



RESPONSE TO COMMENT ON HEIANZA ET AL.

## Effect of Postmenopausal Status and Age at Menopause on Type 2 Diabetes and Prediabetes in Japanese Individuals: Toranomon Hospital Health Management Center Study 17 (TOPICS 17). *Diabetes Care* 2013;36:4007–4014

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We thank Akter et al. (1) for their interest in our study (2). While we agree that the mean age was higher in the postmenopausal women than in the premenopausal women, results of our additional analysis of the 10,878 women showed that independently of older age ( $\geq 50$  years) and demographic and metabolic factors (BMI, parental history of diabetes, physical activity habit, smoking habit, hypertension, log-transformed triglycerides, and HDL cholesterol) the postmenopausal state was associated with a 1.50 (95% CI 1.30–1.74) higher probability of the presence of dysglycemia (either type 2 diabetes or prediabetes) compared with premenopausal women. Admittedly, and as Akter et al. suggested, the association was attenuated (odds ratio [OR] 1.16 [95% CI 1.004–1.33];  $P = 0.044$ ) when we included chronological age as a continuous variable in the multivariate-adjusted model.

If we conducted a stratified analysis, the age-adjusted OR for dysglycemia was particularly significant among women aged  $\geq 50$  years (OR 1.24 [95% CI 1.03–1.50];  $P = 0.022$ ). The age-adjusted OR for dysglycemia was 0.91 (95% CI 0.71–1.17) among women aged  $< 50$  years. However, importantly, we found that there was a significant positive effect of

an interaction between younger chronological age and the postmenopausal state on the presence of dysglycemia ( $P < 0.001$ ). This finding also supports the notion that the menopausal state among younger women would be an important factor for the presence of hyperglycemia; however, further studies would be needed to confirm our findings.

The first conclusion of our study was that the postmenopausal state was significantly associated with dysglycemia independently of normal aging, although the increased probability in postmenopausal women did not equal that in men (2). We mentioned that the prevalence of diabetes was reported to be lower in women than in men aged 60 years or younger, whereas women in their 60s and 70s were more likely to have diabetes than men of the same age based on data from the International Diabetes Federation and a study from China (3). While Akter et al. noted that “this may not be the case for the Japanese population” (1) based on the report of the 2010 National Health and Nutrition Survey in Japan, we could not totally agree with this point. In the survey, individuals with a high probability of having diabetes were identified according to data on

HbA<sub>1c</sub> or a self-reported history of clinician diagnosis without data on fasting glucose concentrations. As we mentioned, there has been an issue of age- and sex-specific prevalence of hyperglycemia according to fasting glucose and postprandial glucose concentrations (4,5). Data from the survey in Japan also indicated that the probability of diabetes among women was particularly elevated after the age of 60 years, but it is difficult to directly compare the prevalence rate of diabetes in our study to that of other reports. As our results were based on a cross-sectional analysis (2), further prospective studies should examine whether menopause itself would be an independent risk factor for the development of future type 2 diabetes.

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

### References

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