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Risk Assessment of Vitamin B₁₂ Deficiency in Male Population of Bahawalpur District

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ABSTRACT

The primary goal of this study was to investigate the prevalence of vitamin B₁₂ insufficiency in various age groups. It is descriptive cross-sectional research in which 180 individuals were assessed for vitamin B₁₂ from the district of Bahawalpur. Patients were placed into groups based on their ages. BMI and serum B₁₂ levels were analyzed and a questionnaire was filled out by them. Data were statistically analyzed through T-test, ANOVA followed by post-hoc Dunnett T₃ test, and frequency by Chi-square test. Results revealed that Vitamin B₁₂ statically differed in groups of marital status, sun exposure/day/hour, diet groups, diabetic groups, and age groups. While BMI differed according to different weight groups, sun exposure/day/hour, diabetic groups. The frequency of all the groups statistically differed in all the groups. BMI had a negative correlation with the Vitamin B₁₂ level. It was concluded that the male population was not at risk but the old population at the risk of low levels of vitamin B₁₂.

INTRODUCTION

Vitamin deficiencies are a typical issue around the world, with Vitamin B₁₂ lack being perceived as a wellbeing concern about 100 years back. The meaning of vitamin B₁₂ (cobalamin) lack fluctuates with the measure utilized (Oo and Thachil, 2015). Vitamin B₁₂ deficiency is quite a common and widespread condition. This all-inclusive range is presumably because of regional, ethnic and socio-economic factors (Rehman *et al.*, 2019). Vitamin B₁₂ deficiency is a common finding, with a prevalence of around 6% in those under the age of 60 and up to 20% in more mature participants. The daily dosage of VB12 necessary is 2.4 g/d (Bensky *et al.*, 2019). VB12 is produced by microbes and is mostly present in animal-derived nutrition. Deficient admission (delayed vegetarianism), pernicious anemia, and malabsorption are the major

etiologies of VB12d (Stabler and Allen, 2004). Hematologic abnormalities shown as ineffective erythropoiesis are one of the most well-known manifestations of VB12d. Megaloblastic alterations are caused by a slowing of the nuclear division cycle in comparison to the cytoplasmic development cycle. These progressions might result in disengaged iron deficiency as well as other cytopenias, which are usually minor. The big findings on a peripheral blood smear are macrocytic red blood cells and highly segmented neutrophils. The hematologic response to therapy is rapid, and the weakness improves within one to fourteen days and stabilizes between four to two months of treatment (Stabler, 2004). Levels of VB12 have been shown to standardize within 1 to 4 months (Moleiro *et al.*, 2018).

Vitamin (B12) is essential for embryonic and infant development. Exogenous intake of this vitamin is critical for humans who are unable to absorb B12 (Akcaboy *et al.*, 2015). The vitamin is once in a while found in nourishment got from plants; along these lines, those following severe vegan eats fewer carbs are probably going to have a deficient intake of B₁₂ (Şahin *et al.*, 2019). Vitamin B12 deficiency in newborns and children can cause developmental delays, nutritional problems, and neurological side effects such as hypotonia, as well as demyelinating nervous system sickness and spasms. The reported prevalence of Vitamin B12 in children ranges between 7.7 and 45 percent (Estourgie-van *et al.*, 2019). Cerebral pain is viewed as one of the most well-known interminable neurological manifestations in youngsters and grown-ups around the world, influencing roughly 50% of the overall public (Rasmussen *et al.*, 2001). It might indicate a potentially life-threatening illness, such as an intracranial tumor, damage, and vascular or metabolic infection, however, by and large, it is a generous issue comprising of an essential cerebral pain, for example, headache or strain type migraine (Stovner *et al.*, 2007). Strain type migraine is likewise the most habitually revealed essential cerebral pain disorder in younger students and teenagers with a commonness of 7.8–57.5% (Arruda *et al.*, 2010).

Despite the fact that the precise etiology of strain-type migraine has yet to be fully described, both solid and psychogenic aspects are thought to be associated with pressure-type cerebral pain (Fumal and Schoenen, 2008). Furthermore, current research has revealed a significant association between sorrow and anxiousness and pressure-type cerebral discomfort, particularly in females (Anttila *et al.*, 2004). There is a current debate over whether a comprehensive diet that restricts the number of central ingredients of supplements, for example, vitamins, iron, proteins, carbohydrates, and fats, could be effective in the treatment of cerebral discomfort. Various doctors have discussed lengthy weight loss programs that include high folate, low fat, ketogenic, modified Atkins, and high omega-3/low omega-6 diets. Several studies in the literature have also revealed that supplements such as folate, Vitamin B2, Vitamin B6, and Vitamin B12 may be beneficial in the treatment of headache sufferers (Menon *et al.*, 2015). Vitamin B12

insufficiency is a worldwide health concern, particularly in developing countries. In developed countries, a prevalence of 1–3 percent has been reported in children, although in developed countries, as a result of unhealthiness, the prevalence may be as high as 40 percent in children (Rasmussen *et al.*, 2001). The most well-known cause of Vitamin B12 insufficiency is a lack of access, and clinical features of inadequacy include hematological and neurological findings. A few juvenile studies have shown that early Vitamin B12 supplementation improves neurological findings (Stabler, 2004).

Vitamin B12 is a basic micronutrient that is essential for human growth and health, and it plays an important role in DNA synthesis and brain activities. Its deficit is associated with hematologic, neurologic, and mental symptoms. With the exception of the elderly, vitamin B12 insufficiency and tiredness are not frequent in wealthy countries but are widespread in less fortunate populations all over the world (El-Khateeb *et al.*, 2014). The purpose of the present study is to assess the risk assessment of the male population of district Bahawalpur.

METHODS

A descriptive cross-sectional study was carried out in Bahawal Victoria Hospital Bahawalpur, Punjab, Pakistan. Following the informed agreement, a sample of 180 individuals.

Age Groups

The patients were separated into three age groups: those between the BMI groups that were underweight, normal, and overweight, groups of married and unmarried, groups on the basis of sun exposure 1-2 hours daily, 3-5 hours daily, 6-8 hours daily, they were divided on the basis of diet e.g., vegetarian and non-vegetarian, divided into diabetic and non-diabetic patients. Ages of 18 and 30, those between the ages of 31 and 45, and those above 45 to 60 years. All other data were collected by the questionnaire.

BMI and VitaminB₁₂ Measurement

The weight and height of every participant were measured through simple machines and were recorded and then converted into Body mass index. The electro-chemiluminescence (ECLIA) technique was used to determine the serum vitamin B₁₂ count.

Statistical Analysis

The study's data were investigated utilizing the SPSS® for Windows version 18.0 programmed (Chicago, IL, USA). To assess the common influence of several independent factors on a particular dependent variable, the two-way ANOVA test followed by post-hoc Dunnett T₃ was utilized. The student's T-test was used to assess the gender distributions of the groups. The Pearson correlation test was used to assess the relationship between BMI and vitamin B₁₂ levels. The frequency was statistically measured through the chi-square test. The P-value significance threshold was set at 0.05. The findings were presented as mean standard deviation.

RESULTS AND DISCUSSION

Body Mass Index

In the present study, the results showed that mean ± SEM of BMI, Vitamin B₁₂ of different BMI groups, and their frequency were present in (table no. 1). The statistical analysis ANOVA lead by post-hoc Dunette-T₃ test revealed that BMI of normal is significantly low than the overweight and high than the underweight groups. The chi-square test revealed that the frequency of BMI group had a significant difference. While there was no significant difference was present in the Vitamin B₁₂ results.

Table 1. The mean ± SEM of Vitamin B₁₂ and BMI of the male population of district Bahawalpur (n=180) frequency and percentage frequency according to Body Mass Index

BMI	mean ± SEM	mean ± SEM	Frequency	% frequency	χ ²
	VitaminB ₁₂	BMI			
Underweight	511.13±2.37	18.40±0.07 ^a	13	7.2	
Normal	510.27±3.31	22.32±0.17 ^b	107	59.44	<0.001
Over weight	511.66±3.95	31.51±0.24 ^c	60	33.3	
Overall	510.79±2.38	23.85±0.23			

a, b superscript show the significant difference (P<0.05) between the groups

Marital Status

It was further explored that the values of vitamin B₁₂ was significantly high another and there

is a significant difference in the marital status. The values of BMI showed no significant differences in table (2).

Table 2. The mean ± SEM of Vitamin B₁₂ and BMI of the male population of district Bahawalpur (n=180) frequency and percentage frequency according to marital status.

Marital Status	mean ± SEM	mean ± SEM	Frequency	% frequency	χ ²
	Vitamin B ₁₂	BMI			
Married	508.70±2.85 ^a	24.02±0.27	144	80.0	
Un-married	519.17±3.07 ^b	23.21±0.45	36	20.0	<0.001
Overall	510.79±2.38	23.85±0.23			

a, b superscript show the significant difference (P<0.05) between the groups

Sun Exposer /Day/Hour

In this survey, it was discovered that the exposure to sunlight group 1-2 h/d had a significantly high value of vitamin B12 than the other groups which had long exposure to light. That

is due to the ultraviolet light destroying vitamin B12. The values of BMI had a significant difference in the groups with different exposure times. The frequency of different groups of exposure time had a statistically significant difference in table (3).

Table 3. The mean ± SEM of Vitamin B₁₂ and BMI of the male population of district Bahawalpur (n=180) frequency and percentage frequency according to sun exposure/day/hour.

Daily sun exposure/hour	mean ± SEM Vitamin B ₁₂	mean ± SEM BMI	Frequency	% frequency	χ ²
1-2 hours daily	520.81±2.73 ^a	25.17±0.46 ^a	28	15.6	
3-5 hours daily	509.36±2.72 ^b	23.35±0.30	124	68.9	<0.001
6-8 hours daily	507.10±8.96 ^b	21.33±0.46 ^b	28	15.6	
Overall	510.79±2.38	23.85±0.23			

a, b superscript show the significant difference (P<0.05) between the groups

Diet

The vegetarian and non-vegetarians had statistically significant differences in values of vitamin B12 while no significant differences in the values of BMI the significantly high population of

males are non-vegetarian in the population presented in table no. (4).

Table 4. The mean ± SEM of Vitamin B₁₂ and BMI of the male population of district Bahawalpur (n=180) frequency and percentage frequency according to diet.

Dietary habits	mean ± SEM Vitamin B ₁₂	mean ± SEM	Frequency	% frequency	χ ²
Vegetarian	505.25±3.68 ^a	23.79±0.47	52	28.9	<0.001
Non-vegetarian Total	513.04±2.98 ^b	23.88±0.27	128	71.1	
	510.79±2.38	23.85±0.23			

a, b superscript show the significant difference (P<0.05) between the groups

Age Groups

The result of this study exhibited that vitamin B₁₂ had significantly low values in the older group (45-60 years old) than the other groups. The values of vitamin B₁₂ was significantly high in the young adult group (18-30 years old) than in the other groups. It was due to the absorption of vitamin B₁₂ decreasing with age and its absorption becoming low in the old ages.

Furthermore, the Pearson's correlation statistical analysis showed that the BMI and the value of Vitamin B₁₂ had a negative correlation (r=-0.108; P>0.05). B12 is required by the body for tetrafolate generation and methylation reactions, both of which are essential for DNA synthesis. Folic acid is also necessary, along with B12, for the conversion of homocysteine to methionine and the arrangement of formed components in the bone marrow. As a result of the damage of DNA amalgamation caused by B12 or maybe folate shortage, thrombocytopenia may occur, just as weakness and leucopenia. Folic acid and B12 deficit altered platelets numerically and dimensionally, and platelet volume increased while platelet includes decreased in the gatherings with deficiencies.

According to review research, B₁₂ insufficiency may be a probable cause of disengaged thrombocytopenia and platelet organization, which is more noteworthy than normal levels. The B12 averages of the examination lack groups were lower than these characteristics, neurologic and mental side effects were initiated; nevertheless, lower levels and low levels for longer time frames may be necessary for the appearance of hematologic inconsistencies. However, the examination structure functioned against the clinical evaluation of specific tests and subjects. Different standards also require the estimation of plasma absolute homocysteine and serum methyl-malonic corrosive levels, as well as B₁₂ levels for the determination of B12 deficiency (Jaggia and Northern, 2015).

CONCLUSION

It was concluded that the male population of Bahawalpur was not at a higher risk of vitamin B12 deficiency. The old-age male population and high sun exposure have had a deficiency of vitamin B12. They are at a high risk of vitamin B12 deficiency

therefore, they need an assessment of vitamin B₁₂ in this situation.

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