

COMPARATIVE DIAGNOSTIC PERFORMANCE OF HEMOGLOBIN A1C AND ORAL GLUCOSE TOLERANCE TEST FOR DETECTING DYSGLYCEMIA IN ADULTS

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Background: Diabetes mellitus has emerged as a critical public health concern in South Asia, with Bangladesh experiencing a rapid escalation in type 2 diabetes. Dysglycemia, including prediabetes and diabetes (DM), increases the risk of cardiovascular disease. HbA1c is a widely used diagnostic tool due to its practicality, stability, and substantial connection with diabetic consequences, though its accuracy compared to glucose-based criteria may vary. The aim of this study was to evaluate the diagnostic performance of HbA1c relative to OGTT and determine optimal HbA1c cut-offs for diabetes and prediabetes. **Methods:** This cross-sectional study was conducted at a medical university from September 2022 to March 2025, enrolling 376 participants without prior diabetes. The OGTT served as the gold standard to assess HbA1c sensitivity and specificity at varying thresholds. Receiver operating characteristic curves were employed to ascertain the appropriate cut-off threshold. **Results:** Among 376 participants, 46.3% had normal glucose tolerance, 28.7% had diabetes, and 25% had prediabetes by OGTT. For diabetes, HbA1c $\geq 6.5\%$ showed 75.9% sensitivity and 96.3% specificity, whereas the optimal cut-off was 6.1% (89.8% sensitivity, 86.9% specificity). For prediabetes, the optimal HbA1c cut-off was 5.6% (66% sensitivity, 54% specificity) with poor agreement with OGTT. Concordance between HbA1c and OGTT was strong for diabetes ($\kappa=0.76$) but weak for prediabetes ($\kappa=0.13$). **Conclusion:** Our results indicate that lowering the HbA1c diagnostic threshold to 6.1% may improve sensitivity without substantially compromising specificity, thereby enhancing early diabetes detection in this population. However, HbA1c should not be relied upon solely for prediabetes, where OGTT remains the gold standard.

Keywords: HbA1c, Oral Glucose Tolerance Test, Type 2 Diabetes Diagnosis

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