Authors' response

We appreciate the comments of the esteemed readers on our article[1] and for bringing up important aspects for discussion. As mentioned, opportunistic screening for prediabetes was done using glucometer (One Touch Ultra, Johnson & Johnson, India), and individuals having either impaired fasting glucose (IFG) or post-prandial/random blood glucose between 140-199 mg/dl underwent two 75 g glucose oral glucose tolerance tests (OGTTs) on separate days within a week. Individuals with persistent IFG and/or impaired glucose tolerance were included as individuals with prediabetes (IPD). Glucose estimation during OGTTs was done using venous blood sample by glucose oxidase method using fully automated clinical chemistry analyzer (Daytona, serial number-58260536, Furuno Electric, Nishnomeya, Japan).

The number of normal individuals and patients with newly diagnosed treatment naïve type-2 diabetes (T2D) evaluated were too small to obtain any meaningful interpretable data, and hence was not discussed. The idea of evaluating this small number of normal individuals and T2D patients and compare them with prediabetes was to highlight that vitamin-D deficiency is common among IPD and is reflective of vitamin-D deficiency in the general population.

Quantitative insulin sensitivity check index (QUICKI) is derived using the inverse of the sum of the logarithms of the fasting insulin and fasting glucose, and is an accepted and validated surrogate marker of insulin resistance (IR) in normal individuals and those with T2D[2]. Values obtained on calculation are a continuum, a higher value suggestive of reduced IR, whereas a lower value is suggestive of increased IR. QUICKI values have been reported to be 0.45 in healthy ideal individuals believed to be having no IR and 0.30 in patients with T2D, the other end of the spectrum[2]. Although a few studies have used QUICKI <0.33 as a definition for IR[3], this in general, is not advisable. Tools like QUICKI were developed to compare IR among groups of individuals in large epidemiological studies, and the absolute values obtained in an individual is less meaningful in the context of diagnosis or treatment of IR. It is imperative that large studies are conducted in each population across the spectrum of glycaemia to develop specific cut-offs for QUICKI. However, such data are not available among Indians, and hence use of individual cut-offs should be discouraged.

Causality and association cannot be established in cross-sectional studies like this, as has been mentioned in the discussion section[1]. However, in a subsequent prospective study, we have documented both increased vitamin-D and decreased albumin-creatinine ratio to be predictive of prediabetes reversal to normoglycaemia[4]. Further, in a randomized controlled trial over a three year period, we documented vitamin-D supplementation to be beneficial in reducing prediabetes progression to diabetes and increasing its reversal to normoglycaemia, through improvement in IR, systemic inflammation and dyslipidaemia[5], thus confirming our initial observations in this study[1].

Deep Dutta*, Indira Maisnam, Ankit Shrivastava, Anirban Sinha, Sujoy Ghosh, Pradip Mukhopadhyay, Satinath Mukhopadhyay & Subhankar Chowdhury
Department of Endocrinology & Metabolism
Institute of Postgraduate Medical Education & Research & SSKM Hospital, Kolkata 700 020, India
**For correspondence*:
deepdutta2000@yahoo.com

References

1. Dutta D, Maisnam I, Shrivastava A, Sinha A, Ghosh S, Mukhopadhyay P, *et al*. Serum vitamin-D predicts insulin resistance in individuals with prediabetes. *Indian J Med Res* 2013; *138* : 853-60.
2. Katz A, Nambi SS, Mather K, Baron AD, Follmann DA, Sullivan G, *et al*. Quantitative insulin sensitivity check index: a simple, accurate method for assessing insulin sensitivity in humans. *J Clin Endocrinol Metab* 2000; *85* : 2402-10.
3. Hettihawa LM, Palangasinghe S, Jayasinghe SS, Gunasekara SW, Weerarathna TP. Comparison of insulin resistance by

indirect methods-HOMA, QUICKI and McAuley-with fasting insulin in patients with type 2 diabetes in Galle, Sri Lanka: a pilot study. *Online J Health Allied Sci* 2006; *5* : 1-50.

4. Dutta D, Choudhuri S, Mondal SA, Mukherjee S, Chowdhury S. Urinary albumin: creatinine ratio predicts prediabetes progression to diabetes and reversal to normoglycemia: role of associated insulin resistance, inflammatory cytokines and low vitamin D. *J Diabetes* 2014; *6* : 316-22.

5. Dutta D, Mondal SA, Choudhuri S, Maisnam I, Hasanhoor Reza AH, Bhattacharya B, *et al*. Vitamin-D supplementation in prediabetes reduced progression to type 2 diabetes and was associated with decreased insulin resistance and systemic inflammation: An open label randomized prospective study from Eastern India. *Diabetes Res Clin Pract* 2014; *103* : e18-23.