Applicability of homeostasis model assessment of insulin resistance to patients with hyperglycemia: reply to Kawada

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for the Fujiwara-kyo Osteoporosis Risk in Men Study Group

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Dear Editor,

We appreciate Dr. Kawada for giving us two queries on our article [1] concerning representativeness of the participants of our study for the general male population since their fasting plasma glucose (FPG) and serum lipid levels did not distribute normally, and applicability of the homeostasis model assessment of insulin resistance (HOMA-IR) to the participants including those with hyperglycemia.

For the first query, FPG and serum lipid levels of our study participants distributed log normally rather than normally indicated by the Shapiro–Wilk statistic which is known to have much greater statistical power than χ^2 test for goodness of fit. Although Dr. Kawada stated that FPG levels distributed normally from his experience, FPG values of men aged 60 years and older randomly selected from the Japanese population in the National Health and Nutrition Survey (NHNS) in 2010 [2] did not distribute normally according to the Shapiro–Wilk statistic ($p < 0.0001$). Furthermore, the prevalence of diabetes mellitus in our subjects was 17.9 % which was not significantly different from 19.5 % for males aged 60 years and older as reported in NHNS. Also, no significant difference was observed for FPG levels between the present study and NHNS. Although the subjects of the present study were volunteers from one area of Japan, which

was acknowledged as a limitation of the study, they may not be significantly different from the general population.

Second, we agree with Dr. Kawada on the limitation of HOMA-IR. As we wrote in the article, the associations between undercarboxylated osteocalcin (ucOC) and glucose metabolism indices were considerably attenuated when 176 participants on drug therapy for diabetes mellitus were excluded from the analysis and remained significant between ucOC and FPG or HbA1c and, therefore, not significant between ucOC and HOMA-IR. In addition, when we excluded 106 men whose FPG levels exceeded 140 mg/dl from the analysis, according to the opinion of Dr. Kawada, no significant association was observed between ucOC and HOMA-IR. Therefore, we admit that the result including participants with hyperglycemia was interpreted with caution. Because of limitations of HOMA-IR, we did not use it as the primary outcome of our study. The main result of our study was that ucOC was associated with glucose metabolism while carboxylated osteocalcin was not, and this did not alter even if the result using HOMA-IR was not significant.

Conflicts of interest None.

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