

Change in glycemic status over one year in young bangladeshi people with prediabetes and its relevance to TCF7L2 polymorphisms: A prospective cohort study

*Noman-Bhuiyan AA¹ , Ashraf K² , Ratul RH³ , Hasan M⁴ , Sultana N⁵ , Hasanat MA⁶ 

¹Abdullah Al Noman Bhuiyan, Resident, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; ²Koushik Ashraf, MD, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; ³Rifat Hossain Ratul, PhD Candidate, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; ⁴Mashfiqul Hasan, PhD Candidate, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; ⁵Nusrat Sultana, Associate Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh; ⁶Muhammad Abul Hasanat, Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh

Abstract

Background: Prediabetes is an intermediate glycemic state with variable risk of progression to type 2 diabetes mellitus (T2DM). With the downward shift in age at T2DM onset in Bangladesh, genetic susceptibility may contribute to early glycemic deterioration. TCF7L2 is among the strongest genetic determinants of T2DM risk worldwide; however, its relevance to short-term glycemic transitions in young people with prediabetes remains unclear.

Objectives: To determine the one-year glycemic transitions among young Bangladeshi people with prediabetes, using a normoglycemic (NGT) comparison group, and explore their relevance to four TCF7L2 polymorphisms, namely rs12255372, rs7903146, rs7901695, and rs11196205.

Methods: This prospective cohort study was conducted among participants aged 10–34 years previously classified as prediabetes (n=154) and NGT (n=154) in a nationwide community prevalence study. Participants were enrolled consecutively across all eight administrative divisions and reassessed after one year with repeat OGTT, anthropometry, and TCF7L2 genotyping by Sanger sequencing.

Results: Baseline clinical characteristics were comparable between groups. At one year, 69.4% of participants with prediabetes reverted to NGT, 29.2% remained prediabetic, and 1.3% progressed to diabetes. Among those with baseline NGT, 13.6% developed dysglycemia. After adjustment, waist circumference was the only independent predictor of an unfavorable outcome in the prediabetes group (adjusted OR=4.44, 95% CI 1.67–11.83, p=0.003). Of the four SNPs, only rs7901695 was associated with reversion under the log-additive model (OR=0.48, 95% CI 0.25–0.91; p=0.024) in unadjusted analysis. All SNPs showed strong linkage disequilibrium (D' 0.90–1.00). Global haplotype association was significant in the prediabetes group (p=0.011), but not in the NGT group (p=0.3).

Conclusion: Reversion to normoglycemia was the most common one-year outcome among young Bangladeshi people with prediabetes. Central adiposity independently associated with an unfavorable outcome, while the TCF7L2 region showed an association with glycemic outcome. These findings warrant confirmation in larger, longer-term studies. [*J Assoc Clin Endocrinol Diabetol Bangladesh*, 2026;5(Suppl 1): S38]

Keywords: Prediabetes, Young-onset diabetes, Glycemic transition, TCF7L2, Haplotype

***Corresponding & presenting author:** Dr. Abdullah Al Noman Bhuiyan, Resident, Department of Endocrinology, Dhaka, Bangladesh, email: aanoman036@gmail.com, ORCID iD: <https://orcid.org/0009-0006-2086-9661>