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Chinese migrants exhibit impaired postprandial lipaemia compared to Caucasian counterparts following both high fat and high carbohydrate test meals.

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People of Chinese ethnicity develop type 2 diabetes mellitus (T2DM) at a younger age and lower body mass index (BMI) than their Caucasian counterparts. Furthermore, Chinese migrants to Westernised countries have an increased risk of metabolic diseases compared to those in their country of origin[1,2]. We propose that this increased risk is due to a greater manifestation of metabolic abnormalities in response to altered diet and lifestyle behaviours. Although fasting lipaemia and glycaemia are commonly used to predict risk of CVD and T2DM, assessment of impaired postprandial metabolism has been found to be a more sensitive indicator of risk[3]. We hypothesised that Chinese migrants, at risk of T2DM, exhibit impaired postprandial lipid and lipoprotein metabolism compared to Australian-born Caucasian counterparts. Chinese and Caucasian adults at risk of T2DM were recruited to the study in which postprandial lipaemia and glycaemia were monitored following consumption of a high fat and high carbohydrate breakfast meal followed by a mixed, lunch meal. In a nonrandomised acute crossover trial, 15 adults (n = 8 Chinese and n = 7 Caucasian) aged ≥ 18 and ≤ 65 years at risk of T2DM (AUSDRISK score > 12 (median = 14.0, IQR = 3.0)), attended two postprandial test days separated by ≥ 7-day washout period. Test breakfast meals were isocaloric (3.6 MJ), high fat (46% energy from fat, 46% energy from carbohydrates) or high carbohydrate (74% E carbohydrates, 17.5% E fat). Blood samples were collected at baseline (fasting), 180 min and 360 min after consumption of the breakfast meal. The lunch meal (3.7 MJ, 18% E fat, 76% E carbohydrates) was consumed 240 min after baseline. Samples were analysed for lipaemia and glycaemia. Additionally, chylomicron-rich, and VLDL-rich lipoprotein fractions were isolated by sequential ultracentrifugation and chylomicron particle number (apolipoprotein (apo) B48), triacylglycerol (TAG), and total cholesterol were assessed in these fractions. Data were analysed using a mixed between-within-subject analysis of variance. There were no differences in age, and baseline anthropometric measures between groups, apart from the Chinese group exhibiting significantly lower waist circumference and BMI compared to the Caucasian group. There were no differences between groups in blood measures, apart from a higher total- and LDL-cholesterol concentration in the Caucasian compared to the Chinese group ($P<0.05$). Despite identical fasting TAG concentrations, the Chinese group, compared with the Caucasian group exhibited significantly elevated serum TAG and chylomicron-apo-B48 concentrations at 360 min following both test meals ($P<0.01$). All other postprandial measures were not different between groups. These findings show that despite having identical or improved fasting glycaemia and lipid profile, the Chinese group exhibited impaired postprandial lipid metabolism which may contributes to their increased risk of metabolic diseases.

Keywords: postprandial metabolism; ethnicity; cardiovascular disease

Ethics Declaration

Yes

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