Elevated Hemoglobin A1c Is Associated with Incident Diabetes Within 4 Years Among Normoglycemic, Working-age Individuals in an Employee Wellness Program

Background

- Hemoglobin A1c (HbA1c) measurement is useful for diagnosis as well as risk prediction for type 2 diabetes.1,2
- HbA1c testing is not usually offered to individuals who have a fasting glucose (FG) test, making it difficult to assess the usefulness of testing HbA1c in patients with normal FG levels.
- However, some employee wellness programs test for both biomarkers.
- **Objective**: The investigators evaluated the association of HbA1c levels with incident diabetes in non-diabetic individuals who had normal fasting glucose (<100 mg/dL) and were enrolled in an employee wellness program.

Methods

- Individuals included in the study were enrolled in an employee wellness program in 2012 and had at least one scheduled clinical visit during a 4-year follow-up. Individuals were excluded if they had FG levels ≥100 mg/dL or diabetes (defined as FG≥126 mg/dL mg/dL, HbA1c ≥6.5%, or self-reported physician diagnosis).
- The association of baseline HbA1c level with incident diabetes in any follow-up exam was evaluated by regression model.
  - Incident diabetes was defined as a FG ≥126 mg/dL or a self-reported physician diagnosis of diabetes.
  - The model was adjusted for other risk factors: age, sex, FG, triglyceride-to-HDL-C ratio, serum creatinine, alanine aminotransferase, body-mass index (BMI), and blood pressure.

Results

- Among 21,339 individuals included in the study, 513 developed diabetes during the 4-year follow-up.
- Elevated baseline HbA1c (>5.9%, <6.5%) was associated with incident diabetes: odds ratio (OR)=2.2 (95% CI=2.0 to 2.5; P<0.001) per 1 standard deviation increase.
- Individuals in the top 5% of baseline HbA1c levels (>5.9%) had >8-fold greater odds of developing diabetes compared to those with normal HbA1c levels (<5.7%): OR=8.4 (95% CI=6.1-10.8; P<0.001) after adjustment for other risk factors.
- Individuals with an intermediate level of HbA1c (5.7%–5.9%) had >2-fold greater odds of developing diabetes compared to those with normal HbA1c levels: OR=2.7 (95%CI=2.2-3.3; P<0.001) after adjustment for other risk factors.

Conclusions

- Among participants in an employee wellness program without diabetes and with normal fasting glucose (<100 mg/dL), elevated baseline HbA1c levels were associated with future development of diabetes.
- HbA1c testing of normoglycemic individuals may help identify persons with an elevated risk for developing diabetes. Counseling on prevention tactics could be offered to such a target population.