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Dysglycemia Under The Lens: Comparative Diagnostic Performance of Hemoglobin A1c and Oral Glucose Tolerance Test

*Hoque AM[1], Mustari M[2], Fariduddin M[3], Selim S[4]

[1]Ahmad Monirul Hoque, Resident, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; [2]Marufa Mustari, Assistant Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; [3]Md. Fariduddin, Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; [4]Shahjada Selim, Associate Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh

Abstract

Background: Dysglycemia, encompassing prediabetes and diabetes (DM), is linked to increased complications and cardiovascular risk. Since 2010, HbA1c has been recommended as a practical and stable diagnostic tool, though its accuracy may differ from glucose-based criteria.

Objectives: To assess the diagnostic accuracy of HbA1c against oral glucose tolerance test (OGTT) and determine optimal HbA1c cut-offs for DM and prediabetes.

Methods: This cross-sectional study was conducted in the endocrinology department of BMU from September 2022 to March 2025. We evaluated HbA1c thresholds against OGTT in 376 non-diabetic participants, using ROC analysis to determine diagnostic accuracy and optimal cut-off values.

Results: Out of the 376 people who took part, 174 (46.3%) had normal glucose tolerance (NGT), 108 (28.7%) had been diagnosed with diabetes mellitus (DM), and 94 (25%) had prediabetes based on the criteria of the OGTT. The median age was 35 years, with a range of 28 to 43.8 years. At an HbA1c level of 6.5%, the sensitivity and specificity for DM were 75.9% and 96.3%, respectively. In the case of prediabetes, at 5.7%, the sensitivity was 53.2%, and the specificity was 63.2%. The optimal cut-off value for diagnosing DM and prediabetes was determined to be 6.1% ((AUC (95% CI) = 0.956 (0.935 to 0.977), $p < 0.001$)) and 5.6% ((AUC (95% CI) = 0.617 (0.546 to 0.688), $p < 0.01$)), respectively. There was a strong concordance between HbA1c and OGTT for DM diagnosis (kappa, $\kappa = 0.76$, $p < 0.001$) but a poor concordance for prediabetes identification (kappa, $\kappa = 0.13$, $p<0.033$).

Conclusions: The HbA1c standards for diabetes and prediabetes were 6.1% and 5.6%, respectively, lower than the ADA recommendation. Changing prediabetes and diabetes thresholds based on HbA1c values may enhance accuracy. *[J Assoc Clin Endocrinol Diabetol Bangladesh, 2025;4(Suppl 1): S39]*

Keywords: HbA1c, OGTT, Dysglycemia, Diagnostic accuracy

***Presenting and corresponding author:** Dr. Ahmad Monirul Hoque, Resident, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh Medical University, Dhaka, Bangladesh.
Contact-01880893766, E-mail: ahmadhoque8937@gmail.com