Abstract

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Magnesium supplementation improves indicators of low magnesium status and inflammatory stress in adults older than 51 years with poor quality sleep.

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BACKGROUND: Low magnesium status has been associated with numerous conditions characterized as having a chronic inflammatory stress component. Some animal findings indicate that a moderate magnesium deficiency, similar to which apparently commonly occurs in humans, may enhance inflammatory or oxidative stress induced by other factors, including disrupted sleep/sleep deprivation.

OBJECTIVE AND METHODS: Thus, an experiment was performed with 100 adults (22 males and 78 females) aged 59 ± 8 years (range 51 to 85 years) with poor sleep quality revealed by a Pittsburg Sleep Quality Index (PSQI) score higher than five. The participants were randomly assigned to two groups matched by gender, age, and overall PSQI score. After baseline assessment (week one) of body mass index (BMI), diet, blood and urine biochemical variables, and sleep quality, one group was given a 320 mg magnesium/day supplement as magnesium citrate and the other group a sodium citrate placebo for seven weeks. Final assessments were made five and seven weeks (which were combined for statistical analysis to reduce intra-individual variation) after supplement initiation for the 96 participants who completed the study as designed.

RESULTS: Based on food diaries, 58% of the participants were consuming less than the US. Estimated Average Requirement (EAR) for magnesium. Consuming less than the EAR was associated with a significantly higher BMI and plasma C-reactive protein (CRP) concentration. Only 40 participants had plasma CRP concentrations higher than 3.0 mg/L (an indication of chronic inflammatory stress). Overall PSQI scores improved (10.4 to 6.6, p < 0.0001) and erythrocyte magnesium increased (4.75 to 5.05 pg/cell, p = 0.01) regardless of magnesium or placebo supplementation. Magnesium vs placebo supplementation did not significantly affect serum magnesium when all participants were included in the analysis. When only the 37 participants with serum magnesium concentrations < 1.8 mg/dL (indication of deficient magnesium status) were analyzed, magnesium supplementation, but not the placebo, increased serum magnesium concentrations. Magnesium supplementation vs placebo decreased plasma CRP in participants with baseline values > 3.0 mg/L.

CONCLUSIONS: The findings show that many individuals have a low magnesium status associated with increased chronic inflammatory stress that could be alleviated by increased magnesium intake. Because dietary magnesium intake did not change during the experimental period, another factor, possibly a placebo effect, improved sleep quality, which resulted in increased erythrocyte magnesium. This factor prevented the determination of whether magnesium deficiency contributes to poor sleep quality. The findings, however, suggest an association between magnesium status and sleep quality that needs further study to definitively determine whether a low magnesium status is a cause or an effect of poor sleep quality.

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