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Research Article

AWARENESS OF VITAMIN B12 DEFICIENCY AMONG THE GENERAL POPULATION

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ABSTRACT

Aim: To study the level of awareness on vitamin B12 deficiency among the general population and to educate the population on preventive measures.

Objective: To study the causes, signs and symptoms, treatment, investigation and prevention of vitamin B12 deficiency among the general population and to educate the population on preventive measures.

Background: Vitamin B12, or Cobalamin, is a water-soluble vitamin and plays a vital role in the normal functioning of the brain and the nervous system and in the formation of red blood cells. It also helps to regulate and synthesize DNA. It occurs in animal products, such as fish, meat, eggs, and dairy products. Vitamin B12 deficiency can result in irreversible and potentially severe damage, especially to the human nervous system and brain. It can also cause anemia.

Reason: This study is done in order to understand the role of vitamin B12 and also help in the prevention and better treatment of diseases associated with its deficiency leading to better quality of life.

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INTRODUCTION

Vitamin B12 is a water-soluble vitamin that is naturally present in foods like, milk, poultry, eggs, meat etc.^{1,2,3} Methylcobalamin and 5-deoxyadenosylcobalamin are the forms of vitamin B12 that are active in human metabolism⁴. Vitamin B12 is required for proper red blood cell formation, neurological function, and DNA synthesis³. Vitamin B12 functions as a cofactor for methionine synthase. Methionine synthase catalyzes the conversion of homocysteine to methionine^{4,5}. If pernicious anemia is left untreated, it causes vitamin B12 deficiency, leading to megaloblastic anemia and neurological disorders, even in the presence of adequate dietary intake of vitamin B12. Vitamin B12 deficiency is common, affecting between 1.5% and 15% of the general population^{6,7}. In many of these cases, the cause of the vitamin B12 deficiency is dietary deficiency⁸. 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. Vitamin B12, bound to protein in food, is released by the activity of hydrochloric acid and gastric protease in the stomach⁴.

The average intake of vitamin B12 is 2.4 mcg/day. During pregnancy it is increased to 2.6mcg and during lactation it increases 2.8 mcg. In addition to oral dietary supplements,

vitamin B12 is available in sublingual preparations as tablets or lozenges. These preparations are frequently marketed as having superior bioavailability.

Vitamin B12 deficiency can be caused by medications like proton pump inhibitors and anticancer drugs for prolonged periods¹⁰. Due to its role in energy metabolism, vitamin B12 is frequently promoted as an energy enhancer and an athletic performance and endurance booster. These claims are based on the fact that correcting the megaloblastic anemia caused by vitamin B12 deficiency should improve the associated symptoms of fatigue and weakness⁹. During infancy, signs of a vitamin B12 deficiency include failure to thrive, movement disorders, developmental delays, and megaloblastic anemia¹¹.

MATERIALS AND METHODS

This was a questionnaire based study. The questionnaire consisted of 15 well structured questions. Study subjects were recruited from a randomly selected population at Chennai (n =158). The subjects who participated were from different socio-economic backgrounds, age, educational background, locations and included men and women. The data collected was analyzed using Microsoft Excel (version 10) and tabulated along with explanatory visual charts with respect to the various parameters chosen.

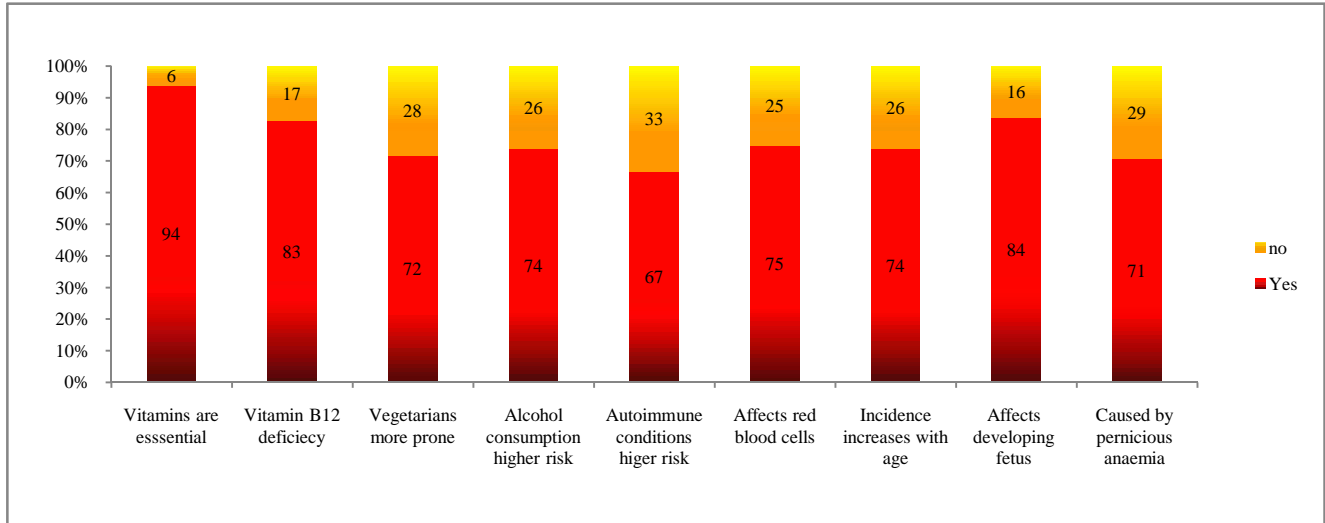
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RESULTS AND DISCUSSION

The results from the survey were analyzed. It was noted that the level of awareness among the general population was relatively high. Most of the subjects under the study acknowledge the role of vitamins in maintaining metabolism and in functioning of the body. They were aware of vitamin B12 deficiency. The normal plasma or serum level of vitamin B12 is 170-250pg/mL⁴. About 53% of the population knew that it was also known as Cobalamine, as it contained the mineral cobalt⁴.

The population was well informed about the effects it could have on the developing fetus in pregnant mothers with vitamin B12 deficiency.

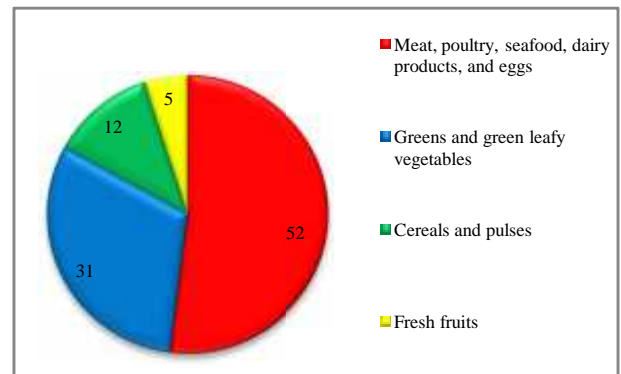
Vitamin B12 status is typically assessed via serum or plasma vitamin B12 levels. Values below approximately 170–250 pg/mL (120–180 picomol/L) for adults⁴ indicate a vitamin B12 deficiency. However, evidence suggests that serum vitamin B12 concentrations might not accurately reflect intracellular concentrations⁵.



About half of the study population was well informed about the sources of vitamin B12. Vitamin B12 is naturally found in animal products, including fish, meat, poultry, eggs, milk, and milk products. Vitamin B12 is generally not present in plant foods, but fortified breakfast cereals are a readily available source of vitamin B12 with high bioavailability for vegetarians^{4,12}. Some nutritional yeast products also contain vitamin B12.

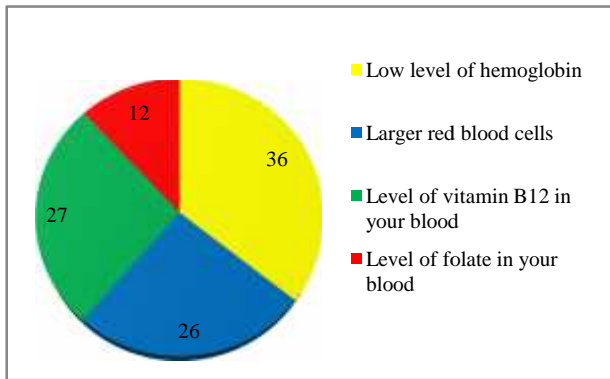
Only 38% knew that it lead to megaloblastic anemia, while most were convinced that it lead to pernicious anemia. Pernicious anemia is an autoimmune disease that affects the gastric mucosa and results in gastric atrophy¹³. This leads to the destruction of parietal cells, achlorhydria, and failure to produce intrinsic factor, resulting in vitamin B12 malabsorption^{3,4,14}. Atrophic gastritis, a condition affecting 10%–30% of older adults, decreases secretion of hydrochloric acid in the stomach, resulting in decreased absorption of vitamin B12^{4,14,15}. Strict vegetarians and vegans are at greater risk than lacto-ovo vegetarians and non-vegetarians of developing vitamin B12 deficiency because natural food sources of vitamin B12 are limited to animal foods⁴. Vitamin B12 crosses the placenta during pregnancy and is present in breast milk. Exclusively breastfed infants of women who consume no animal products may have very limited reserves of vitamin B12 and can develop vitamin B12 deficiency within months of birth^{4,16}.

Most of the population believes increased consumption of alcohol, age factor, a vegetarian diet and autoimmune disease lead to the increased prevalence of vitamin B12 deficiency.

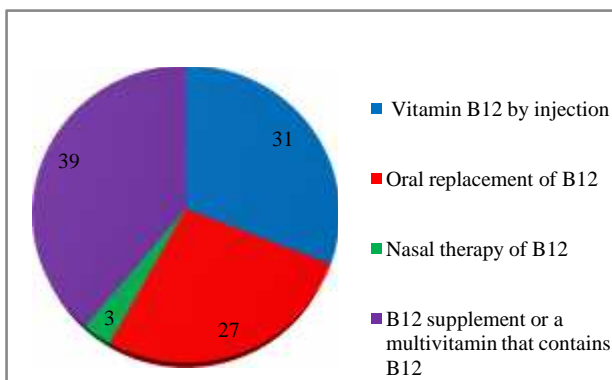


An elevated serum homocysteine level (values >13 micromol/L)¹⁷ might also suggest a vitamin B12 deficiency. However, this indicator has poor specificity because it is influenced by other factors, such as low vitamin B6 or folate levels⁴. Elevated methylmalonic acid levels (values >0.4 micromol/L) might be a more reliable indicator of vitamin B12 status because they indicate a metabolic change that is highly specific to vitamin B12 deficiency^{4,5}.

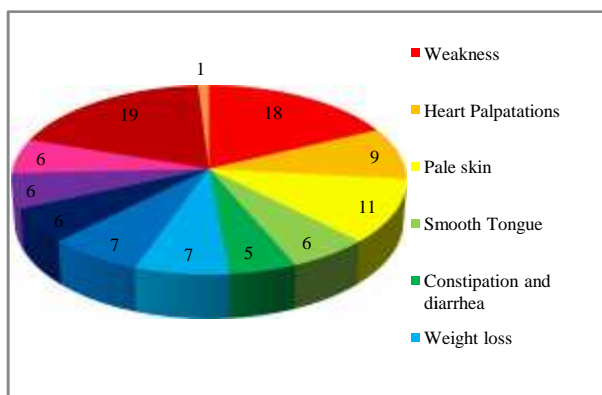
In dietary supplements, vitamin B12 is usually present as cyanocobalamin⁴, a form that the body readily converts to the active forms methylcobalamin and 5-deoxyadenosylcobalamin. In addition to oral dietary supplements, vitamin B12 is available in sublingual preparations as tablets or lozenges. These preparations are frequently marketed as having superior bioavailability^{18,19}. Vitamin B12, in the form of cyanocobalamin and occasionally hydroxocobalamin, can be administered parenterally as a prescription medication, usually by intramuscular injection¹⁷.



Some patients might prefer Vitamin B12 in a gel formulation applied intranasally²⁰. The various treatment methods were popular among the public, however only 3% knew about the nasal therapy for the same.



Vitamin B12 deficiency is characterized by megaloblastic anemia, fatigue, weakness, constipation, loss of appetite, and weight loss^{1,3}. Neurological changes, such as numbness and tingling in the hands and feet, can also occur^{4,21}. Additional symptoms of vitamin B12 deficiency include difficulty maintaining balance, depression, confusion, dementia, poor memory, and soreness of the mouth or tongue²². The neurological symptoms of vitamin B12 deficiency can occur without anemia, so early diagnosis and intervention is important to avoid irreversible damage. This study established that only 19% were fully aware of all the symptoms and the rest had a general idea of the same.



From this we can conclude that the participants were aware of Vitamin B12 deficiency and had good knowledge of the same. This study established that etiology, cause, symptoms, diagnoses and treatment of the same was familiar among the

study group. This could be due the literacy percentage and socio-economic status of the population. Increased awareness and knowledge of the same can be brought about by organizing camps, health programs and conference on the same by both government and non-governmental organizations. This study is done in order to understand the role of vitamin B12 and also help in the prevention and better treatment of diseases associated with its deficiency leading to better quality of life²³.

References

- Herbert V. Vitamin B12 in Present Knowledge in Nutrition. 17th ed. Washington, DC: International Life Sciences Institute Press, 1996.
- Herbert V, Das K. Vitamin B12 in Modern Nutrition in Health and Disease. 8th ed. Baltimore, MD: Williams & Wilkins, 1994.
- Combs G. Vitamin B12 in The Vitamins. New York: Academic Press, Inc., 1992.
- 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.
- Clarke R. B-vitamins and prevention of dementia. Proc NutrSoc 2008; 67:75-81. [PubMed abstract]
- Vidal-Alaball J, Butler CC, Cannings-John R, Goringe A, Hood K, McCaddon A, et al. Oral vitamin B12 versus intramuscular vitamin B12 for vitamin B12 deficiency. *Cochrane Database Syst Rev* 2005; (3):CD004655. [PubMed abstract]
- Butler CC, Vidal-Alaball J, Cannings-John R, McCaddon A, Hood K, Papaioannou A, et al. Oral vitamin B12 versus intramuscular vitamin B12 for vitamin B12 deficiency: a systematic review of randomized controlled trials. *Fam Pract* 2006; 23:279-85. [PubMed abstract]
- Carmel R. How I treat cobalamin (vitamin B12) deficiency. *Blood* 2008; 112:2214-21. [PubMed abstract]
- Lukaski HC. Vitamin and mineral status: effects on physical performance. *Nutrition* 2004; 20:632-44. [PubMed abstract]
- Natural Medicines Comprehensive Database. Vitamin B12.
- Monsen ALB, Ueland PM. Homocysteine and methylmalonic acid in diagnosis and risk assessment from infancy to adolescent. *Am J Clin Nutr* 2003; 78:7-21. [PubMed abstract]
- Nirisha Nivasini, Pernicious Anemia, proceedings of 9th international BDS students seminar on Basic medical sciences 8th November 2014., *International journal of Pharma and bio sciences* ISSN 0975-6299.
- Tucker KL, Rich S, Rosenberg I, Jacques P, Dallal G, Wilson WF, et al. Plasma vitamin B12 concentrations relate to intake source in the Framingham Offspring Study. *Am J Clin Nutr* 2000; 71:514-22. [PubMed abstract]
- Johnson MA. If high folic acid aggravates vitamin B12 deficiency what should be done about it? *Nutr Rev* 2007; 65:451-8. [PubMed abstract]

15. Andrews GR, Haneman B, Arnold BJ, Booth JC, Taylor K. Atrophic gastritis in the aged. *Australas Ann Med* 1967; 16:230-5. [PubMed abstract]
16. von Schenck U, Bender-Gotze C, Koletzko B. Persistence of neurological damage induced by dietary vitamin B12 deficiency in infancy. *Arch Dis Childhood* 1997; 77:137-9. [PubMed abstract]
17. Andrès E, Federici L, Affenberger S, Vidal-Alaball J, Loukili NH, Zimmer J, *et al.* B12 deficiency: a look beyond pernicious anemia. *J Fam Pract* 2007; 56:537-42. [PubMed abstract]
18. Yazaki Y, Chow G, Mattie M. A single-center, double-blinded, randomized controlled study to evaluate the relative efficacy of sublingual and oral vitamin B-complex administration in reducing total serum homocysteine levels. *J Altern Complement Med* 2006; 12:881-5. [PubMed abstract]
19. Sharabi A, Cohen E, Sulkes J, Garty M. Replacement therapy for vitamin B12 deficiency: comparison between the sublingual and oral route. *Br J Clin Pharmacol* 2003; 56:635-8. [PubMed abstract]
20. Suzuki DM, Alagiakrishnan K, Masaki KH, Okada A, Carethers M. Patient acceptance of intranasal cobalamin gel for vitamin B12 replacement therapy. *Hawaii Med J* 2006; 65:311-4. [PubMed abstract]
21. Heaton EB, Savage DG, Brust JC, Garrett TF, Lindenbaum J. *Neurological aspects of cobalamin deficiency. Medicine* 1991; 70:229-44.
22. Bottiglieri T. Folate, vitamin B12, and neuropsychiatric disorders. *Nutr Rev* 1996; 54:382-90. [PubMed abstract]
23. John DA, Brundha MP (2016) Awareness of Vitamin A Deficiency among Middle Aged Men-Research. *Vitam Miner* 5: 144. doi: 10.4172/2376-1318.1000144

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