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Effects of Oral Magnesium Supplementation on Insulin Resistance and Type 2 Diabetes Mellitus
LoAndra Berg, MS, FNP; Renea L. Beckstrand, PhD, RN, CCRN, CNE

Purpose
To examine the relationship of magnesium levels related to insulin resistance and type 2 diabetes mellitus.

Background and Significance
Diabetes is a metabolic disease in which the body does not produce or correctly use insulin to maintain proper levels of glucose in the blood resulting in serious health consequences. Diabetes is a major factor in:
- coronary heart disease
- stroke as well as blindness
- kidney failure
- non-traumatic amputations due to disruption of the microvascular system (Schulze & Hu, 2005).

The Center for Disease Control reported in 2007:
- 23.6 million people in the United States (7.8% of the population) have diabetes
- 17.9 million diagnosed
- 5.7 million people undiagnosed

Every year marks a large increase in the number of people diagnosed with diabetes.

Data Sources
Databases were searched using the keywords: magnesium, and type 2 diabetes mellitus.

Limitations
Magnesium status is difficult to determine because only 1% of the body’s magnesium is found in the blood, 50% is found in the bones, and the rest resides in cells of tissues and organs (NIH, 2009).

Results
Seven research articles were reviewed which investigated the relationship between serum magnesium levels and type 2 diabetes mellitus. Supplemental magnesium did not clearly decrease the need for medication for glucose control, although the length of the studies may have been too short to be conclusive.

All seven articles suggested that magnesium supplementation did reduce insulin resistance.

Conclusions
Recent studies suggest that oral magnesium supplementation is inexpensive, safe, and well tolerated. Magnesium supplementation has been suggested to decrease insulin resistance and delay the onset of type 2 diabetes mellitus.

The current RDA for magnesium, adjusted to age and gender, seems adequate; however, these groups are susceptible to hypomagnesaemia:
- women
- the elderly
- those living in soft water areas
- those at increased risk for magnesium loss
- those with a magnesium binding defect

The beneficial effects directly attributable to magnesium supplementation in some studies, suggest the need for further research.

Implications for Practice
Magnesium plays such a vital role in cellular health that the reviewed studies suggested keeping serum magnesium levels on the high side of normal. Magnesium supplementation is relatively safe, affordable, and vital for many functions in the body; therefore, oral magnesium supplementation is recommended.

Research data are inadequate at this time to prove that oral magnesium intake decreases the need for hypoglycemic agents. Until conclusive data is obtained, maintaining a high average serum magnesium level has few side effects and any potential delay in the onset of diabetes is beneficial for helping to prevent the complications of diabetes.