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Research Article

**DEFICIENCY OF VITAMIN B 12 IN POPULATION OF  
MULTAN SOUTH PUNJAB**<sup>1</sup>Dr Hassan Hayat Durrani, <sup>2</sup>Dr Zahida Perveen, <sup>3</sup>Dr Sadaf Islam<sup>1</sup>GHQ Hospital, Rawalpindi<sup>2</sup>Lahore General Hospital, Lahore<sup>3</sup>THQ Hospital, JPPW

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**Abstract:**

*Vitamin B -12 is an essential vitamin which is water soluble and helps in the formation of red blood cells, helps in nerve function, helps in cell metabolism and helps in DNA production. Vitamin B -12 is obtained from animal source like eggs, poultry, meat, and fish and from dairy products. Vitamin B -12 supplements are widely available in the market to treat the deficiency of B -12. The source of vitamin B 12 is expensive therefore the poor are not able to get it from their regular food and hence they have the deficiency of B 12. It is the capacity of the human body to store Vitamin B 12 for several years. But if a person is following pulses and vegetables in his routine diet he will definably get the deficiency of Vitamin B 12 because plant food is lacking this vitamin. The deficiency of vitamin B 12 can cause fatigue, anemia, mood disturbance, intestinal problem, muscle weakness and nerve damage. Vitamin B 12 is essential for growth and development of young children.*

*The study was conducted in Nishter Hospital Multan a South Punjab region from the time period of June 2018 to February 2019. Total of 150 samples was analyzed including adults, expecting mothers and older. Screening of the patients was done based upon the complete blood counts and the serum test for B 12 deficiency.*

*The deficiency of vitamin B 12 is more than it is realized by the practitioner. It is vital to analyze the high-risk group for diagnosing the deficiency especially for elderly and pregnant women. Better understanding of symptoms, diagnosis, pathology and treatment at early stage can help to reduce the potential risk and consequences of the vitamin B 12 deficiencies as compared to the cases where the deficiency remained untreated.*

**Corresponding author:****Dr. Hassan Hayat Durrani,**

GHQ Hospital, Rawalpindi

QR code



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**OVERVIEW:**

Vitamin B -12 is an essential vitamin which is water soluble and helps in the formation of red blood cells, helps in nerve function, helps in cell metabolism and helps in DNA production. Vitamin B -12 is obtained from animal source like eggs, poultry, meat, and fish and from dairy products. Vitamin B -12 supplements are widely available in the market to treat the deficiency of B -12. The source of vitamin B 12 is expensive therefore the poor are not able to get it from their regular food and hence they have the deficiency of B 12. It is the capacity of the human body to store Vitamin B 12 for several years. But if a person is following pulses and vegetables in his routine diet he will definably get the deficiency of Vitamin B 12 because plant food is lacking this vitamin. The deficiency of vitamin B 12 can cause fatigue, anemia, mood disturbance, intestinal problem, muscle weakness and nerve damage. Vitamin B 12 is essential for growth and development of young children. Erythrocytes proliferation and maturations is with the help of vitamin B 12 and deficiency can lead to hemolysis and hyperbilirbinemia. The purpose of the study is to analyze the deficiency of B 12 in young, women and among older.

**METHODOLOGY:**

The study was conducted in Nishter Hospital Multan a South Punjab region from the time period of June 2018 to February 2019. Total of 150 samples was analyzed including adults, expecting mothers and older. Screening of the patients was done based upon the complete blood counts and the serum test for B 12 deficiency. The complete history of the patient along with their socioeconomic status, gender, age and laboratory reports was documented. The diagnostic test for B 12 deficiency positive were consider. Sometime in patients with liver or cancer disease the vitamin B 12 is artificially high and also alcohol consumption increases the B 12 level. The complete medical history helps the physician to analyze the treatment of B 12 deficiency.

**RESULTS AND DISCUSSIONS:**

Vitamin B12 deficiency is a common disorder and has significantly affected the population from all age groups specially those who are in the high risk group. It is estimated that nearly 50 percent of the population is having vitamin B12 Deficiency. The older people are also deficient but most of the time their deficiency remained undiagnosed. The risk of deficiency of Vitamin B12 increases with the increase in age in the lower and in middle class. The high risk group having the deficiency of vitamin B 12 is considered the pregnant women, vegetarian, patient

having gastrointestinal surgery history, anemia and older people. Serum Cobalamin deficiency test is the main test to assess the deficiency of B 12. There are many other tests which help to detect the deficiency of B 12.

**The Pathology and physiology of Vitamin B 12 Deficiency:**

The source of vitamin B12 is animal based and when taken in food it releases cobalamin from food with the help of hydrochloric acid and pepsin in the stomach. Glycoprotein in saliva binds the cobalamin and then it moves to jejunum and duodenum where enzyme from pancreas helps to break down the complex and cobalamin is released, pancreatic cell from the stomach release the intrinsic factor which binds the cobalamin and makes it a complex named cobalamin intrinsic factor. The distal ileum absorbs the complex and releases the cobalamin in the plasma. Therefore, there must be adequate level of intake of vitamin B 12 in the food. Any disorder in the sequence can result in the deficiency of the vitamin B12.

**Vitamin B 12 deficiency Risk Factor:**

The Pakistani population which is from lower middle class, lower class, poor ,pregnant women, older people, vegetarian are consider high at risk for developing the deficiencies of vitamin B12.

**Senior citizens** are considered at high risk especially after 60s due to poor absorption of vitamin B 12 in the food. In older age gastric atrophy and gastric acid production both reduces in amount and causes the malabsorption of vitamin B12 from food.

**Vegetarians:** Vegetarians develops the deficiency of B 12 but the Pakistani population is not vegetarian by choice , due to high cost of animal related product like meat, fish and poultry they are unable to afford it in their daily food.

**Pregnancy:** Vitamin B 12 is considered an essential element during pregnancy due to its cell multiplication and synthesis of DNA. Pregnant women with low level of vitamin B 12 is considered a risk factor for baby and can cause fetal and neonatal defects. During pregnancy the vitamin B 12 supplements can help to reduce the risk for fetal defects.

**Pernicious anemia:** is an autoimmune condition which can destroy the gastric parietal cells and also the intrinsic factor which binds the cobalamin is lacking which reduces the absorption of vitamin B12.

**Gastrointestinal Surgery:** is also a risk factor for low absorption of vitamin B12 from their food. individual who went through the procedure having

Table 1 The Age distribution of Vitamin B 12 deficient

Age	Deficient
Young children	10
Women	60
Adults	30
Older People	50
Total	150

#### Sign and symptoms:

Following are the general sign and symptoms which are observed in the patients deficient in vitamin B12

Table 2 Sign and symptoms

Pale color of conjunctiva
Vision loss
Mucosal ulceration
Hyper pigmentation
Jaundice
Appetite loss
Issue in digestion
Numbness to hands and feet
Fatigue
Dizziness
Concentration and memory impairment
Anxiety
Depression

#### Physical Examination of Selected population:

There are no set standard for assessing the deficiency of vitamin B 12 clinically in the population. Sometime symptoms may match to other attributes of diseases. But generally when examining the elderly the neurological and cognitive dysfunction should be noted. The general sign and symptoms present in the patients of vitamin B 12 are given in the table 2.

#### Diagnostic Testing for Vitamin B 12

The patients, who have sign and symptoms of vitamin B 12 deficiencies, were for further assessment referred to laboratory diagnostic test. CBC (complete blood count) and B12 cobalamin serum level helps to identify the anemia. Patients with consuming different medicines can also lower the cobalamin serum level like deficiency of folate, pregnancy and consumption of oral contraceptive. The higher level may be because of renal disease, disease of liver and disorder of myeloproliferative.

Table 3 Specificity and sensitivity of Serum Laboratory Tests for Vitamin B<sub>12</sub> Deficiency

Criteria	Specificity	Sensitivity
Decreased B12 level	Uncertain	95 to 97
Methylmalonic Acid serum level elevated	Uncertain	Less than 97

**Treatment:**

Deficiency of vitamin B12 can be treated with cyanocobalamin injections given intramuscular or it can be given in the form of oral therapy. The injectable dose which is stored in the body is approximately 1 mg which helps in the restoration and replacement of B12 in the form of acute deficiency or having acute neurological signs and symptoms. The dose of injections was from one injection to maximum three injections per week for those cases where neurological symptoms are missing. The dose is suggested daily when the neurological symptoms are present for three weeks till the improvement of the symptoms.

Table 4 Management of Dose

Symptoms	Dose time till improvement
Reticulocyte count or methylmalonic acid level,	7 days
Thrombocytopenia, Anemia, , mean corpuscular volume, or leukopenia	2 months
Neurologic sign and symptoms	1.5 months to three months

The study involved 150 patients with Vitamin B 12 deficiency and among them 120 were given oral high dose one mg to two mg daily was considered as an effective measure and showed improvement in the signs and symptoms of the deficiency of the vitamin 12. The patients were screened before starting the oral and intramuscular therapy for the reaction to any other medicine they are already taking for their other medical ailment. Oral therapy of cobalamin is common in the patients who want to avoid the pain of injection and also the therapy has improved their life and reduced the deficiency symptoms.

**Dietary** vitamin B12 is associated with animal origin food and meat. Balanced diet can help to provide between 8 to 30ug/day. Older people have difficult absorption of B12 therefore they need supplements as a replacement therapy.

**Awareness of the Patients:** Educating patients and family about vitamin B 12 deficiency, symptoms, balanced dietary requirement, importance of supplements and replacement therapy importance in case of deficiency can help to reduce the number of patients in the society.

**CONCLUSION:**

The deficiency of vitamin B 12 is more than it is realized by the practitioner. It is vital to analyze the high-risk group for diagnosing the deficiency especially for elderly and pregnant women. Better understanding of symptoms, diagnosis, pathology and treatment at early stage can help to reduce the potential risk and consequences of the vitamin B 12 deficiencies as compared to the cases where the deficiency remained untreated.

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