Salt intake reduction strategies in the Eastern Mediterranean Region

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Abstract

Background: The high burden of noncommunicable diseases (NCDs), particularly cardiovascular diseases (CVDs), in countries of the Eastern Mediterranean Region requires an immediate public health attention. The World Health Organization (WHO) has recommended salt reduction as a "best buy", recognizing it as one of the most cost–effective approaches in preventing NCDs and reducing CVDs and medical costs.

Aim: In the context of the global target to reduce salt intake by 30% by 2025, the objective of this review is to present an up-to-date overview of the current salt reduction initiatives in the Region by highlighting regional and national policies, strategies, and activities that aim at characterizing and/or reducing the intakes of dietary salt.

Methods: This review details the WHO policies and strategies which address salt reduction in the WHO Eastern Mediterranean Region.

Results: The high intake levels of sodium in the countries of the Region are emphasized. The policies and strategies in place to address this situation are described, however, there is a need for more data on intake levels.

Conclusions: There are a number of salt reduction initiatives currently being undertaken in the countries of the Region. The WHO should continue to play a key role in providing evidence-based tools for the planning, implementation, and surveillance of national salt reduction initiatives.

Keywords: salt intake/reduction, policies and strategies, cardiovascular disease, Eastern Mediterranean Region

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Introduction

The global burden of noncommunicable diseases (NCDs) represents a major public health challenge, compromising social and economic development throughout the world (*1*). According to the World Health Organization (WHO), NCDs have caused approximately 38 million deaths per year since 2012, representing 68% of worldwide mortality (*2*).

In the Eastern Mediterranean Region, it is estimated that NCDs account for over 50% of annual deaths (2.2 million deaths) and 60% of the disease burden (*3*). It is projected that deaths from NCDs will increase by 25% in the Region, recording the second highest projected increase among the 6 WHO regions (*3–5*). More specifically, the prevalence of cardiovascular diseases (CVDs) is rapidly growing, constituting the main underlying causes of morbidity and mortality in countries of the Region (*6,7*). In fact, it is estimated that 55% of mortality from NCDs is attributable to CVDs, with deaths due to CVD ranging from 49% in Oman to 13% in Somalia (*8*).

High blood pressure is recognized as a major underlying risk factor for CVDs (*9*). According to WHO, it is estimated that 62% of all strokes and 49% of coronary heart disease events are secondary to high blood pressure (*10,11*). In addition to other lifestyle factors and eating habits that may affect blood pressure, the evidence indicates a direct relationship between sodium intake and elevated blood pressure (*12,13*).

The major source of dietary sodium (95%), other than in countries which use plentiful amounts of monosodium glutamate as a flavour enhancer, is salt (*14*). It has been reported that excess salt intake may be responsible for approximately half of the disease burden ascribed to high blood

pressure (*15*). Accumulated evidence suggests that modest reductions in dietary salt may reduce blood pressure in all age groups, protect against serious vascular complications and considerably decrease cardiovascular events (*10,14,16,17*). Even a small decrease in salt intake levels (1 g/person/day) will lower stroke and heart attack deaths by more than 7% (*18*). A meta-analysis of 36 studies from several countries found that, reducing sodium intake by a mean of 1.74 (±0.58) g/day resulted in a decrease in average resting systolic blood pressure of 3.4 mmHg and a decrease in resting diastolic blood pressure of 1.5 mmHg (*14*). More premature deaths and disability can be averted by reducing the average blood pressure of a population than by simply focusing on reducing the salt intake of those with overt hypertension (*5,14*).

WHO key measures to reduce salt consumption at the population level include (*4,5,15*):

- identification of the baseline level of population sodium/salt intake and the main foods contributing to this intake;
- setting a national target for sodium/salt intake in line with the global target as part of a national multisectoral salt reduction plan;
- establishing sodium reduction targets for each category of food, prioritizing the ones that contribute most to population intake;
- working with food manufacturers to progressively reduce sodium/salt incrementally in their products, in line with agreed food group targets; working with restaurants and catering services to reduce the addition of salt during meal preparation;
- establishing consumer-friendly nutrition labelling regulations that include sodium;
- considering fiscal tools to encourage the production and consumption of foods with a reduced sodium content;
- establishing policies for food procurement in public institutions that encourage the purchase of products with lower sodium content;
- establishing national food-based dietary guidelines that incorporate sodium reduction;
- implementing information campaigns to raise consumer awareness of the need to reduce salt intake, and social marketing to impact on consumers' behaviour;
- creating an enabling environment for salt reduction through local policy interventions and promotion of "healthy food" in settings such as schools, workplaces, communities and cities;

- monitoring population sodium intake, sodium content of manufactured products, sources of sodium/salt in the diet, and consumer knowledge, attitudes and behaviours relating to the consumption of products containing sodium/salt, in order to inform policy.

The cost–effectiveness of salt reduction strategies has also been highlighted. According to a recent study conducted in the United States of America, a 3 g reduction in daily salt consumption was associated with a decrease in annual healthcare cost by US$ 10 billion to US$ 24 billion (*10,17*). Similarly, in the United Kingdom it was estimated that for a total campaign cost of £15 million to reduce daily salt intake, £1.5 billion per year would be saved in health care costs (*7*).

Acknowledging the strong body of evidence linking high salt/sodium intake with increased NCD risk, the upper limit for sodium intake has been set at 2300 mg/day (close to 6 g of salt per day) by the Institute of Medicine (*19*). A joint report by WHO and the United Nations Food and Agriculture Organization recommended in 2003 a reduction of sodium intake at the population level to no more than 2000 mg/day (5 g of salt per day) (*20*). In 2013, these recommendations were updated, confirming a salt intake limit of 5 g/day for the adult population (*14*), with downward adjustments being recommended for children based on their lower energy requirements (*14*).

Given this evidence, and the fact that population-based strategies in some countries, such as Finland and the United Kingdom, have led to marked reductions in blood pressure levels and in deaths from strokes and ischaemic heart disease, WHO designated population salt reduction as one of the "best buys" for having a major impact on the health of a country. Action on salt reduction was emphasized by WHO as part of the implementation of the Global Strategy on Diet, Physical Activity, and Health (*21*) and the 2008–2013 Action Plan for the Global Strategy for the Prevention and Control of NCDs (*22,23*). The implementation of this strategy comprised technical meetings on the creation of environments that foster the reduction of salt intake (*24*) as well as the assessment and monitoring of population salt consumption and major dietary sources (*24*). The WHO 2010 Global Status Report on NCDs recommended decreased salt intake and salt content of food as cost–effective measures that should be adopted immediately (*4*), a position that was endorsed in 2011 by the Political Declaration of the United Nations High Level Meeting on NCDs (*25*). This was followed by the development and adoption of the Global Monitoring Framework and Voluntary Global Targets for the Prevention and Control of NCDs in

which Member States committed to a 30% relative reduction in mean intake of salt among populations by 2025 (*25*). In addition, another target for 2025 was endorsed by the United Nations General Assembly, which aims at a 25% relative reduction in the prevalence of raised blood pressure (defined as systolic and/or diastolic blood pressure ≥ 140/90 mmHg) or overall mortality from NCDs (*26*). In the Eastern Mediterranean Region, where 25% of the adult population is hypertensive (*10*), and where more than half of the mortality from NCDs is attributed to CVDs (*8*), there is a crucial need for population-based strategies aimed at reducing salt intake and the incorporation of such strategies within the priority national agendas.

The objective of this review is to present an up-to-date overview of the current salt reduction initiatives in the Region by highlighting regional and national policies, strategies, and activities that aim at characterizing and/or reducing the intakes of dietary salt in countries of the Region.

WHO policies and strategies to address salt reduction in the Eastern Mediterranean Region

Implementation of regional strategies

At the Eastern Mediterranean Region level, the Regional Committee in its 59th and 60th sessions in October 2012 and October 2013 adopted 2 resolutions (EM/RC59/R.2 and EM/RC59/R.4) concerning the implementation of the Political Declaration. A regional framework for action was developed to implement the Political Declaration, incorporating a set of strategic interventions including salt reduction (*27*). Similarly to all the other regions, the Eastern Mediterranean Region will need to report on progress in meeting the global targets to the UN General Assembly in September 2018.

Following these developments, the WHO Regional Office for the Eastern Mediterranean Region convened a series of multi-stakeholder technical meetings focusing on population salt reduction strategies that culminated in:

- developing policy guidance with recommended actions for Member States to lower national salt intake and death rates from high blood pressure and stroke in the Eastern Mediterranean Region; the policy goal is “a progressive and sustainable reduction in national salt intake in the next 3–4 years by 25% to reduce stroke and heart disease rates within 5 years”;

- setting up a regional monitoring mechanism to monitor progress and maintain accountability for results at the national and regional levels;
- developing and publishing the regional protocol on 24-hour urinary sodium and iodine measurements, to be used as a guide to support research efforts in the Region;
- supporting a network of regional research institutions—in Egypt, Islamic Republic of Iran, Jordan, Lebanon, Morocco, Tunisia, and United Arab Emirates—to conduct 24-hour urinary sodium excretion measurements to assess dietary sodium intakes;
- integration of salt reduction and salt iodization by ensuring the recommended salt consumed is iodized, including the salt used in food processing or cooking (*23*).

Current levels of sodium intake in countries of the Eastern Mediterranean Region

The gold standard in the assessment of dietary sodium intake is the measurement of urinary sodium excretion over a 24-hour period for a representative population sample (Figure 1). This approach has been adopted by several countries in the Eastern Mediterranean Region (*28–34*). Preliminary results suggest that, among adults, the highest sodium intake levels are found in Jordan for both males and females (4.1 g/person/day), while Lebanon recorded the highest sodium intake for males (4.8 g/person/day) and the Islamic Republic of Iran the highest intake for females (3.9 g/person/day) (*29*,*30*,*34*) (Figure 1). Lower estimates were reported from Saudi Arabia, Morocco (*32*,*33*), and the United Arab Emirates (*29*). Few studies have assessed intakes in children; in the Islamic Republic of Iran, a study conducted on 374 healthy children and adolescents aged 11–18 years old showed that 31.3% were in the highest tercile of sodium intake, with a mean of 5.86 g/day (*35*).

Several countries in the Region have also conducted dietary assessment studies in their attempts to evaluate the population's sodium intake (Figure 2) (*36–42*) (Nasreddine LN, et al. Intakes and sources of sodium in Lebanon: findings from a national study. American University of Beirut; 2009, unpublished report). It must be noted, however, that the dietary assessment of sodium intake may be subject to several sources of error. One of the biggest challenges for the assessment of sodium intakes based on dietary assessment tools is the availability of up-to-date, culture-specific salt, and/or sodium food composition tables. Indeed, the food composition estimates are rarely, if ever, based on actual analysis, and are often based on data from other countries, which may also be outdated. In addition, dietary assessment may be subject to recall

bias and inaccuracies in the estimation of portion size; the validity of the instruments used for assessing the intake of sodium is often a limiting factor for countries of the Region (*43*). Among adults, the highest sodium intakes were documented in Jordan (6.5 g/person/day) and Bahrain (5.3 g/person/day in males; and 3.7 g/person/day in females) (*36*,*39*) (Figure 2). High sodium intakes were also reported from Tunisia (4.3 g/person/day among males) (Figure 2).

The observed inter-country discrepancies in dietary sodium intakes may be explained by differences in study design, targeted age group, dietary assessment methods, and the type of food composition database adopted for sodium intake estimation, among other factors. These intake values may only be approximate, but they do illustrate that sodium intakes are far too high in Eastern Mediterranean Region countries.

Based on a Bayesian estimation model, Powles et al. published a systematic analysis of sodium intake levels worldwide, based on reported 24-hour urinary sodium excretion and dietary surveys (Figure 3) (*44*). Sodium intakes in countries of the Middle East and North Africa region were high, ranging between 2.1 and 5.4 g/person/day (equivalent to 5.25–13.5 g/person/day as salt) and exceeding the levels reported from North America, Western Europe, Australia, sub-Saharan Africa and Latin America. Based on this study, the Eastern Mediterranean Region countries with the highest levels of sodium consumption were Bahrain, Islamic Republic of Iran, Jordan, Libya, Morocco, Qatar, Syrian Arab Republic and Tunisia. The lowest intakes were reported for Djibouti, Somalia and Sudan, The average estimated sodium intake for the Region was 3.9 g/person/day (9.75 g/person/day as salt) (*44*), which is almost double the maximum intake level recommended by WHO.

The high intake of salt in countries of the Region is of concern given the association between salt/sodium intake and elevated blood pressure. The impact of high sodium intake on the prevalence of hypertension and CVDs in the Region may be further compounded by the inadequate dietary practices among Eastern Mediterranean populations. In fact, it is acknowledged that the blood pressure raising effects of sodium may be counteracted to some extent by increasing the intake of potassium (*45*,*46*) and maintaining a moderate intake of fat (*46*). However, dietary studies conducted in the Region showed that, as the nutrition transition unfolds, the consumption of potassium-rich foods such as wholegrain unsalted cereals, fruits and vegetables is decreasing, while the consumption of total fat, refined grains and high energy,

nutrient-depleted foods is on the rise (*47*). Increases in body weight and adiposity, which are hallmarks of the nutrition transition, may also be contributing to further increases in blood pressure in countries of the Region (*48,49*).

Sources of sodium intake in countries of the Eastern Mediterranean Region

Studies conducted in the Region have also attempted to identify the major dietary contributors to sodium intake. Available data highlight bread and dairy products as major sources. For instance, in Lebanon, the major dietary contributors to sodium intake among adults were found to include bread (25%), processed meat (12%) and dairy products (10%) such as cheese and *labneh* (strained yogurt) (*34*). In Bahrain, the main dietary contributors were bread and rice, followed by dairy products (*50*) and in Morocco, the main contributors included cereals and cereal-based products, followed by spices and condiments, and milk and milk products (*33*). In Oman, the major sources of sodium in the diet were reported to include salted fish, canned tomato paste, sausages and eggs (*34*). In the Islamic Republic of Iran, the top sources of sodium included table and cooking salt, followed by grains, cheese, vegetables and other dairy products (*51*).

Scaling up national progress

Based on the policy guidance and recommended actions for salt reduction, many countries of the Region are currently taking active steps towards developing and/or implementing national initiatives and strategies to decrease salt intake among the population.

Kuwait is gradually reducing the salt content of bread through its public bread supplier, which provides the majority of the bread in the market. In 2013, salt content of bread decreased by 20%, achieved by 10% reduction in the first 6 months, followed by another 10% reduction in the last 6 months of the year. This is an important public health achievement. Moreover, Kuwait is currently revising its salt standard for cheese and is establishing national targets to limit the salt content of 13 types of the most commonly consumed cheeses.

Qatar has reduced the salt content of bread produced by its main public bread supplier (which has a one-third market share) by 20% since early 2014. This reduction has already been achieved among the main bakeries of the country, and some other bakeries are currently in the pilot phase. The salt reduction strategy in Qatar relies on testing the level of salt in bread samples based on the original recipes and working with the bakeries to gradually reduce the level in samples that

contain more than 0.8% salt. The Ministry of Health is monitoring the implementation to ensure sustainability of salt reduction in the country. An additional 10% reduction in salt content of bread is planned for the end of 2017.

The Islamic Republic of Iran has adopted legislation on salt reduction in a number of products, including establishing maximum levels of salt in highly consumed canned foods such as tomato paste and in salty snacks.

Other Member States have prepared legislation on salt reduction (e.g. Jordan and Oman) and/or revised existing legislation to develop benchmarks for salt content of highly consumed foods such as cheese (e.g. Jordan and Kuwait). In others (e.g. Egypt, Islamic Republic of Iran, Jordan, Kuwait, Oman, Qatar and Tunisia), multisectoral national committees have been established, with the authority to strategize and monitor implementation of salt reduction activities. Morocco conducted an awareness campaign for bakers (involving 300 bakeries) in the region of Grand Casablanca in 2014 (70% of these bakers committed to implement the programme of salt reduction in bread). They conducted a national survey to assess salt intake at national level in 2016. Oman also reviewed the food standards where the benchmark for salt content in bread was set at 0.5 g/100g bread. In Lebanon, the Lebanese Action on Sodium and Health (LASH) group was established in February 2012 (*52*). The main work of LASH focuses on the assessment of salt intake and sources, and improving salt-related knowledge, while also establishing collaborations with the ministries to reduce the amount of salt used in traditional bread.

In summary, different countries are currently at different stages in the development and/or implementation of salt reduction initiatives. National initiatives include the establishment of national committees or working groups, the engagement of the government in salt reduction initiatives through regulatory measures and legislation (e.g. Bahrain, Islamic Republic of Iran, Jordan, Oman, Palestine and Qatar,), the specification of the food categories prioritized for action such as bread and canned foods, the development of national benchmarks and targets (e.g. Bahrain, Islamic Republic of Iran and Oman have salt targets), the development of dietary guidelines (e.g. Afghanistan, Lebanon, Oman, Palestine, Saudi Arabia, and Tunisia), the use of the media to raise consumer related awareness (e.g. Lebanon and United Arab Emirates), the use of labelling as an approach to highlight high salt (e.g. Gulf Cooperation Council countries and Islamic Republic of Iran), the development of collaborative action involving the food industry

and/or restaurants and food caterers (e.g. Kuwait, Morocco, Qatar, Tunisia and United Arab Emirates), and the monitoring and evaluation of sodium intakes and the regular generation of data on salt content of foods (e.g. Islamic Republic of Iran, Lebanon, Oman and Qatar).

The way forward

Implementation measures pertinent to salt reduction should be occurring in all countries of the Region and should be guided by a national multisectoral strategy and plan to reduce population salt intake. Compliance monitoring by Member States is a priority, with an agreed set of actions to scale up interventions and measure their impact at both, national and regional levels, while sharing evidence on what really works in our Region. Engagement of civil society, youth, and the media is essential, particularly in building awareness and advocacy efforts around salt reduction and policy impact measurement. Based on the technical consultations and feedback from Member States, WHO is currently working on a series of steps to support countries in adopting other cost–effective measures, such as developing guidance on legislative approaches to salt reduction, front of pack labelling, mass media campaigns, and examining evidence of how best to implement taxes on excessively salted foods based on international experiences of the effectiveness of such measures. The WHO also intends to generate evidence on the economic cost of salt reduction and advice on how to address the technological barriers and food safety concerns related to producing quality bread with a low salt content.

To this end, WHO has developed a general framework of action and tools to help Member States to create a successful salt reduction strategy. These tools identified 5 major areas of interventions (*24,25,53*).

- *Surveillance to measure and monitor salt use:* WHO offers a variety of tools for monitoring and evaluating salt reduction interventions, including various methods for qualitative and quantitative assessment of a policy, as well as its cost–effectiveness. There are 3 key stages in monitoring a salt reduction programme.

  – <list2>Measure and monitor population salt consumption patterns.
  – Measure and monitor the sodium content of food.
  – Monitor and evaluate the impact of the salt reduction programme.

- *Harness industry to promote reformulation of foods and meals to contain less salt:* promoting the reformulation of food products involves developing a clear set of criteria or targets for salt levels in foods in order to provide a benchmark for the food industry to achieve. These targets can be met through either voluntary or legislative approaches, e.g. adopting, regulatory measure such as taxes on high salt foods, and labelling and communication strategies which can encourage the food industry to reformulate.
- *Implement standards for effective and accurate labelling and marketing of food:* effective labelling can help consumers understand the salt content of foods quickly and easily.
- *Educate and communicate to empower individuals to eat less salt:* raising awareness of the health impact of high salt consumption and the major sources of sodium in diets will influence consumer behaviour and increase demand for lower-salt food products, a key objective of a sustainable reduction in salt consumption. Successful education and communication strategies can lead to changes in social norms related to salt in foods, increased demand for healthier lower-salt products, and consequently improvements in overall health for individuals and communities.
- *Create healthy environment and support settings to promote a healthy diet:* a number of approaches have been successful in reducing the levels of salt in food served in schools, workplaces and other institutional settings. As with children in schools, most adults now spend the vast majority of their time in the workplace. Therefore protecting and promoting health in these settings, including lowering salt intake, is critical.

Several core elements which bridge salt reduction strategies ensure its success. These cross-cutting areas include political commitment, programme leadership, partnerships, advocacy and integration with iodine deficiency elimination programmes.

Conclusion and recommendations

Available evidence emphasizes the high intake levels of sodium in the countries of the Eastern Mediterranean Region while also highlighting the need for more data on intake levels. This review also underlines the wide spectrum in salt reduction initiatives that are currently being undertaken in countries of the Region. It is recommended that countries that have been able to carry out surveys to determine the main dietary contributors and sources of salt in their populations serve as examples for neighbouring countries that have yet to undertake such

investigations. Member States are encouraged, using baseline data on food composition and the contribution of various food groups to salt intake, to establish clear product-specific targets. The WHO should continue to play a key role in providing evidence-based tools for the planning, implementation and surveillance of national salt reduction initiatives.

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