Journal for Re Attach Therapy and Developmental Diversities
eISSN: 2589-7799
2023 August; 6 (9s): 1711-1714

# A Comparative Study Of Mineral Micronutrients And Vitamin B12 In Psychotic Patient

**Nand kishor Tak[1], Rajeev Choudhary[2], Disha singh[3], Pragati Upadhyay[4*], Anudeep Upadhyay[5], Soni Ravikant[6], Ram Kishan Jat[7], Santosh Kumar[8]**

[1]Associate Professor, Department of Psychiatry, Mahatma Gandhi Medical College and Hospital, Jaipur.
[2]Associate Professor Department of Anatomy, Mahatma Gandhi Medical College and Hospital, Jaipur.
[3]Associate Professor & Head Department of Organon University College of Homoeopathy kekri, Ajmer.
[4*]Tutor, Department of Biochemistry Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan.
[5]5 th Prof. MD General Medicine Yerevan Haybusak University, Yerevan, Armenia
[6]Professor Department of Biochemistry Mahatma Gandhi Medical College and Hospital, Jaipur.
[7]Professor, Department of Medicine, Mahatma Gandhi Medical College and Hospital, Jaipur, Rajasthan, India
[8]Assistant professor Department of Anatomy Government medical college & hospital, Dholpur (Raj.)

***Correspondence Author:** Pragati Upadhyay
Email: pragatiupadhyay21@gmail.com

**Article History** Received date: 26 May 2023 Revised date: 30 June 2023 Accepted date: 28July 2023

**Abstract:**

Anemia is a condition where red blood cell (RBC) count and haemoglobin (HBG) concentration are lower than the reference range, which results as a decrease in the oxygen-carrying capacity, Following a compromise the physiological needs.
Along with the Decrease HBG concentration and haematocrit (HCT) RBC count, mean corpuscular volume (MCV), reticulocyte count, examination of blood film, and HBG electrophoresis are significant parameters for the diagnosis of anemia.
India is a common hub for megaloblastic anemia with prevalence range of 2-40%. Nutritional deficiency of either cobalamin (vitamin B12) or folate (vitamin B9) are commonest causes of Megaloblastic anemia.
This is case control analytical study carried out on 50 diagnosed Psychotic Patient as per the International Classification of diseases, Tenth revision (ICD-10). The study was conducted in Psychiatry department of Mahatma Gandhi Medical College & Hospital, Jaipur. Fifty age and sex matched healthy individuals constituted the control group. Our study found low levels of vitamin B12 and hemoglobin in psychotic patients. which might contribute to the psychosis symptoms.

**Keywords:** Vitamin B12, Psychotic Patient, Mineral Micronutrients

## INTRODUCTION

Anemia is a condition where red blood cell (RBC) count and haemoglobin (HBG) concentration are lower than the reference range, which results as a decrease in the oxygen-carrying capacity, Following a compromise the physiological needs.
Along with the Decrease HBG concentration and haematocrit (HCT) RBC count, mean corpuscular volume (MCV), reticulocyte count, examination of blood film, and HBG electrophoresis are significant parameters for the diagnosis of anemia.[1]
Condition called Megaloblastic anemia (MA) occurs due to ineffective erythropoiesis (RBC production), where impaired DNA synthesis in the hematopoietic precursors and intramedullary hemolysis is noticed. Increased MCV, leading to macrocytosis features of RBCs is the hallmark of MA. In addition, thrombocytopenia, along with leukopenia, are common presentations of MA.[2]
In past two decades a noticeable increase in incidence of MA has been registered, particularly in underdeveloped nations.[3]
India is a common hub for megaloblastic anemia with prevalence range of 2-40%. Nutritional deficiency of either cobalamin (vitamin B12) or folate (vitamin B9) are commonest causes of Megaloblastic anemia.[2]
An individual with MA may appear with clinical symptoms such as weakness, fatigue, dizziness, shortness of breath, tachycardia and pale skin. Along with gastrointestinal symptoms, including sore tongue, gum bleeding, weight loss, stomach upset, constipation, and diarrhea. Furthermore, MA results in nerve cell damage, which manifests as numbness

or tingling sensations in fingers and toes, individual might also complain of walking difficulty, memory loss, mood swings, disorientation, depression, and dementia in severe cases.[5]
MA is considered the main feature of vitamin B12 deficiency with an association to psychosis, mood, cognitive, and neurologic symptoms.[6,7]
The condition Psychosis could be defined in one or more of five domains which are: Hallucinations, Delusions, Abnormal motor behaviors (including catatonia, disorganized speech), Thinking, Negative symptoms. The relation among Neuropsychiatric symptom incidence and the individuals diagnosed with vitamin B12 deficiency ranges from 4% to50%. In addition, several case reports and other studies during over past hundred years have described an association of vitamin B12 deficiencies with psychosis symptoms.
A complete blood count (CBC) test is affordable and can be easily made while Leukocytes perform different tasks in immune system.[9] Changes in leukocyte count reflect immune system reaction in inflammation. Whereas for chronic and low-grade inflammation and clinical outcomes in neuroimmune disorders, neutrophil lymphocyte ratio (NLR) is considered as an important marker. [10-12]
Monocytes are sources of several cytokines and directly affect platelets and endothelial cells, which induces prothrombotic and proinflammatory pathways. Inflammatory process might be part of schizophrenic etiology. [13-15]
Platelet-lymphocyte ratio (PLR) is used as simple indicator that correlates with inflammation, cardiovascular and chronic diseases,[10,12,16] peripheral platelet models are utilized as indicators of central serotonin (5-HT) metabolism, as they reflect central serotonergic functions.[17]
Serotonin as well is involved in the pathophysiology of psychotic disorders and plays axle roles in regulation of vascular tone and platelet aggregation.[18]
Abnormal platelet counts and mean platelet volume (MPV) parameters could also be determined in some psychiatric disorders, including bipolar disorder, unipolar depression, and schizophrenia.[10] [19] [20] Patients with some psychiatric disorders have raised platelet counts.[8,21] Varsak et al [22] discovered that the NLR was significantly higher in first episode psychosis (FEP) versus control groups.

## MATERIAL & METHOD

This is case control analytical study carried out on 50 (n=50) diagnosed Psychotic Patient as per the International Classification of Diseases, Tenth revision (ICD-10). The study was conducted in Psychiatry department of Mahatma Gandhi Medical College & Hospital, Jaipur. Fifty (n=50) age and sex matched healthy individuals constituted the control group.

**Inclusion Criteria:**

Diagnosed case of Psychotic Patient
Age between 18 to 60 years.
Patients who were willing to participate in the study.
Age and sex-matched healthy subjects n=50 constituted the control group.

**Exclusion Criteria:**

Unwillingness to perform yoga continuously or included refusal.
Patients in mental retardation, severe physical illness, or serious orthopedic problems

Results obtained were presented as mean ± SD for the case and control groups and compared statistically using SPSS software. All parameters analyzed were compared by applying student t-test.

## RESULT& DISCUSSION:

| | SUBJECTS | CONTROL | t- value | P- value |
|---|---|---|---|---|
| **IRON (mg/dL)** | 39.11 ± 9.16 | 87.24 ± 13.18 | -21.20 | 0.000 |
| **Vitamin B12 (pg/mL)** | 200.07 ± 32.73 | 371.90 ± 102.70 | -11.27 | 0.000 |
| **HB (g/dL)** | 7.50 ± 1.56 | 14.67 ± 1.42 | -24.03 | 0.000 |
| **RB C (µL)** | 3.03 ± 0.60 | 5.07 ± 0.54 | -17.87 | 0.000 |

This study was designed to determine Mineral Micronutrients and Vitamin B12 in Psychotic Patient. Mean serum iron and vitamin B12 were higher in control as compared to subjects. Rajkumar et al. reported a case of a 31-year-old man who suffered from psychotic symptoms with deficient vitamin B12**.** [25] Additionally, Ssonko et al published a study paper that included 280 in patients at Mental Health Hospital in Uganda and they found that the majority of hospitalized psychiatric patients had deficient serum vitamin B12. The current study finding shows that psychosis in patients have an insignificant lower serum vitamin B12 level when compared to controls.

RBC count, HBG were significantly lower in the patient group than in controls, which is consistent with a cross-sectional study conducted by Jombo and Ekwere on 60 persons with schizophrenia treated with either typical or atypical antipsychotics except for MPV.

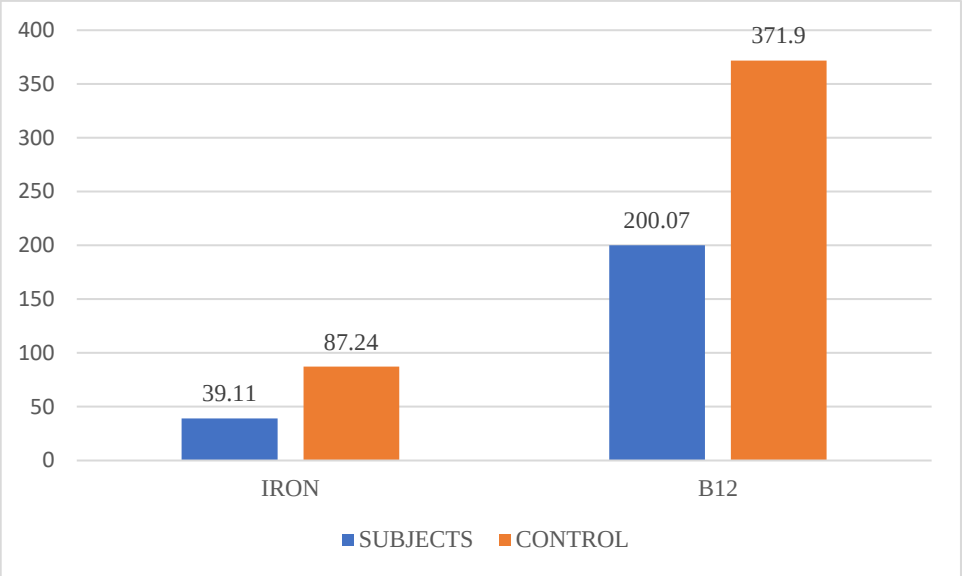


**Figure 1** Comparison of serum iron and vitamin B12 between control and subject group

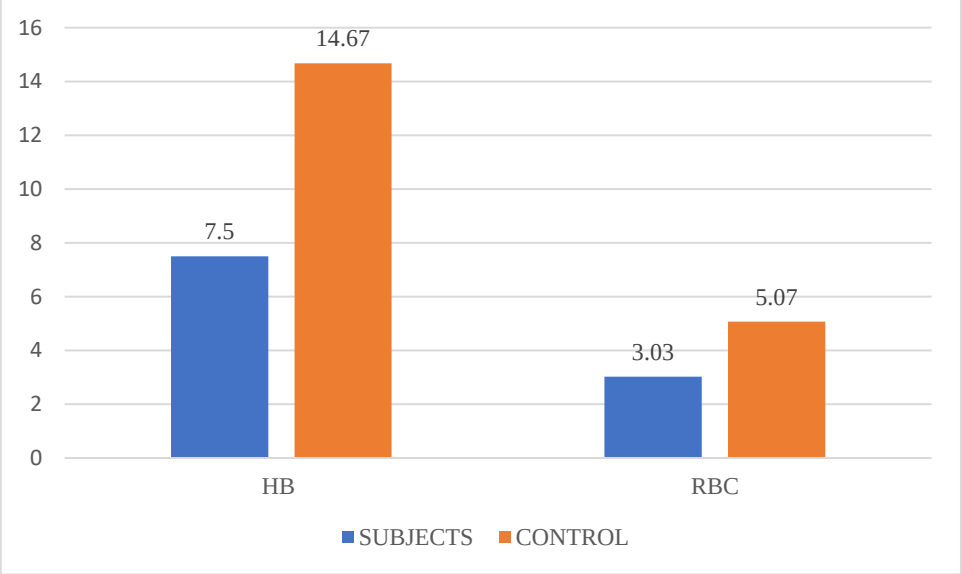


**Figure 2** Comparison of hemoglobin and RBC between control and subject group

**CONCLUSION:**

Present study found low levels of vitamin B12 and hemoglobin in psychotic patients which might contribute to the psychosis symptoms.

For future studies, we recommend recording baseline vitamin levels and assessing psychosis symptom severity at admission, and then following patients' symptoms after introducing vitamin B12 supplements. Moreover, increasing sample size and involving females in the study may obtain more accurate and precise results.

**REFERENCE**

1. Romain M, Sviri S, Linton D, Stav I, van Heerden PV. The role of vitamin B12 in the critically ill—a review. *Anaesth Intensive Care*. 2016;44 (4):447–452. doi:10.1177/0310057X16044004102.
2. Watanabe F, Bito T. Vitamin B12 sources and microbial interaction. *Exp Biol Med*. 2018;243(2):148–158. doi:10.1177/15353702177466123.
3. Allen LH, Miller JW, De Groot L, et al. Biomarkers of Nutrition for Development (BOND): vitamin B-12 review. *J Nutr*. 2018;148 (suppl_4):1995S–2027S. doi:10.1093/jn/nxy2014.
4. Kaur N, Nair V, Sharma S, Dudeja P, Puri P. A descriptive study of clinico-hematological profile of megaloblastic anemia in a tertiary care hospital. *Med J Armed Forces India*. 2018;74(4):365–370. doi:10.1016/j.mjafi.2017.11.0055.
5. Hariz A, Bhattacharya PT. *Megaloblastic Anemia*. StatPearls [Internet]; 2020.
6. Goossen LH. Anemias caused by defects of DNA metabolism. In: *Rodak's Hematology-E-Book: Clinical Principles and Applications*. Elsevier Health Sciences; 2019:282.7.
7. Koury MJ, Ponka P. New insights into erythropoiesis: the roles of folate, vitamin B12, and iron. *Annu Rev Nutr*. 2004;24:105–131. doi:10.1146/ annurev.nutr.24.012003.1323068.
8. Obeagu EI, Babar Q, Obeagu GU. Megaloblastic anaemia-a review. *Int J Curr Res Med Sci*. 2021;7(5):17–24.9.
9. Zahorec R. Ratio of neutrophil to lymphocyte counts-rapid and simple parameter of systemic inflammation and stress in critically ill. *Bratisl Lek Listy*. 2001;102(1):5–14.10.
10. Özdin S, Sarisoy G, Böke Ö. A comparison of the neutrophil-lymphocyte, platelet-lymphocyte and monocyte-lymphocyte ratios in schizophrenia and bipolar disorder patients–a retrospective file review. *Nord J Psychiatry*. 2017;71(7):509–512. doi:10.1080/08039488.2017.134051711.
11. Akıl E, Bulut A, Kaplan İ, Özdemir HH, Arslan D, Aluçlu MU. The increase of carcinoembryonic antigen (CEA), high-sensitivity C-reactive protein, and neutrophil/lymphocyte ratio in Parkinson's disease. *Neurol Sci*. 2015;36(3):423–428. doi:10.1007/s10072-014-1976-112.
12. Rembach A, Watt AD, Wilson WJ, et al. An increased neutrophil–lymphocyte ratio in Alzheimer's disease is a function of age and is weakly correlated with neocortical amyloid accumulation. *J Neuroimmunol*. 2014;273(1–2):65–71. doi:10.1016/j.jneuroim.2014.05.00513.
13. Abacioglu OO. Monocyte to high-density lipoprotein ratio: a prognostic factor for mitral valve prolapse? *Bratisl Lek Listy*. 2020;121(2):151–153. doi:10.4149/BLL_2020_02114.
14. Canpolat U, Çetin EH, Cetin S, et al. Association of monocyte-to-HDL cholesterol ratio with slow coronary flow is linked to systemic inflammation. *Clin Appl Thromb Hemost*. 2016;22(5):476–482. doi:10.1177/107602961559400215.
15. Kaplan I, Kaplan M, Abacioglu O, Yavuz F, Saler T. Monocyte/HDL ratio predicts hypertensive complications. *Bratisl Lek Listy*. 2020;121 (2):133–136. doi:10.4149/BLL_2020_01816.
16. Topal E, Celiksoy MH, Catal F, Karakoç H, Karadağ A, Sancak R. The Platelet Parameters as Inflammatory Markers in Preschool Children with Atopic Eczema. *Clin Lab*. 2015;61(5–6):493–496. doi:10.7754/Clin.Lab.2014.14093017.
17. Ataoglu A, Canan F. Mean platelet volume in patients with major depression: effect of escitalopram treatment. *J Clin Psychopharmacol*. 2009;29 (4):368–371. doi:10.1097/JCP.0b013e3181abdfd7
18. Seidel A, Arolt V, Hunstiger M, Rink L, Behnisch A, Kirchner H. Major depressive disorder is associated with elevated monocyte counts. Acta Psychiatr Scand. 1996;94(3):198–204. doi:10.1111/j.1600-0447.1996.tb09849.x19.
19. Yüksel RN, Ertek IE, Dikmen AU, Göka E. High neutrophil-lymphocyte ratio in schizophrenia independent of infectious and metabolic parameters. Nord J Psychiatry. 2018;72(5):336–340. doi:10.1080/08039488. 2018.145889920.
20. Kirlioglu S, Balcioglu Y, Kalelioglu T, Erten E, Karamustafalioglu N. Comparison of the complete blood count-derived inflammatory markers in bipolar patients with manic and mixed episodes. Clin Study. 2019;195:199.21.
21. Ragolsky M, Shimon H, Shalev H, Weizman A, Rubin E. Suicidal thoughts are associated with platelet counts in adolescent inpatients. J Child Adolesc Psychopharmacol. 2013;23(1):49–53. doi:10.1089/cap.2012.005722.
22. Varsak N, Aydin M, Ibrahim E. The evaluation of neutrophil-lymphocyte ratio in patients with first episode psychosis. Family Practi Palliative Care. 2017;1(3):65–69. doi:10.22391/920.28741123.
23. Dogan M, Ariyuca S, Peker E, et al. Psychotic disorder, hypertension and seizures associated with vitamin B12 deficiency: a case report. Hum Exp Toxicol. 2012;31(4):410–413. doi:10.1177/096032711142240424.
24. Payinda G, Hansen T. Vitamin B12 deficiency manifested as psychosis without anemia. Am J Psychiatr. 2000;157(4):660–661. doi:10.1176/appi. ajp.157.4.660
25. Rajkumar A, Jebaraj P. Chronic psychosis associated with vitamin B12 deficiency. J Assoc Physicians India. 2008;56:115–116.
26. Jombo HE, Ekwere TA. A cross-sectional study of the impact of antipsychotic medications on the hematological profile of patients with schizophrenia in a tertiary health facility in Uyo, South-South, Nigeria. Int Neuropsychiatr Dis J. 2018;11(2):1–9. doi:10.9734/INDJ/2018/40894