

Elevated Hemoglobin A_{1c} Is Associated With Incident Diabetes Within 4 Years Among Normoglycemic, Working-age Individuals in an Employee Wellness Program

Background

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

Methods

- Individuals included in the study were enrolled in an employee wellness program in 2012 and had at least 1 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, HbA_{1c} ≥6.5%, or self-reported physician diagnosis).
- The association of baseline HbA_{1c} 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 HbA_{1c} (>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 HbA_{1c} levels (>5.9%) had >8-fold greater odds of developing diabetes compared to those with normal HbA_{1c} levels (<5.7%): OR=8.4 (95% CI=6.6-10.8; *P*<0.001) after adjustment for other risk factors.
- Individuals with an intermediate level of HbA_{1c} (5.7%-5.9%) had >2-fold greater odds of developing diabetes compared to those with normal HbA_{1c} 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 HbA_{1c} levels were associated with future development of diabetes.
- HbA_{1c} 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.

Article published in the journal *Diabetes Care*

Authors

Dov Shiffman,¹ Carmen H Tong,¹ Charles M Rowland,¹ James J Devlin,¹ James B Meigs,^{2,3} Michael J McPhaul¹

Affiliations

¹ Quest Diagnostics, San Juan Capistrano, CA

² Massachusetts General Hospital, Division of General Internal Medicine, Boston, MA

³ Harvard Medical School, Boston, MA

Citation

Shiffman D, Tong CH, Rowland CM, et al. *Diabetes Care*. 2018;41:e1-e2.

Webpage

<http://care.diabetesjournals.org/content/early/2018/04/11/dc17-2500.full-text.pdf>

References

1. American Diabetes Association. *Diabetes Care*. 2012;35(suppl 1):S64-S71.
2. World Health Organization. Available at: http://www.who.int/diabetes/publications/diagnosis_diabetes2011/en/. Accessed February 2, 2017.