Abstract
Twenty-Four-Hour Urinary Sodium and Potassium Excretion in Children and Young People: A Systematic Review and Meta-Analysis †

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Abstract: In children and other young people, diets high in sodium and low in potassium lead to increases in blood pressure and a higher risk of cardiovascular disease later in life. Our primary objective was to assess daily sodium and potassium intakes in children and young people aged 2–18 years from upper-middle and high-income countries, using gold-standard 24 h urinary sodium and potassium excretion studies. Secondary objectives were to assess: (1) the sodium-to-potassium molar ratio; (2) differences by gender, age, and geographical region; and (3) the sodium concentration in children’s diets. The following databases were searched to identify relevant studies published between 1998 and 2021: Cochrane Database of Systematic Reviews, Embase, Food Science and Technology Abstracts, Google Scholar, MEDLINE and Scopus. Data were pooled using random-effects meta-analysis, and meta-regression was used to quantify heterogeneity. A total of 2592 studies were identified, with 22 meeting the inclusion criteria (n = 5323, 48% girls; mean age 9.7 years). Mean 24 h urinary sodium excretion in boys was 2730 mg/d (95% CI, 2460–3001), potassium excretion was 1564 mg/d (95% CI, 1400–1728), and the sodium-to-potassium molar ratio was 3.2 (95% CI, 2.8–3.6). Corresponding values for girls were 2336 mg/d (95% CI, 2139–2534), 1428 mg/d (95% CI, 1300–1556), and 3.0 (95% CI, 2.6–3.4), respectively. There was a positive association between sodium and potassium excretion and the sodium-to-potassium ratio and age. Geographically, European and Oceanian participants excreted more potassium and had a lower mean sodium-to-potassium ratio than their Asian counterparts. Mean sodium intake in children as young as 5–6 years old exceeded the World Health Organization (WHO) upper limit of 2000 mg/d, while potassium intake was subpar. Public health monitoring, policies, and programmes to reduce dietary sodium and increase potassium intake are essential to protect the future cardiovascular health of children and young people.

Keywords: dietary sodium; dietary potassium; children and young people; meta-analysis

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