RESPONSE TO COMMENT ON ANJANA ET AL.

Incidence of Diabetes and Prediabetes and Predictors of Progression Among Asian Indians: 10-Year Follow-up of the Chennai Urban Rural Epidemiology Study (CURES). Diabetes Care 2015;38:1441–1448

Ranjit Mohan Anjana, Mohan Deepa, and Viswanathan Mohan

Diabetes Care 2016;39:e66 | DOI: 10.2337/dci15-0037

We thank Drs. Yamauchi and Aizawa for their comment (1) in response to our article (2). They question the exclusion of HbA_{1c} in the definition of prediabetes in our study, because we defined prediabetes as fasting plasma glucose (FPG) 100–125 mg/dL (5.6–6.9 mmol/L) or 2-h plasma glucose 140–199 mg/dL (7.8–11.0 mmol/L).

Undoubtedly, the use of HbA_{1c} has several advantages: the test can be performed at any time of the day and does not require a fasting sample. However, in developing countries such as India there are several limitations to using HbA_{1c} for epidemiological/community screening. These include its high cost; the lack of standardization of the test; the interference by hemoglobinopathies, such as sickle cell anemia and thalassemia (which are seen in significant numbers of some ethnic groups), iron deficiency anemia; and the use of drugs, such as dapsone; among others (3). Iron deficiency anemia is highly prevalent in India, especially among women in the reproductive age-group. Our earlier studies from the same Chennai Urban Rural Epidemiology Study (CURES) cohort used in this study (4), as well as another cohort, showed that the use of HbA_{1c} criteria, even in the absence of anemia, resulted in a markedly higher prevalence of diabetes compared with the use of the glucose values. Higher diabetes and prediabetes rates could have huge economic implications, leading to significantly higher health care costs. Moreover, we showed a significant overlap of HbA_{1c} levels in the range used to define prediabetes with normal glucose tolerance (5).

In the baseline of our CURES cohort, we assessed the prevalence of diabetes based on HbA_{1c} and fasting and 2-h glucose and reported that the use of HbA_{1c} criteria identifies a different set of individuals with milder glucose intolerance and lower serum triglyceride levels (4). Although this has some advantages in identifying individuals at an earlier stage in the natural history of the disease, it probably identifies individuals at lower cardiometabolic risk. Moreover, there are no HbA_{1c} cut points for impaired fasting glucose (IFG) and impaired glucose tolerance (IGT), which does not allow for looking at the incidence of various categories of dysglycemia as we have done in our study.

HbA_{1c} was introduced by the American Diabetes Association as a diagnostic test for diabetes and prediabetes in 2010. Prior to that, all studies have used only plasma glucose measurements to define diabetes and prediabetes. Hence, we disagree with the strongly worded statement by Yamauchi and Aizawa that they "consider the use of prediabetes as a synonym for IFG/IGT as inappropriate and misleading, if not totally wrong" (1). In many parts of the developing world, where 80% of all people with diabetes and prediabetes live, routine HbA_{1c} tests are simply not available and the IFG/IGT definition would be the only way to diagnose prediabetes. Thus, we wish to state that our findings of high incidence rates of diabetes and prediabetes in Asian Indians are true and reliable.

Acknowledgments. The authors thank the epidemiology team of Madras Diabetes Research Foundation for the fieldwork and all the participants who took part in the study.

Duality of Interest. No potential conflicts of interest relevant to this article were reported.

References

1. Yamauchi K, Aizawa T. Comment on Anjana et al. Incidence of diabetes and prediabetes and predictors of progression among Asian Indians: 10-year follow-up of the Chennai Urban Rural Epidemiology Study (CURES). Diabetes Care 2015;38:1441–1448 (Letter). Diabetes Care 2016;39:e65. DOI: 10.2337/dc15-2576
2. Anjana RM, Shanthi Rani CS, Deepa M, et al. Incidence of diabetes and prediabetes and predictors of progression among Asian Indians: 10-year follow-up of the Chennai Urban Rural Epidemiology Study (CURES). Diabetes Care 2015;38:1441–1448
3. Unnikrishnan R, Mohan V. Challenges in estimation of glycated hemoglobin in India. Diabetes Technol Ther 2013;15:897–899
4. Nazir A, Papita R, Anbalagan VP, Anjana RM, Deepa M, Mohan V. Prevalence of diabetes in Asian Indians based on glycated hemoglobin and fasting and 2-H post-load (75-g) plasma glucose (CURES-120). Diabetes Technol Ther 2012;14:665–668
5. Mohan V, Vijayachandrika V, Gokulakrishnan K, et al. A1C cut points to define various glucose intolerance groups in Asian Indians. Diabetes Care 2010;33:515–519

Madras Diabetes Research Foundation and Dr. Mohan's Diabetes Specialities Centre, WHO Collaborating Centre for Noncommunicable Diseases Prevention and Control and International Diabetes Federation Centre of Education, Chennai, India

Corresponding author: Ranjit Mohan Anjana, dranjana@drmohans.com.