

Desalinated sea water linked to iodine deficiency disorders

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Credit: George Hodan/public domain

An estimated 300 million people worldwide rely on over 17,000 desalination plants in 150 countries for water, and the numbers are likely to grow.

"There is no doubt that desalination is a blessing. However, we need to be mindful of unintended consequences," says Dr. Aron Troen from the Hebrew University's Institute of Biochemistry, Food Science and Nutrition, in the Robert H. Smith Faculty of Agriculture, Food and Environment. "Desalination removes minerals from the water and could conceivably diminish intake of minerals such as iodine that serve as essential micronutrients," he adds.

His recent study, published by *Public Health Nutrition*, assessed the relationship between iodine intake and [thyroid function](#) in an area where drinking water is supplied from iodine-poor [desalinated water](#). It found a surprisingly high prevalence of insufficient iodine intake and a strong association of thyroid dysfunction among adults with low intake of iodine.

The study was conducted in the city of Ashkelon on the southern Mediterranean coast of Israel – a country with the highest percentage of desalinated water consumption in the world, where five desalination plants produce about 50 percent of its water.

In collaboration with Dr. Dov Gefel of Barzilai University Medical Center in Ashkelon and PhD student Yaniv Ovadia, the researchers used an Iodine Food Frequency Questionnaire to model the effect of depleting [iodine content](#) in [drinking water](#) on the distribution of iodine intake. Thyroid function was rigorously assessed by clinical examination, ultrasound and blood tests, including serum thyroglobulin (Tg) and autoimmune antibodies.

"Our estimated intake data are supported by significant associations of intake with a diagnosis of iodine deficiency disorders and with elevated thyroglobulin, a putative biomarker of inadequate intake," says Dr. Troen.

With surging population growth and water scarcity worldwide, seawater desalination is increasingly used to meet increased demand for water.

"The increasing reliance on desalination could contribute to an increase in iodine deficiency disorders, which raises a nutritional and public health issue of a major global concern," says Dr. Troen. "This research supports the urgent need to probe the impact of desalinated [water](#) on thyroid health in Israel and elsewhere," concludes Dr. Troen.

Iodine deficiency is the single most important cause of preventable mental and intellectual deficiency worldwide.

"Luckily, any problems with iodine nutrition that might emerge from [desalination](#) can be easily and inexpensively remedied by the iodization of table salt," explains Dr. Troen. "Unlike magnesium, the solution is relatively straightforward - to iodize salt, provided there is legislation for routine population surveillance for [iodine](#) intake to ensure that salt iodization does not lead to excessive intake."

Rough calculation of the potential costs for treatment of children born in Israel if a quarter of the population is mildly deficient amounts to 1 billion shekel per year (265 million USD). This calculation is based on a paper by Monahan M. et al, in *Lancet Diabetes and Endocrinology* 2015.

More information: Yaniv S Ovadia et al. Can desalinated seawater contribute to iodine-deficiency disorders? An observation and hypothesis, *Public Health Nutrition* (2016). [DOI: 10.1017/S1368980016000951](https://doi.org/10.1017/S1368980016000951)

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