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# Optimizing Weight Loss with AI (GenAIS℠): A Randomized Trial of Dietary Supplement Prescriptions in Obese Patients

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**Abstract :** Background: Obesity is a complex, multifactorial chronic disease that poses significant health risks. Recent advancements in artificial intelligence (AI) offer the potential for more personalized and effective dietary supplement (DS) regimens to promote weight loss. This study aimed to evaluate the efficacy of AI-guided DS prescriptions compared to standard physician-guided DS prescriptions in obese patients. Methods: This randomized, parallel-group pilot study enrolled 60 individuals aged 40 to 60 years with a body mass index (BMI) of 25 or greater. Participants were randomized to receive either AI-guided DS prescriptions (n = 30) or physician-guided DS prescriptions (n = 30) for 180 days. The primary endpoints were the percentage change in body weight and the proportion of participants achieving a ≥5% weight reduction. Secondary endpoints included changes in BMI, fat mass, visceral fat rating, systolic and diastolic blood pressure, lipid profiles, fasting plasma glucose, hsCRP levels, and postprandial appetite ratings. Adverse events were monitored throughout the study. Results: Both groups were well balanced in terms of baseline characteristics. Significant weight loss was observed in the AI-guided group, with a mean reduction of -12.3% (95% CI: -13.1 to -11.5%) compared to -7.2% (95% CI: -8.1 to -6.3%) in the physician-guided group, resulting in a treatment difference of -5.1% (95% CI: -6.4 to -3.8%; $p < 0.01$). At day 180, 84.7% of the AI-guided group achieved a weight reduction of ≥5%, compared to 54.5% in the physician-guided group (Odds Ratio: 4.3; 95% CI: 3.1 to 5.9; $p < 0.01$). Significant improvements were also observed in BMI, fat mass, and visceral fat rating in the AI-guided group ($p < 0.01$ for all). Postprandial appetite suppression was greater in the AI-guided group, with significant reductions in hunger and prospective food consumption, and increases in fullness and satiety ($p < 0.01$ for all). Adverse events were generally mild-to-moderate, with higher incidences of gastrointestinal symptoms in the AI-guided group, but these were manageable and did not impact adherence. Conclusion: The AI-guided dietary supplement regimen was more effective in promoting weight loss, improving body composition, and suppressing appetite compared to the physician-guided regimen. These findings suggest that AI-guided, personalized supplement prescriptions could offer a more effective approach to managing obesity. Further research with larger sample sizes is warranted to confirm these results and optimize AI-based interventions for weight loss.

**Keywords :** obesity, AI-guided, dietary supplements, weight loss, personalized medicine, metabolic health, appetite suppression
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