

How much salt is too much salt?

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Introduction

The overall prevalence of hypertension in Turkey's adult population is 21.4% and reaches a maximum of 43.3% in patients aged >65 years (1). The SALTURK study reported that Turkey's salt consumption averages between 14.8 and 18.1 g per day (2, 3). This leads to a simple question, how much salt is too much salt?

Guideline recommendations

The American Heart Association (AHA) recommends a daily salt intake of <3.75 g for the general population (4). This indicates that the average Turkish citizen's salt consumption is more than five times higher than the amount AHA recommends. Therefore, salt consumption is high in Turkey by any standards. However, before we embark on a massive anti-salt campaign, we need to verify the evidence regarding the AHA recommendations, i.e., what is the scientific evidence that healthy people, young and old, men, women, and children should consume less than 3.75 g salt or 1.5 g sodium per day? The AHA's recommendations regarding salt restriction are based on multiple well-established observations such as salt increases blood pressure (BP), and high BP is known to cause cardiovascular disease. However, the AHA's recommendation of 3.75 g per day is arbitrary, as are most dietary recommendations. Other institutions, such as WHO and European Society of Cardiology, recommend sodium intake of 2.0-2.5 g per day (5, 6). However, it does not necessarily mean that lowering BP by eating less salt will consistently decrease the risk of heart disease, regardless of whether you are hypertensive or have normal BP, whether your salt consumption is excessive, moderate, or even low. In the US, we have observed a drastic reduction in cardiovascular disease over the past decades (7). However, the average American continues to consume about 9 g of salt daily, (approx-

mately half of that an average Turk's salt intake) an amount that has not changed in years despite the reduction in heart disease. Conceivably, a reduction in dietary sodium may prove beneficial in high salt eaters who also have high BP. However, in people with normal BP, lowering salt intake has little, if any, effect and may even be harmful when becoming too severe (8).

Salt and life expectancy

Of note, with an average lifespan of 87.3 years, women in Hong Kong have the highest life expectancy worldwide despite an average salt intake of 8–9 g per day (9). A cursory look at 24-h urinary sodium excretion and healthy life expectancy at birth in 181 countries, adjusted for potential confounders, seems to indicate that salt intake, except possibly when extremely high, may actually prolong lifespan, contrary to expectations (Fig. 1) (10).

Additionally, we assessed mortality and found an inverse correlation between salt intake and all-cause mortality. Our observation of salt consumption directly correlating with life expectancy and inversely with all-cause mortality worldwide argues against dietary sodium intake being the reason of decreasing life expectancy or being a risk factor for premature death. Importantly, however, these data are observational and represent estimated averages for individual countries. Clearly, they should not be used as a base for nutritional recommendations.

Sodium and potassium

Of interest are the recent data of O'Donnell et al. (11) who evaluated the joint association of sodium and potassium urinary excretion (as surrogate measures of intake) with cardiovascular events and mortality in 18 high-, middle-, and low-income countries. The authors documented that the combination of moderate sodium intake (3-5 g/day) with higher potassium intake is

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Accepted Date: 30.05.2019

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DOI:10.14744/AnatolJCardiol.2019.37657



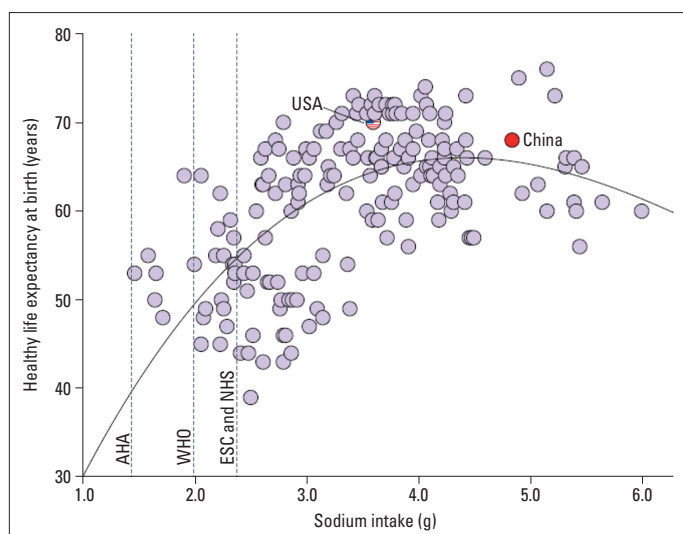


Figure 1. Age-standardised estimated sodium intake and healthy life expectancy at birth in 182 countries. Data are from Powles and colleagues⁷ and UN Data.⁸ Dotted lines show recommended daily intake thresholds.

AHA - American Heart Association; ESC - European Society of Cardiology; NHS - UK National Health Service

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associated with the lowest risk of mortality and cardiovascular events. The J-shaped association of sodium intake with mortality and cardiovascular events does not support the current WHO recommendation to consume low sodium diets (<2.0 g/day). In contrast, the association of potassium excretion and mortality or cardiovascular risk is inverse and linear. Importantly, therefore, a higher potassium intake attenuated the increased cardiovascular risk associated with high sodium intake. Not surprisingly, cardiovascular risk with high sodium intake was most prominent in subjects with low potassium intake.

Specific aspects for Turkey

Hidden sources of salt

Red pepper [Marash Biber, Urfa Biber, Aleppo Biber (Fig. 2)] is extensively used in the Turkish cuisine; it is also found in small bowls on most dining tables. Traditionally and unbeknownst to most consumers, salt (and sunflower oil) is generously added to the chilies to keep the mixture slightly moist. Thus, in Turkey, pepper is a substantial source of sodium, whereas in other countries, it is completely free of salt. The same holds true for Ayran, which may contain up to ten times more salt than regular yogurt.

Conclusion

Hypertensive or not, there is no doubt that overall salt consumption is too high in Turkey. It is off the chart compared with that in most other countries. Surprisingly, in limited surveys, stroke rates are only moderately increased in Turkey, perhaps



Figure 2. Pepper in Turkey—a substantial source of sodium

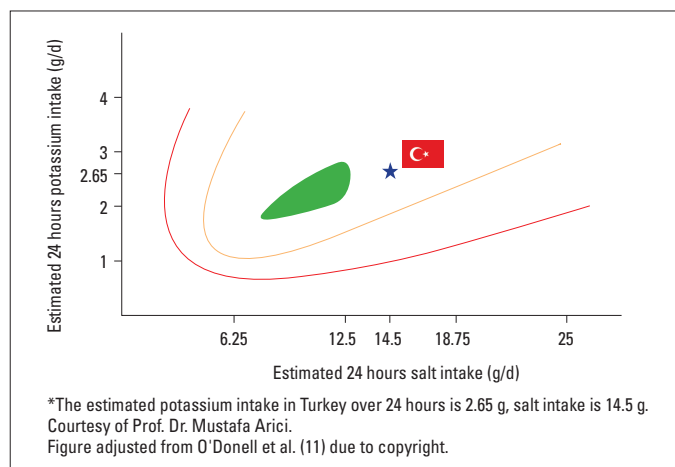


Figure 3. Interplay between sodium and potassium intake and outcome

because of potassium-rich food as suggested by the provocative manuscript by O'Donnell et al. (11). The Turkish cuisine is rich in vegetables (such as eggplants, peppers, onions, lentils, beans, zucchinis, and tomatoes), nuts (such as pistachios, almonds, hazelnuts, and walnuts), and fruits (such as melons, apricots, and grapes), all of which are exceedingly high in potassium (Fig. 3).

This, together with other ingredients in the Mediterranean diet, may well mitigate some of the damage done by an excessive salt intake. Regardless, we still believe too much salt is too much salt, even in Turkey!

Conflict of interest: Franz H. Messerli, MD currently has financial relationships with the following entities: WebMD, American College of Cardiology, Lancet, Pfizer, Menarini, Sandoz, Boehringer, Medtronic, Novartis.

Peer-review: Internally peer-reviewed.

Authorship contributions: Concept – B.N.W.; Design – A.N.; Supervision – F.H.M.; Funding – B.N.W.; Materials – A.N.; Data collection &/ or processing – A.N.; Analysis &/or interpretation – F.H.M.; Literature search – B.N.W.; Writing – F.H.M.; Critical review – F.H.M.

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