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LETTER TO THE EDITOR

Prevalence of prediabetes according to hemoglobin A1c versus fasting plasma glucose criteria in healthy adults

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Current American Diabetes Association Guidelines recommend either glycated hemoglobin (HbA_{1c}) or fasting plasma glucose (FPG) as screening tools for diagnosing diabetes mellitus [1]. However, there is conflicting evidence regarding the correlation between these two measures [2, 3]. This issue is particularly important in a population of young and healthy adults who will undergo repetitive screening examinations. We therefore aimed to evaluate the performance of both HbA_{1c} and FPG as tools to diagnose prediabetes in a large sample of young and healthy adults.

We conducted a cross-sectional analysis of healthy adults aged 25–41 years participating in a prospective cohort study [4]. Individuals with known diabetes, body mass index (BMI) >35 kg/m2, and prevalent cardiovascular disease were excluded such that a total of 1,542 participants remained in this analysis. Detailed information about the study methodology has been published previously [4]. Prediabetes was defined as an HbA_{1c} of 5.7–6.4 % and/or an FPG of 5.6–6.9 mmol/l [1]. Prediabetic individuals were classified as being diagnosed either by HbA_{1c}, FPG, or by both criteria. Multivariable logistic regression models among individuals with prediabetes were used to evaluate independent risk factors predisposing to a diagnosis of prediabetes with HbA_{1c} only.

Prediabetes was diagnosed in 477 (30.9 %) individuals (36.8 % among men, 25.8 % among women, $p < 0.0001$). The diagnosis was obtained by HbA_{1c} only in 381 (79.9 %), by FPG only in 47 (9.9 %) individuals, and by both tests in 49 (10.3 %) individuals. The Pearson's correlation coefficient between HbA_{1c} and FPG was 0.26. Individuals diagnosed by elevated HbA_{1c} only were more likely to be female (91.0 vs. 71.1 % among men, $p < 0.0001$), less likely to be obese (61.6 vs. 83.2 % among non-obese, $p < 0.0001$), and less likely to be hypertensive (65.8 vs. 82.8 % among non-hypertensives). Insulin and Homeostatic model assessment of insulin resistance (HOMA-IR) [5] levels significantly differed across the four groups (Fig. 1).

In multivariable logistic regression analyses, sex (OR 4.14, 95 % CI 1.81–9.45, $p = 0.0008$), past smoking (OR

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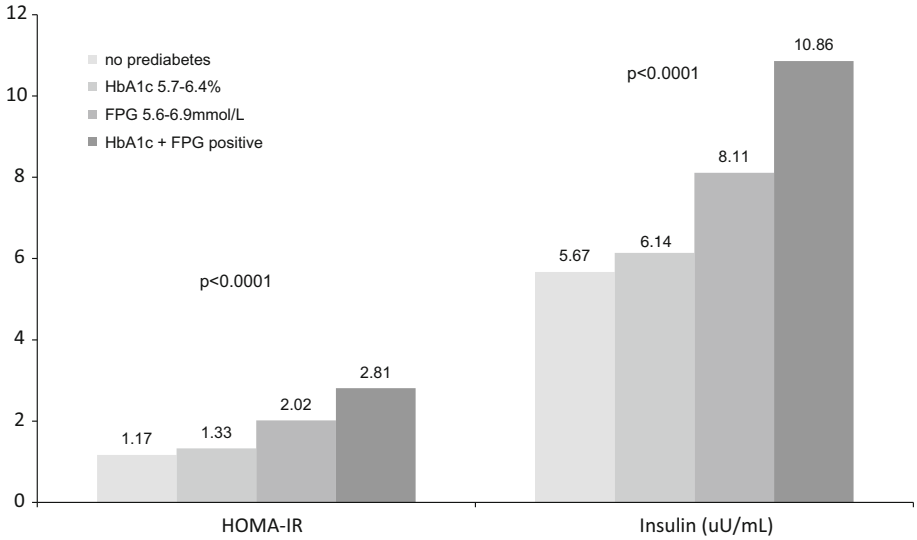

Fig. 1 Insulin levels and HOMA insulin resistance among prediabetic groups

0.47, 95 % CI 0.24–0.92, $p = 0.03$), alcohol consumption (OR 0.93, 95 % CI 0.87–0.99, $p = 0.03$), and HOMA-IR (OR 0.40, 95 % CI 0.29–0.56, $p < 0.0001$) were independent predictors for a diagnosis of prediabetes by HbA_{1c} criteria only.

In conclusion, the prevalence of prediabetes among young and healthy adults was highly dependent on the test used and was much higher using HbA_{1c} criteria, especially among women. The correlation between HbA_{1c} and FPG was modest. If confirmed, our findings may have important implications for screening recommendations in the population, and may lead to an increase in the prevalence of prediabetes in healthy adults. From a mechanistic perspective, our results suggest that those diagnosed by HbA_{1c} only have a lower insulin resistance than those diagnosed by an elevated FPG.

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Conflict of interest Jonas Blum, Stefanie Aeschbacher, Tobias Schoen, Matthias Bossard, Katrin Pumpol, Noé Brasier, Martin Risch, Lorenz Risch, and David Conen declare that they have no conflict of interest.

Human and Animal Rights disclosure All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Declaration of Helsinki 1975, as revised in 2008.

Informed consent disclosure Informed consent was obtained from all patients for being included in the study.

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