

The effect of magnesium supplementation on fasting blood glucose levels and glycemic control on type two diabetes mellitus.

By

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Abstract:

Over a 24-week period, a cross-sectional study was designed to examine the effects of once-daily magnesium tablets on type 2 diabetes. This study looked at how magnesium sulfate affected fasting blood glucose levels and improved glycemic control in people with type 2 diabetes.

The study, which involved 90 type 2 diabetes patients (41 men and 49 women) from Salahuddin General Hospital in Tikrit Municipality, from January 2022 to December 1, 2022. For people with type 2 diabetes, this medication is highly compelling. After taking magnesium sulfate once daily after a meal for 24 weeks, this medication significantly lowers type 2 diabetes patients' fasting blood sugar levels and enhances blood sugar control.

Keyword: Magnesium supplements for type 2 diabetes.

Introduction:

Magnesium, a mineral that is abundant in the body, is found in many foods naturally, added to others, taken as a dietary supplement, and used in some medications (such as antacids and laxatives). Magnesium is a cofactor for over three hundreds enzyme systems that control various biochemical reaction in the body, including protein synthesis, muscle and nerve function, glycemic control, and blood pressure regulation (1-3).

Vegetables with green leaves, legumes, nuts and seeds, and whole grains are foods that are high in magnesium (2).

Men need 420 milligrams (mg) of magnesium per day if they are over the age of 31, and they need 400 mg if they are under the age of 30 (3-4).

The oxidative phosphorylation, glycolysis, and production of energy all require magnesium, helps bones maintain their structural integrity and is required for the synthesis of DNA, RNA, and the antioxidant glutathione. Additionally, magnesium helps in the active transport of calcium and potassium ions across cell membranes, which are important for the transmission of nerve impulses, the contraction of muscles, and a normal heartbeat [3]. Although the amount of magnesium in water varies depending on the source and brand (1 mg/L to 120 mg/L or more), tap water, bottled water, and bottled water are all potential sources of magnesium (5).

The average body absorption of dietary magnesium is between 30 and 40 percent(6). As long as they are taken regularly, magnesium supplements can be taken as any time.

Magnesium aids in enhancing the function of the hormone insulin, which lowers blood sugar levels because insulin is required to control blood sugar levels (7). Additionally, it lowers insulin

resistance in people with type 2 diabetes, which aids in the management of the disease. aids in preventing cardiovascular disease.

Persistently high blood sugar (glucose) levels are a defining characteristic of diabetes mellitus. Diabetes comes in several different types. Diabetes type 1 and type 2 are the two most common types.

Type 2 diabetes (T2D) is a chronic metabolic disorder that results from defect in insulin secretion, insulin action, or both(8). Heart disease, stroke, kidney disease, blindness, and amputation are caused by chronic hyperglycemia (9). The World Health Organization claims that the prevalence of diabetes is rising alarmingly. There are 422 million diabetics worldwide(10). To enhance glycemic control strategies in type 2 diabetes mellitus patients, numerous studies have been carried out(11-13). Mg supplementation has also been advocated as an adjunctive therapy in the management of diabetes symptoms(14,15).

Materials and methods:-

A prospective observational study was conducted on a diabetic patient who received just one oral magnesium tablet after meals while giving birth at Salahuddin General Hospital between January 2022 and December 2022. has been completed.

The study included 90 patients (41 men and 49 women). Patient with type 2 diabetes taking once-daily medication for six months.

Regulating HbA1c and controlling post-strip fasting blood sugar.

For 10 hours, blood samples were taken by venipuncture for HbA1c by enzymatic method and by finger prick for fasting blood glucose. Quantitative variable area units are expressed as mean \pm standard deviation (SD) in applied mathematics analysis of information. The analysis of the quantitative variables used the Student's t-test.

an amount $P < 0.05$ were thought about statistically significant.

Results:

Modern studies on each patient were completed. The purpose of this study was to assess the effects of magnesium tablets on type 2 diabetes patients who took the medication daily after meals (400 mg for 41 men and 49 women).

Consequently, fasting blood sugar was markedly reduced ($P < 0.05$) in table and improvement result in HbA1c which significantly ($p < 0.05$) in table 2.

Table 1: The effect of magnesium supplement on ninety type 2 diabetic mellitus patients.

Number of patients	Before treatment	After treatment
	Mean \pm S.D	Mean \pm S.D
90	182.7 \pm 25.2	166.14 \pm 33.9

Table 2: The effect of magnesium supplement on HBA1c in ninety diabetes mellitus type 2 patients.

Number of patients	Range of HBA1c	Before treatment	After treatment
		Mean \pm S.D	Mean \pm S.D
25	8 - 10	8.59 \pm 0.76	7.9 \pm 0.44
30	7 - 8	7.52 \pm 1.78	6.96 \pm 0.10
35	6 - 7	6.33 \pm 1.12	6.23 \pm 1.4

Discussion:

In this study, we discovered that magnesium supplementation significantly lowered blood sugar levels and significantly improvement HbA1c.

Lower blood sugar levels are the result of magnesium's role in enhancing insulin function, which is necessary to control blood sugar levels. Lower blood sugar levels result from improved insulin function, which is facilitated by magnesium. Insulin regulates blood sugar levels. Additionally, it lessens type 2 diabetics' insulin resistance. It can control and lessen it condition with its assistance.

There is conflicting clinical evidence regarding the impact that Mg supplementation has on patients with diabetes type 2's metabolic indices (19). Large randomized clinical trials are still needed to confirm the speculative function of ancillary Mg in the control of DM2(20,21). Magnesium supplementation may increase insulin sensitivity and blood glucose levels during fasting and postprandial periods. Increased serum and cellular Mg levels and insulin sensitivity are significantly correlated, as we discovered [22]. Additionally, we have demonstrated that older DM2 adults with altered endothelial function can benefit from Mg supplementation(23–24).

Numerous studies have linked whole grains' positive effects on enhancing insulin sensitivity with their high Mg content in dietary fiber(25–28)]. In DM2 patients with hypomagnesemia, fasting and postprandial blood glucose levels, as well as insulin sensitivity, oral Mg supplementation has been demonstrated to be beneficial [29]. Insulin sensitivity in non-diabetic patients with insulin resistance has also been shown to improve(8,30).

Consequently, oral Mg supplementation seems to help treat Mg deficiency in DM2 patients and enhance oxidative stress, inflammatory markers, and insulin resistance.

Other potential factors that could contribute to the discrepancies between studies include variations in Mg balance, glycemic control, and age.

Improvements in these glycemic indices were not only linked to an increase in insulin sensitivity, but Mg may also aid in the translocation of glucose transporter 4 (GLUT 4) to the cell membrane, brought on by the tyrosine kinases' activation in the presence of magnesium(31).

He agreed with Chacko and colleagues' findings. When researchers looked at how oral magnesium supplementation (500 mg of elemental magnesium per day for four weeks) affected metabolic biomarkers in obese subjects, they discovered that fasting C-peptide levels and fasting insulin levels had significantly improved thanks to the Mg treatment. [32]. The findings are also in line with Mooren's clinical study, which showed that after taking magnesium supplements for six

months, Mooren's FBS and a number of insulin sensitivity indices significantly improved compared to those who took a placebo(33).

Conclusion:

This study looked at one of the contentious elements of diabetes prevention and management tactics. As a result of the findings, oral Mg supplementation significantly enhanced HbA1c and markedly decreased fasting blood sugar. Additionally, type 2 diabetic patients who took magnesium supplements experienced decreased insulin resistance and better glycemic control.

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