014).
[14] Green, R. Vitamin B12 deficiency from the perspective of a practicing hematologist. Blood 129, 2603–2611 (2017)
[15] Carmel, R. Prevalence of undiagnosed pernicious anemia in the elderly. Arch. Intern. Med. 156, 1097–1100 (1996).
[16] Yajnik, C. S. et al. Vitamin B12 deficiency and hyperhomocysteinemia in rural and urban Indians. J. Assoc. Physicians India 54, 775–782 (2006).
[17] Premkumar, M. et al. Cobalamin and folic acid status in relation to the etiopathogenesis of pancytopenia in adults at a tertiary care centre in north India. Anemia 2012, 707402 (2012).
[18] Basran JF, Hogan DB. Vitamin E and Alzheimer disease. Geriatr Aging. 2002;5:8–12.
[19] Tessier D. Antioxidants and cardiovascular disease in the elderly. Can J Contin Med Educ. 2002;14:67–74
[20] Keller HH, Gibbs AJ, Boudreau LD, et al. Prevention of weight loss in dementia with comprehensive nutritional treatment. J Am Geriatr Soc. 2003;51:945–52.
[21] Takashashi Y, Sasaki S, Takahashi M, Okubo S, Hayashi M, Tsugane S. A population-based dietary intervention trial in a high-risk area for stomach cancer and stroke: changes in intakes and related biomarkers. Prev Med. 2003;37:432–41. [
[22] Van Wymelbeke V, Guedon A, Maniere D, et al. A 6-month follow-up of nutritional status in institutionalized patients with Alzheimer's disease. J Nutr Health Aging. 2004;8:505–8.
[23] Reuben DB, Herr KA, Pacala JT, et al. Geriatrics at your fingertips. 6th ed. Malden, MA: Blackwell Publishing; 2004
[24] Gariballa SE. Nutritional support in elderly patients. J Nutr Health Aging. 2000;4:25–7.
[25] Robert D. Lindeman , Linda J. Romero , Kathleen M. Koehler, Hwa Chi Liang , MA, Asenath LaRue , Richard N. Baumgartner & Philip J. Garry . Serum Vitamin B12, C and Folate Concentrations in the New Mexico Elder Health Survey: Correlations with Cognitive and Affective Functions. Journal of the American College of Nutrition Volume 19, 2000 - Issue 1.
[26] Victoria M. Flood, Wayne T. Smith, Karen L. Webb, Elena Rochtchina and Valerie Anderson. Prevalence of low serum folate and vitamin B12 in an older Australian population. AUSTRALIAN AND NEW ZEALAND JOURNAL OF PUBLIC HEALTH 2006 VOL. 30 NO. 1.
[27] Patrick J. Stover vitamin B12 and older adults. Curr Opin Clin Nutr Metab Care. 2010 Jan; 13(1): 24–27.
[28] Janice C. Hitzhusen, Mary Ellen Taplin, Wendy P. Stephenson and Jack E. Ansell. Vitamin B12 Levels and Age. A.J.C.P 1986.
[29] Saleh Nazmy Mwafy, , Wesam Mohammad Afana.Hematological parameters, serum iron and vitamin B12 levels in hospitalized Palestinian adult patients infected with Helicobacter pylori: a case–control study. Hematology, Transfusion and Cell Therapy Volume 40, Issue 2, April–June 2018, Pages 160–165.
[30] Ralph Gree. Vitamin B12 deficiency from the perspective of a practicing hematologist. BLOOD, 11 MAY 2017 x VOLUME 129, NUMBER 19

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)