

Prevention of Diabetes in Prediabetic Patients Receiving Medical Nutrition Therapy (MNT)

New study shows that individualized MNT is effective in decreasing HbA1c level in patients diagnosed with prediabetes.

A new study¹ in the Journal of the Academy of Nutrition and Dietetics shows evidence on the effects of Medical Nutrition Therapy (MNT) on glycated hemoglobin (HbA1C), serum lipid levels, and Diabetes Risk Score from baseline to 12 weeks. This study updates prior studies such as the Diabetes Prevention Study², the Finnish Diabetes Prevention Study³, and the Da Qing Impaired Glucose Tolerance and Diabetes Study⁴ showing that lifestyle change can delay the occurrence of type 2 diabetes mellitus. The US Diabetes Prevention Program reported that the incidence of type 2 diabetes was reduced by 58% in the lifestyle group compared with 31% in the metformin group.² The Finnish Diabetes study also found a 58% reduction in the incidence of type 2 diabetes after 3.2 years.³ The Da Qing Impaired Glucose Tolerance study found that diet and/or exercise interventions led to a significant decrease in diabetes incidence over 6 years with 33% reduction in the diet only group, 47% in the exercise only group, and 38% in the diet plus exercise group.⁴

The 2012 Standards of Medical Care in Diabetes recommends that individuals who have pre-diabetes should receive individualized MNT as needed to achieve treatment goals, preferably by a registered dietitian nutritionist (RDN).⁵

The effectiveness of MNT in patients with prediabetes has not been studied using the 3 hours of therapy approved by the Centers for Medicare and Medicaid Services for persons with type 2 diabetes. The purpose of our pilot study was to investigate the effect of MNT in overweight or obese adults with prediabetes compared with usual care on fasting plasma glucose values, HbA1c, serum lipid levels, and Diabetes Risk Score, from baseline to the end of a 12-week intervention.¹

The Participants and Methods:

- 2 groups- One receiving MNT and the other receiving usual care
- MNT group received a baseline 60 minute individual session (with 24 hour dietary recall for intervention group) with RDN, followed by three 30-45 minute sessions for education about promoting weight loss (5 to 7% weight loss), physical activity of moderate intensity 50-70% of HR (150min/day), and strategies to reduce calories and dietary fat
- Usual care group attended biweekly visits
- Diet: Carbohydrates and Monounsaturated Fat: 60-70% of intake, Protein: 15 to 20%, Saturated Fat: <7%, Alcohol: Moderate Consumption 1 drink/day or less for adult women, or 2/day or less for adult men
- Fasting plasma glucose, HbA1C, serum lipid levels, and Diabetes Risk score (scores >9= higher risk of diabetes)⁶ were measured at beginning and end of 12 week trial.

The Results:

- **HbA1c were similar at baseline with the MNT group being slightly higher at 5.99% compared with the usual care group mean of 5.95%. By 12 weeks, the MNT group mean HbA1c decreased to 5.79%, whereas the usual care group's mean HbA1c increased to 6.01% (p=0.01).**
 - **A HbA1C ≥ 5.6 and ≤ 6.4 is diagnostic of prediabetes, while a HbA1C ≥ 6.5 is diagnostic of diabetes.**
- **Diabetes Risk Score was significantly different between groups with MNT having a mean score decreased from 17.54 ± 3.69 to 15.31 ± 3.79 , whereas the usual care group score decreased from 17.23 ± 4.69 to 16.83 ± 4.73 (P<0.001).**

- The Diabetes Risk Score is based on diabetes risk factors including age; body mass index, waist circumference, family history of diabetes, use of blood pressure medication, history of high blood glucose levels, physical activity, and daily consumption of vegetables, fruits, or berries.
- **The MNT group activity increased physical activity from 21 to 95%, whereas the usual care group increased from 21% to 43%.**
- Mean total cholesterol decreased significantly from 199.2±41.74 mg/dL to 191.99±37.03 mg/dL representing a mean loss of 7.21 mg/dL (p=0.01) independent of group assignment.
- Mean LDL cholesterol level decreased significantly from 118.30± 36.12 mg/dL (3.06±0.94 mmol/L) (p=0.04) independent of group assignment.

Key Conclusion and Discussion

- The results demonstrate that individualized MNT is effective in decreasing HbA1c level in patients diagnosed with prediabetes over a 12 week period.
- While the changes in total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, and Diabetes Risk Score were not significant, they all showed more improvement with MNT compared to usual care. It is likely that with a longer duration of therapy these changes would be more statistically significant.
- Additionally, the usual care patients visited the doctor's office more than previously, thus the improvement of the usual care group may have blunted the significance of the findings.

Implications

- Increased coverage of MNT to prevent or delay the onset of type 2 diabetes.
- Earlier diagnosis and treatment of diabetes, to prevent or delay expensive complications.

Increased lifestyle intervention through Medical Nutrition Therapy is imperative to prevent the incidence of diabetes in prediabetic patients.

-
1. Parker AR, Byham-Gray L, Denmark R, Winkle PJ. The effect of medical nutrition therapy by a registered dietitian nutritionist in patients with prediabetes participating in a randomized controlled clinical research trial. *J Acad Nutr Diet.* 2014 Nov;114(11):1739-48.
 2. Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med.* 2002;346(6):393-403.
 3. Tuomilehto J, Lindstrom J, Eriksson J. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. *N Engl J Med.* 2001;344(18):1343-1350.
 4. Pan XR, Li GW, Hu YH, Wang JX, Yang WY, An ZX, Hu ZX, Lin J, Xiao JZ, Cao HB, Liu PA, Jiang XG, Jiang YY, Wang JP, Zheng H, Zhang H, Bennett PH, Howard BV. Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance. The Da Qing IGT and Diabetes Study. *Diabetes Care.* 1997 Apr;20(4):537-44.
 5. American Diabetes Association. Standards of Medical Care in Diabetes-2012. *Diabetes Care.* 2012;35(suppl 1):S11-S63.
 6. Lindstrom J, Tuomilehto J. The Diabetes Risk Score. *Diabetes Care.* 2003;26(3):725-731.