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Research Article

Emphasized warning reduces salt intake: a randomized controlled trial

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Abstract

Excessive salt intake is a major cardiovascular risk factor. At variance to the developed countries, the main source of sodium in transitional and developing countries is salt added while cooking and/or at the table. The objective of this trial was to examine the impact of warning labels placed on home salt containers on daily salt intake.A sample of treated hypertensives (n = 150) was randomized in two subgroups, one receiving just a leaflet about the harmful effects of excessive salt intake (control; n = 74), and the other one receiving in addition warning stickers for household salt containers (intervention; n = 76). Arterial blood pressure (BP) and 24–hour urinary sodium excretion (Na24) were measured in all the subjects at the start of the trial, and 1 month and 2 months later. The average starting Na24 was 207 ± 71 mmol in the control group and 211 ± 85 mmol in the intervention group ($P = .745$). One month and 2 months later, a significant decrease was observed in the intervention group (to 183 ± 63 mmol and 176 ± 55 mmol; $P < .0001$), as opposed to the control group (203 ± 60 mmol and 200 ± 58 mmol; $P = .1466$). Initial BP was 143.7/84.1 mm Hg in the control, and 142.9/84.7 mm Hg in the intervention group ($P = .667$). One month and 2 months later, a significant drop in BP, by 5.3/2.9 mm Hg, was observed in the intervention group as opposed to the control group (0.4/0.9 mm Hg). Decrease in Na24 positively correlated to BP lowering ($r^2 = 0.5989$; $P < .0001$). A significant reduction in 24Na and BP is achieved with warning labels on harmful effects of excessive salt intake. Decreasing daily salt input by 35 mmol may result in an extra BP lowering by some 5–6/2–3 mm Hg. J Am Soc Hypertens 2015;9(3):214–220.

Keywords: Arterial hypertension; blood pressure; salt consumption; sodium.

Introduction

The worldwide prevalence of arterial hypertension in adult populations is about 30%, representing a major public health problem.[1] Excessive salt (NaCl) intake is a leading cardiovascular risk factor, enhancing, in particular, blood pressure (BP) elevation.[2–4] Moreover, immoderate NaCl intake is also related to osteoporosis, obesity, albuminuria, and gastric cancer.[5–11] Reduction in salt consumption does not only improve the prevention and management of arterial hypertension, but offers a number of additional health benefits.[2,4,12–15] The World Health Organization recommends daily salt intake below 5 g, while the daily consumption in the world averages 10–13 g.[16] Therefore, many campaigns have been launched aimed at moderating salt ingestion.[17–21] It is estimated that reduction in daily NaCl intake by mere 3 g would reduce the worldwide number of strokes by 32,000–66,000, and heart attacks by 54,000–99,000, with a decrease in total mortality by 44,000–92,000, and consequent annual savings of 10–24 billion US $.[22]

The first step in salt intake reduction is identification of its sources. In developed countries, salt intake is mainly derived from industrial, processed food, which is responsible for about 75% of the daily intake.[16,23] Therefore, most current interventions aim at salt reduction in manufactured foods. In other, less developed countries, the main NaCl source is in adding salt during home cooking procedures, amounting to 72% in China, 76% in Brazil, and 80% in Korea.[24–27] Available data for southern Europe are similar: in Croatia, most salt, 56.4%, is introduced

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Figure 1. Our warning label on a salt shaker, stating (in Croatian language) "Too much salt is a health hazard."

during cooking and by additional seasoning, followed by grocery bread, 29.8%, and other bakery products, 12.8%,[27] with an average daily intake of 11–13 g.[28,29] Consequently, in transitional and developing countries, salt intake must be primarily curtailed at the level of cooking and adding at the table.

Our hypothesis was that placing particularly designed warning stickers about harmful effects of excessive salt on household containers (salt shaker, household salt containers, spicy dietary supplements with high NaCl content) might considerably reduce its daily intake. When adding salt during cooking procedures or in spicing a meal, the consumer is exposed to continuous and repeated warning about the risk. Potential advantages of this strategy are: (1) a clear message about the harmful effects, given at the right moment (reaching for salt while cooking or adding at the table); (2) long–term, self–reinforcing message (over several months); (3) all family members exposed to the warning; and (4) low cost of the intervention.

After many consultations with health professionals, designers, psychologists, and social workers, we have developed a simple, self–adhesive warning label (Figure 1). In the available literature, we have found no study on the impact of such labeling, and the effectiveness of this approach is unknown.

Methods

The participants in this study were all consecutive adult, treated hypertensives of either gender, registered in a family medicine practice in Mostar, Bosnia and Herzegovina. The sample size was determined using the Sample Size and Power Calculation program, version 1.02, based on a pilot study resulting in a mean urinary sodium excretion in 24 hours (Na24) of 200 $\pm$ 60 mmol, and on the presumed Na24 reduction by $\geq$25 mmol; for the power of 0.8 and a P value of $<$0.05, each of the two groups had to have at least 60 subjects.

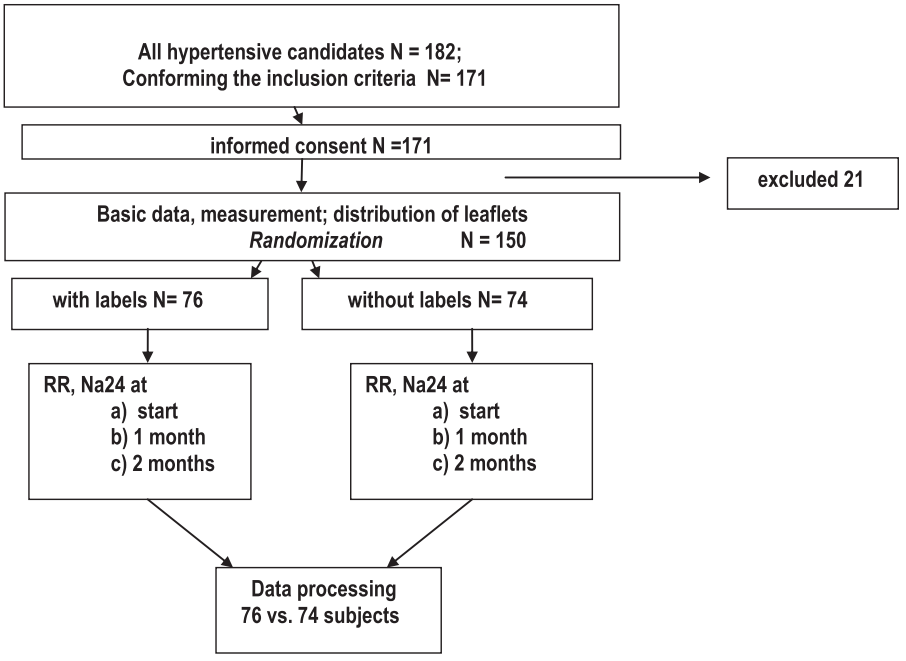

Figure 2. The study flow chart.