

Title: Salt intake, stroke, and cardiovascular disease: meta analysis of prospective studies

Authors: Strazzullo P., D'Elia L., Kandala N-B. & Cappuccio F.P.

Reference: British Medical Journal (2009); 339: b4567

Funding: None

Institutions: Federico II University of Naples; Italy; University of Warwick, Warwick Medical School, WHO Collaborating Centre for Nutrition; Coventry; United Kingdom

Citations: 381 (01/11/13) Google Scholar

Abstract:

Objective. To assess the relation between the level of habitual salt intake and stroke or total cardiovascular disease outcome.

Design. Systematic review and meta-analysis of prospective studies published 1966-2008.

Data sources. Medline (1966-2008), Embase (from 1988), AMED (from 1985), CINAHL (from 1982), Psychinfo (from 1985), and the Cochrane Library.

Review methods. For each study, relative risks and 95% confidence intervals were extracted and pooled with a random effect model, weighting for the inverse of the variance. Heterogeneity, publication bias, subgroup, and meta-regression analyses were performed. Criteria for inclusion were prospective adult population study, assessment of salt intake as baseline exposure, assessment of either stroke or total cardiovascular disease as outcome, follow-up of at least three years, indication of number of participants exposed and number of events across different salt intake categories.

Results. There were 19 independent cohort samples from 13 studies, with 177 025 participants (follow-up 3.5-19 years) and over 11000 vascular events. Higher salt intake was associated with greater risk of stroke (pooled relative risk 1.23, 95% confidence interval 1.06 to 1.43; P=0.007) and cardiovascular disease (1.14, 0.99 to 1.32; P=0.07), with no significant evidence of publication bias. For cardiovascular disease, sensitivity analysis showed that the exclusion of a single study led to a pooled estimate of 1.17 (1.02 to 1.34; P=0.02). The associations observed were greater the larger the difference in sodium intake and the longer the follow-up.

Conclusions. High salt intake is associated with significantly increased risk of stroke and total cardiovascular disease. Because of imprecision in measurement of salt intake, these effect sizes are likely to be underestimated. These results support the role of a substantial population reduction in salt intake for the prevention of cardiovascular disease.

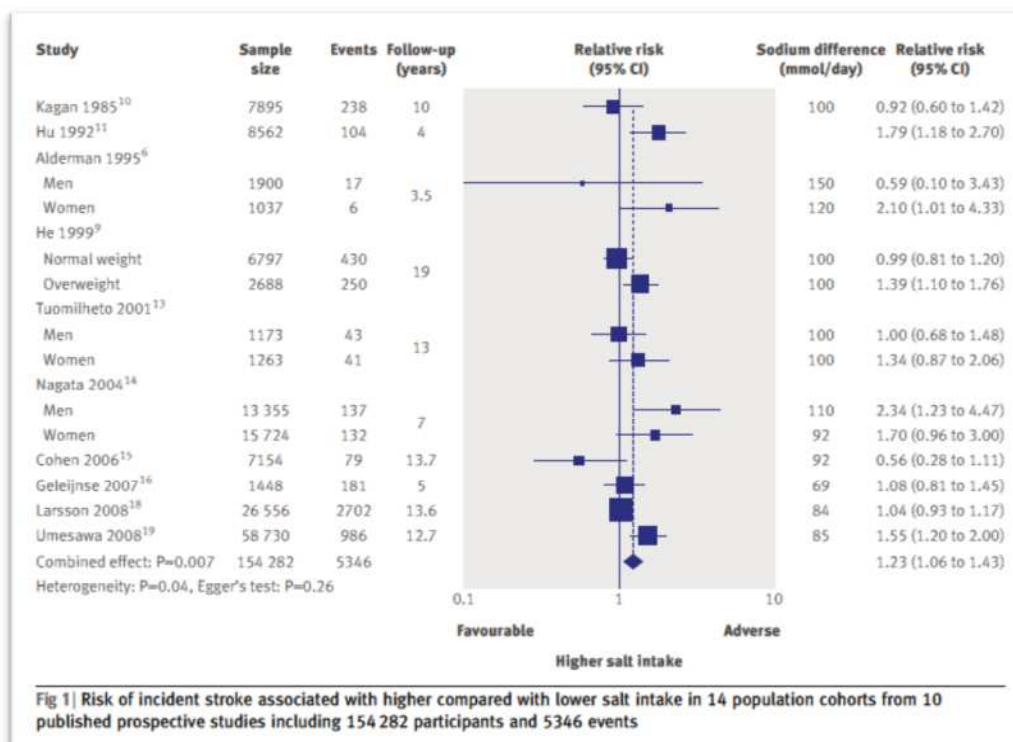


Fig 1 | Risk of incident stroke associated with higher compared with lower salt intake in 14 population cohorts from 10 published prospective studies including 154 282 participants and 5346 events