Endocrine Abstracts (2023) 90 P60 | DOI: 10.1530/endoabs.90.P60

ECE2023 Poster Presentations Diabetes, Obesity, Metabolism and Nutrition

Diabetes and associated risk factors for cardiovascular mortality in Cuba: prospective study of 146,556 participants

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Background: Cardiovascular disease accounts for about one-third of all premature deaths (ie, age <70) in Cuba. Yet, the relevance of major risk factors, including diabetes, systolic blood pressure (SBP), and body-mass index (BMI), to cardiovascular mortality in this population remains unclear.

Methods: In 1996–2002, 146,556 adults were recruited from the general population in five areas of Cuba. Participants were interviewed, measured (height, weight and blood pressure) and followed up by electronic linkage to national death registries until Jan 1, 2017; in 2006–08, 24,345 participants were resurveyed. After excluding all with missing data, cardiovascular disease at recruitment, and those who died in the first 5 years, Cox regression (adjusted for age, sex, education, smoking, alcohol and, where appropriate, BMI) was used to relate cardiovascular mortality rate ratios (RRs) at ages 35–79 years to SBP, diabetes and BMI; RR were corrected for regression dilution to give associations with long-term average (ie, “usual’) levels of SBP and BMI.

Results: After exclusions, there were 125,939 participants (mean age 53 [SD12]; 55% women). Mean SBP was 124 mmHg (SD15), 5% had diabetes, and mean BMI was 24.2 kg/m^2 (SD3.6); mean SBP and diabetes prevalence at recruitment were both strongly related to BMI. During follow-up, there were 4112 cardiovascular deaths (2032 ischemic heart disease, 832 stroke, and 1248 other). Cardiovascular mortality was positively associated with SBP (>=120mmHg), diabetes, and BMI (>=22.5 kg/m2): 20 mmHg higher usual SBP about doubled cardiovascular mortality (RR 2.02, 95%CI 1.88–2.18]), as did diabetes (2.15, 1.95–2.37), and 10 kg/m2 higher usual BMI (1.92, 1.64–2.25). RR were similar in men and in women. The association with BMI and cardiovascular mortality was almost completely attenuated following adjustment for the mediating effect of SBP. Elevated SBP (>=120 mmHg), diabetes and raised BMI (>=22.5 kg/m2) accounted for 27%, 14%, and 16% of cardiovascular deaths, respectively.

Conclusions: This large prospective study provides direct evidence for the effects of these major risk factors on cardiovascular mortality in Cuba. Despite comparatively low levels of these risk factors by international standards, the strength of their association with cardiovascular death means they nevertheless exert a substantial impact on premature mortality in Cuba.

Keywords: Cuba, Cardiovascular, Diabetes, Body-mass index, Blood pressure.