



## Research report

# Barriers for progress in salt reduction in the general population. An international study ☆☆☆



R.S. Newson<sup>a</sup>, I. Elmadfa<sup>b</sup>, Gy. Biro<sup>c</sup>, Y. Cheng<sup>d</sup>, V. Prakash<sup>e</sup>, P. Rust<sup>f</sup>, M. Barna<sup>c</sup>, R. Lion<sup>a</sup>, G.W. Meijer<sup>a</sup>, N. Neufingerl<sup>a</sup>, I. Szabolcs<sup>c</sup>, R. van Zweden<sup>a</sup>, Y. Yang<sup>g</sup>, G.I.J. Feunekes<sup>a,\*</sup>

<sup>a</sup>Unilever Research & Development, Vlaardingen, The Netherlands

<sup>b</sup>Institute of Nutritional Sciences, University of Vienna, Austria

<sup>c</sup>Faculty of Health Sciences, Semmelweis University, Hungary

<sup>d</sup>Department of Nutritional Sciences, Chinese Nutrition Society, China

<sup>e</sup>Council of Scientific & Industrial Research (CSIR) and JSS MVP, India

<sup>f</sup>Department of Nutrition Sciences, University of Vienna, Austria

<sup>g</sup>National Institute of Nutrition and Food Safety, Chinese Center for Disease Control and Prevention, China

## ARTICLE INFO

## Article history:

Received 15 March 2013

Received in revised form 2 July 2013

Accepted 15 July 2013

Available online 23 July 2013

## Keywords:

Salt  
Salt reduction  
Public health  
Behaviour change  
Population-based health  
International

## ABSTRACT

Salt reduction is important for reducing hypertension and the risk of cardiovascular events, nevertheless worldwide salt intakes are above recommendations. Consequently strategies to reduce intake are required, however these require an understanding of salt intake behaviours to be effective. As limited information is available on this, an international study was conducted to derive knowledge on salt intake and associated behaviours in the general population. An online cohort was recruited consisting of a representative sample from Germany, Austria, United States of America, Hungary, India, China, South Africa, and Brazil ( $n = 6987$ ; aged 18–65 years; age and gender stratified). Participants completed a comprehensive web-based questionnaire on salt intake and associated behaviours. While salt reduction was seen to be healthy and important, over one third of participants were not interested in salt reduction and the majority were unaware of recommendations. Salt intake was largely underestimated and people were unaware of the main dietary sources of salt. Participants saw themselves as mainly responsible for their salt intake, but also acknowledged the roles of others. Additionally, they wanted to learn more about why salt was bad for health and what the main sources in the diet were. As such, strategies to reduce salt intake must raise interest in engaging in salt reduction through improving understanding of intake levels and dietary sources of salt. Moreover, while some aspects of salt reduction can be globally implemented, local tailoring is required to match level of interest in salt reduction. These findings provide unique insights into issues surrounding salt reduction and should be used to develop effective salt reduction strategies and/or policies.

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## Introduction

Elevated dietary salt intake is an established risk factor for high blood pressure (Sacks et al., 2001; Hypertension Prevention Trial Research Group, 1990), and salt reduction has consistently been shown to reduce cardiovascular events (Cook et al., 2007; Strazzullo, D'Elia, & Cappuccio, 2009; He & MacGregor, 2011; He, Li, & MacGregor, 2013). Consequently, the World Health Organization issued a public health recommendation of a maximum intake for adults of 5 grams per day (WHO, 2012). However, a review of international salt intakes reveals that most countries have intakes well above this level (Elliott & Brown, 2007). Disturbingly this problem pertains to both adults and children, and is present in both developing and developed countries (Gregory et al., 2000; Strazzullo, D'Elia, & Cappuccio, 2009). Given

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\*\*\* Acknowledgements: We would like to thank the participants for their time and effort and everyone involved in the data collection process, particularly the International Union of Nutrition Sciences, Ben de Boer and the Unilever country nutritionists. Competing interest and financial disclosure: R.S.N., R.L., G.W.M., N.N. & R.v.Z., G.I.J.F. are employees of Unilever R&D. Unilever produces foods of which some are marketed to fit in a healthy diet and lifestyle. The other authors have no disclosures to make. All authors have been involved in the design of the study, drafting or revising of the manuscript for intellectual content and approved the final version to be published.

\* Corresponding author.

E-mail address: [gerda.feunekes@unilever.com](mailto:gerda.feunekes@unilever.com) (G.I.J. Feunekes).

these circumstances, and the negative health effects of salt, a substantial reduction in salt intake at population level would play a significant role in the reduction of cardiovascular disease worldwide. Local scale interventions have successfully reduced salt intake (Kaczorowski et al., 2010; Sacks et al., 2001). However, implementing global salt reduction programmes would be more effective (Webster, Dunford, Hawkes, & Neal, 2011; Appel et al., 2011; Murray, Lauer, & Hutubessy, 2005) and contribute substantial to healthcare cost savings (Barton, Andronis, Briggs, McPherson, & Capewell, 2011).

Interventions that are targeted and based on reliable and valid scientific evidence are more likely to achieve sustained changes (Prochaska & Velicer, 1997). Motivating individuals in the general population to reduce their salt intake, and especially engaging them in sustained behaviour change, is difficult and complex. A solid understanding of behaviour in the general population concerning the willingness to change are therefore important for developing targeted research and successful salt reduction initiatives. Unfortunately, whilst considerable evidence exists documenting the negative health impact of salt, the understanding of behaviours surrounding salt intake, and how to sustainably change these behaviours, is not as abundant. A handful of studies based either on qualitative data (Smith et al., 2006; Bentley, De Jong, Moser, & Peden, 2005), experimental data (Liem, Miremedi, & Keast, 2012), or quantitative data from single countries (Grimes, Riddell, & Nowson, 2009; Kim, Lopetcharat, & Drake, 2012) highlight that attitudes, knowledge of salt intake, and health beliefs are important for changing salt intake habits, particularly as salt intake is hard to estimate and monitor. However, a better understanding is required to develop interventions, which can be implemented on a population-wide scale, that focus on the barriers and motivators to change. Evaluating behaviour at population-level is particularly important for determining general trends and enhances the capacity to understand the population from all ages and backgrounds. Furthermore, using quantitative data will enhance quality of cross-country comparisons, and provide more solid evidence of the current situation with respect to salt usage and readiness of the consumer to reduce salt intake. Moreover, due to wide varieties in food cultures and preferences around the world, an understanding is required of where differences between countries exist, particularly between developed and developing countries.

Providing a clearer picture of population-based perceptions regarding salt and levels of intake, identifying drivers of salt intake, understanding how people use salt, and learning the best methods of communication regarding reducing salt intake is vital for improving the current situation in the general population in various countries. In light of this, an international study was conducted in seven countries to discover where the best opportunities exist to create targeted salt reduction strategies in both developed and developing countries. In some of these countries, such as Brazil, China and the USA, salt-reduction initiatives in selected regions have been instigated (Webster et al., 2011). Self-rated intake and calculated salt intake, sources of salt, interest in salt reduction, knowledge of salt intake recommendations, perceived healthiness and importance of reduction, responsibility for change and communication preferences were evaluated. This study is unique in that it combines salt-intake information with information on attitudes towards salt, a theoretical framework on behaviour change, and explores the communication preferences to provide concrete insights into where the most promising behaviour change can be made in country-specific populations. The findings from this international study can be used to inform global strategies for salt reduction.

## Materials and methods

### Design and procedure

The study consisted of an online cohort conducted in the following countries: Germany, Austria, United States of America, Hungary, India, China, Brazil, and South Africa. Data was collected during April to May 2012 using an online questionnaire which took approximately 15 min to complete. This was completed using the participants own computer in their own setting. The questionnaire had to be completed in one sitting and prompting was provided on incomplete answers to reduce the occurrence of missing data. Participants were recruited through an international online panel provider (GMI), who was registered with the Data Protection Act. Informed consent was provided by all participants and they received a minor standard reimbursement for their time.

### Participants

A recruitment target was set for each country cohort for a sample size of approximately 1000 adults aged 18–65 (with the exception of Germany and Austria where 500 participants were recruited per country, and combined into one group due to cultural and geographical similarity). The online participant panels in the seven countries had population representative samples. Due to the different population structures in each country recruitment was stratified for each country across gender and within age blocks (18–24 year, 25–34 year, 35–44 year, 45–54 year, 55–65 year) to enable cross-country comparability. To ensure the ability to complete the online questionnaire the following inclusion criteria were applied: internet access with current email address, computer proficiency and normal vision (or corrected-to-normal). Further, people who had experienced a major health event (e.g., heart attack, stroke, cancer, and kidney disease), or were on a medically prescribed diet, were not allowed to participate due to their differing reasons for changing their nutrition behaviour than the general population. Additionally, participants were required to be fluent in the official language of their country as this is the language in which the questionnaire was provided (in India and South Africa where there are multiple official languages the questionnaire was provided in English). In total 8833 participants from the panels met the aforementioned criteria for recruitment and were invited to participate. Of these 6987 participants participated in the study and completed the questionnaire to the end (participation rate of 78.7%). The mean age of the final sample was 39.7 years (SD = 13.5; no significant country differences on mean age,  $p > .05$ ), and consisted of 50% females. Missing data in the final sample was less than 1% and only found amongst socio-demographic variables. As such, missing data was excluded casewise for each analysis.

### Materials

A self report questionnaire was developed with questions that were chosen to elicit information that can readily be implemented in a population wide salt reduction strategy. As such we evaluated socio-demographics, perceived and calculated levels and sources of salt intake, stages of change in regards to salt reduction, characteristics of salt usage, knowledge of recommendations, beliefs and attitudes, responsibility for salt reduction, and preferred methods of communication about salt and salt reduction. One standard framework questionnaire was designed, which was then adapted to local foods, serving sizes and culture by local nutritionists. When a language other than English was used, this was then translated

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