*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 22, Issue 1 Ser.12 (January. 2023), PP 43-44*
*www.iosrjournals.org*

# The Effect of Metformin on Vitamin B12 levels in Type 2 Diabetes Patients

[*]Dr.Kudaravalli Jyothsna, [**]Dr.J.Sruthi
[*]*Prof & HOD Pharmacology, Bhaskar Medical College, Moinabad, Telangana- 500075,*
***Post Graduate student Pharmacology, Bhaskar medical college, Moinabad, Telangana-500075.*

***Abstract***
*Metformin can cause serum vitamin B12 deficiency. It requires supplementation of vitamin B12. Its cross-sectional study conducted on diabetes patients who were on metformin therapy. Sample size was 35 with 20 male and 15 female diabetic patients. Metformin therapy is associated with Vitamin B12 deficiency.*

Date of Submission: 14-01-2023 Date of Acceptance: 30-01-2023

## I. Introduction

Metformin can cause serum vitamin B12 deficiency, but studies on the influence of its duration and dose are lacking[1,2]. We investigated vitamin B12 deficiency in patients with type 2 diabetes using metformin, in conjunction with other related factors. Mandatory supplementation with B12 has now been proposed for those taking metformin[3,4]. Taking a daily multivitamin containing 100% of the daily value (DV) for vitamin B12 will do the trick[5].

B12 supplement can be helpful if patient is having type 2 diabetes and they may deficient in the vitamin[6,7]. People who take metformin for type 2 diabetes have lower levels of vitamin B12[8,10]. If you're on metformin, talk to your health care provider about periodically being tested for a B12 deficiency.

## II. Materials And Methods

The present study was a cross-sectional study conducted in Bhaskar Medical College from June 2022 to October 2022. Sample size was 35, 20 males and 15 female patients above 40years of age suffering with diabetes mellitus. Inclusion criteria were known diabetic for more than 1year. Exclusion criteria are of diabetes with cardiovascular, renal and neurological complications and also diabetic ketoacidosis and hyperosmolar diabetic coma and infections.

## III. Results

Metformin therapy has been shown to deplete vitamin B12,l. Patients taking metformin should supplement vitamin B12 and also to monitor vitamin B12 levels.
Vitamin B12 deficiency was seen in 30% of patients.
Daily decrease in Vitamin B12 for each increase in metformin was 1mg (p,0.001)

Table: Comparision of Metformin value in type 2 Diabetis mellitus patient

| Metformin dose | 1000-1500mg | 1500-2000mg | 2000mg |
|---|---|---|---|
| Odds ratio | 1.5 | 7.5 | 8.5 |
| p-value | <0.001 | <0.001 | <0.001 |

Odds ratio for vitamin B12 deficiency was 0.23 and
p-value < 0.001
So these patients are associated with vitamin B12 deficiency and metformin therapy.in T2DM.
In adult patients with T2DM, intra muscular or oral vitamin B12 in doses of 1000 μg daily for a week then once every week for 4 weeks are sufficient to correct vitamin B12 deficiency
Having diabetes mellitus can increase your risk of having a B-12 deficiency because it may be a side effect of metformin, a common treatment for type 2 diabetes mellitus. A 2009 study found that 22 percent of people with type 2 diabetes were low in B-12.

## IV. Discussion

A recent cohort study, 2021, conducted at the University Hospital of Strasbourg, France, examined patients with a diagnosis of metformin-associated cobalamin deficiency and concluded that metformin causes at least 10 percent of the incidence of vitamin $B_{12}$ deficiency and that resulting hematologic abnormalities and peripheral smear changes[11]. Long-term therapy with metformin is known to reduce intestinal absorption of vitamin B12 and folate[12]. The study reports a highly significant inverse correlation between the dose and duration of metformin treatment and reduced serum levels of vitamin B12, with 34% of study participants affected.

## V. Conclusion

If patient currently taking metformin for Type 2 diabetes, he has to take vitamin B12. That's because metformin can lead to vitamin B12 deficiency (low vitamin B12)

## Ackowledgement

My thanks to dean- PV Chalam , CEO- MV Rama Rao for their kind heart to conduct study. My heartfelt thanks to all faculty of Pharmacology, Bhaskar Medical College.

## References

[1]. Nathan DM, Buse JB, Davidson MB, Heine RJ, Holman diabetes: A consensus algorithm for the initiation and adjustment of therapy: a consensus statement from the American Diabetes Association and the European Association for the Study of Diabetes. Diabetes Care 29: 1963-1972.
[2]. Nathan DM, Davidson MB, DeFronzo RA, Heine RJ, Henry RR, et al. (2007) American Diabetes Association. Impaired fasting glucose and impaired glucose tolerance: implications for care. Diabetes Care 30: 753-759.
[3]. Niafar M, Hai F, Porhomayon J, Nader ND (2015) The role of metformin on vitamin B12 deficiency: a meta-analysis review. Intern Emerg Med 10: 93-102.
[4]. Liu Q, Li S, Quan H, Li J (2014) Vitamin B12 status in metformin treated patients: systematic review. PLoS One 9: e100379.
[5]. American Diabetes Association (2017) Standards of medical care in diabetes. Diabetes Care 40.
[6]. Xu C, Wu Y, Liu G, Liu X, Wang F, et al. (2014) Relationship between homocysteine level and diabetic retinopathy: a systematic review and meta-analysis. Diagn Pathol 9: 167.
[7]. Li J, Zhang H, Shi M, Yan L, Xie M (2014) Homocysteine is linked to macular edema in type 2 diabetes. Curr Eye Res 39: 730-735.
[8]. Wickramasinghe SN, Fida S (1993) Correlations between holo-transcobalamin II, holo-haptocorrin, and total B12 in serum samples from healthy subjects and patients. J Clin Pathol 46: 537-539.
[9]. Obeid R, Shannan B, Herrmann W (2011) Advanced glycation end products overload might explain intracellular cobalamin deficiency in renal dysfunction, diabetes and aging. Med Hypotheses 77: 884-888.
[10]. Langan RC, Zawistowski KJ (2011) Update on Vitamin B12 Deficiency. Am Fam Physician 83: 1425-1430.
[11]. Herbert V (l988) Vitamin B-12: plant sources, requirements, and assay. Am J Clin Nutr 48: 852-858.
[12]. Gröber U, Kisters K, Schmidt J (2013) Neuroenhancement with vitamin B12-underestimated neurological significance. Nutrients 5: 5031-5045.

*Dr.Kudaravalli Jyothsna, et. al. "The Effect of Metformin on Vitamin B12 levels in Type 2 Diabetes Patients." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 22(1), 2023, pp. 43-44.