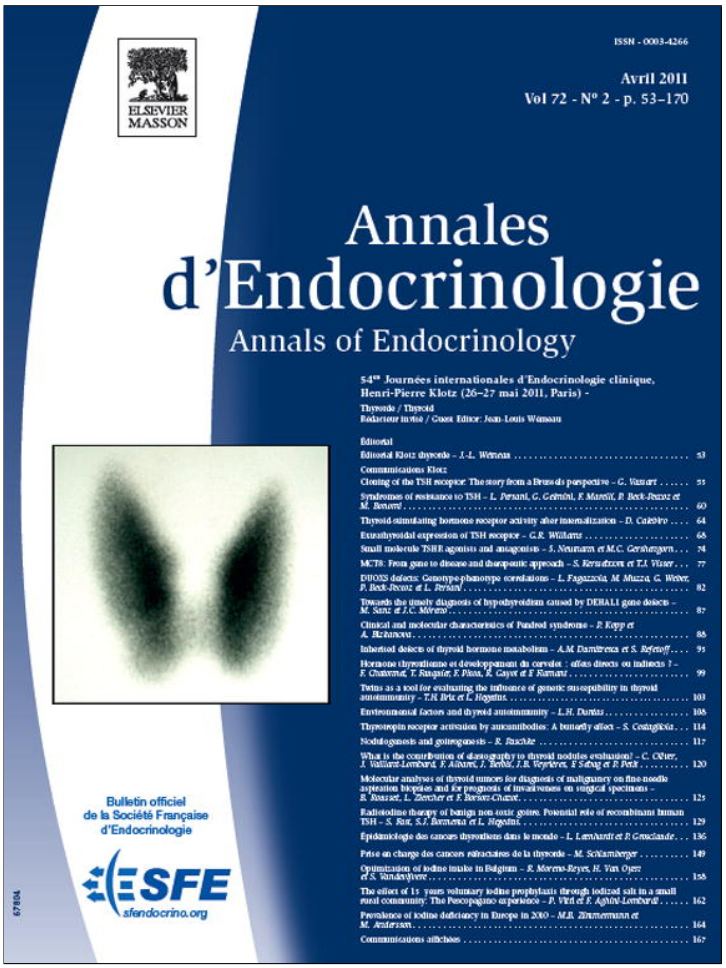

Disponible en ligne sur ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com

Annales d'Endocrinologie 72 (2011) 164–166

Annales d'Endocrinologie
Annals of Endocrinology

Journées Klotz 2011

Prevalence of iodine deficiency in Europe in 2010

Prévalence du déficit iodé en Europe en 2010

M.B. Zimmermann [a,*,b], M. Andersson [a]

[a] *Laboratory of Human Nutrition, Institute of Food, Nutrition and Health, ETH, Schmelzbergstrasse 7, 8092, Zürich, Switzerland*
[b] *Western and Central European Subregional Office of the International Council for the Control of Iodine Deficiency Disorders, Schmelzbergstrasse 7, 8092, Zurich, Switzerland*

Available online 20 April 2011

Résumé

On connaît bien les méfaits du déficit iodé qui contribuent à l'insuffisance du développement intellectuel, aux troubles de la reproduction, aux goitres, à l'hypo- et l'hyperthyroïdie, et sont aisément curables avec l'iodation du sel. Mais partout dans le monde ils continuent à altérer la santé et le développement socioéconomique de plus de deux billions d'individus à risque. Ces quatre dernières décennies, l'iodation du sel s'est globalement largement étendue, mais la majorité des pays européens sont restés en déficit iodé. Bien que chacun des pays d'Europe se soit engagé à l'éradication du déficit iodé à l'Assemblée mondiale de la santé en 1992, le contrôle du déficit iodé n'a reçu qu'une faible priorité dans la plus grande partie de l'Europe. Cet article présente une estimation de la prévalence du déficit iodé en Europe en 2010, en se fondant sur une revue systématique des données actuelles en provenance du système d'information sur le statut nutritionnel en vitamines et en minéraux de l'OMS.

Mots clés : Iode ; Déficience ; Europe ; Thyroïde ; Prévalence

Abstract

The adverse effects of iodine deficiency (ID) — intellectual impairment, damaged reproduction, goiter and hypo- and hyperthyroidism — are well known and easily corrected with salt iodization, but they continue to impair health and socioeconomic development, with more than two billion people at risk worldwide. During the major global expansion of salt iodization over the past four decades, much of Europe has remained iodine deficient. Although every European country endorsed the goal of eliminating iodine deficiency at the 1992 World Health Assembly, control of iodine deficiency has received low priority in much of Europe. However, there has been recent progress in the region and the number of children with low iodine intakes has decreased by ca. 30% since 2003. This paper presents an estimate of the prevalence of iodine deficiency in Europe in 2010, based on a systematic review to update the WHO Vitamin and Mineral Nutrition Information System (VMNIS) database.

Keywords: Iodine; Deficiency; Europe; Thyroid; Prevalence

1. Introduction

The adverse effects of iodine deficiency — intellectual impairment, damaged reproduction, goiter and hypo- and hyperthyroidism — continue to impair health and socioeconomic development, with more than two billion people at risk worldwide [1]. In 2003, based on national medians of urinary iodine concentration (UIC) for 40 European countries, only 19 had adequate iodine nutrition and only nine had household coverage of iodized salt of at least 90% [2]. Over the past decade, compared to other WHO regions, Europe has had the largest percentage of iodine-deficient school age children, as well as the lowest household coverage by iodized salt, despite its relative wealth and high standard of health care. More recently, there have been concerns that salt iodization could undercut efforts to reduce salt consumption in Europe to curb hypertension [3].

2. Methods

We have estimated the prevalence of ID in Europe in 2010 using data compiled in the WHO Vitamin and Mineral

* Corresponding author.
E-mail address: michael.zimmermann@ilw.agrl.ethz.ch (M.B. Zimmermann).

0003-4266/$ – see front matter © 2011 Elsevier Masson SAS. All rights reserved.
doi:10.1016/j.ando.2011.03.023

Table 1
The number of people with low iodine intake in the European region, and the number of countries classified as iodine deficient based on national (or when unavailable, subnational) median UI, in 2010, 2007 and 2003[a,b].

WHO region Europe	Insufficient iodine intake (UI < 100 μg/L)				
	Countries with insufficient intake (no.)	School age children		General population	
		Proportion (%)	Total n° (millions)	Proportion (%)	Total no. (millions)
2010	14	43.6	28.6	43.9	359.9
2007[b]	19	52.4	38.7	52.0	459.7
2003[b]	23	59.9	42.2	56.9	435.5

[a] Based on United Nations population estimates for the year 2002, 2006, 2009 (United Nations Population Division. World Population Prospects – the 2002, 2004 and 2008 revisions. New York: United Nations).
[b] Source [6].

Nutrition Information System (VMNIS) database on ID [4] updated by a systematic literature review. The inclusion criteria were:

- studies using a cross-sectional population-based sample frame;
- studies using standard UIC assay techniques;
- studies presenting the data as median UIC and/or proportion (%) of the population less than 100 μg/L [5].

For each country, the most recent national survey in school age children (if not available, preschool children, adolescents or adults) within 15 years (1994–2009) was selected. For countries where a national survey was not available, all eligible subnational studies carried out within the selected study frame were pooled and presented as a weighted national estimate. The median UIC obtained from the survey data was used to classify countries according to the international criteria of public health significance of iodine nutrition. The regional prevalence of insufficient iodine intake was estimated based on the proportion of the population with a UIC less than100 μg/L [5]. The 2010 estimate was compared to data from 2003 and 2007 [6].

3. Results

In 2010, ca. 92% of the European population were covered by epidemiological iodine status surveys. Only six countries have not collected enough data to estimate their iodine status, but four of these (Andorra, Malta, Monaco and San Marino) have a combined population of just over half a million people, and their iodine status likely reflects that of their immediate neighbours. The two larger countries that lack data are Israel and the United Kingdom. Spain, Italy and Russia lack nationally representative data adding uncertainty to those country estimates. But the quality of the data on iodine nutrition in Europe overall is fairly high: 76% of surveys were done in 2000–2010, 76% surveyed children (the recommended target group) and 70% were national.

Table 1 shows the number of school age children and the general population with low iodine intake in the European region, and the number of countries classified as iodine deficient based on national (or when unavailable, subnational) median UI, in 2010, 2007 and 2003. Between 2003 and 2010 in the population of 6–12-year-old in Europe decreased from 81.2 to 71.5 million, and the total number of school age children who have insufficient iodine intakes fell from 42.2 million (59.9%) in 2003 to 28.6 million (43.6%) in 2010. Thus, the prevalence of ID in Europe has been reduced by ≈30% since 2003. Of the nearly 29 million children in Europe with ID, 34.5% of the total, or 9.9 million, are in three countries with mild iodine deficiency: Russia, France, and Ukraine.

Based on national median UIs, between 2003 and 2010, the number of European countries in which ID remains a public health problem decreased from 23 to 14 (Table 2). Of the nineteen countries with inadequate iodine intake in 2007, 10 improved their iodine nutrition; none of the countries which were adequate in 2007 deteriorated to inadequate in 2010. Of the 43.6% of school age children with insufficient iodine intakes, 15.6% are in the countries of Central Asia and the former USSR, 11.9% are in Eastern Europe, the Baltic States and Turkey and 16.1% are in Western Europe.

4. Discussion

Why is Europe lagging behind the rest of the world in salt iodization and control of ID? Many governments still equate iodine deficiency with goitre and may be unaware of the adverse effects of ID on reproduction and fetal brain development. However, recent controlled trials have shown that mild-to-moderate ID, as present in Europe, impair cognition [7,8]. Nutritional deficiencies get little attention on the European public health agenda with its main focus on lifestyle-related and communicable diseases. Legislation on iodized salt, where enacted, varies from country to country, as do the types and amounts of iodine compound used for fortification. This creates difficulties for food trade and results in an increased number of non-iodized food products on the market. Few countries regularly monitor the impact of their iodized salt programmes. In Europe, an increasingly smaller amount of salt is consumed as table salt (e.g. in the United Kingdom only 15% of all salt consumed) [3]. Thus, it is crucial that salt in processed foods be iodized, but legislation in most countries does not cover the food industry. Finally, current recommendations for salt consumption by WHO and other bodies are less than 5 g per day [3], and if adopted by European pop-

Table 2
Iodine nutrition status by country in the WHO European Region in 2010, based on urinary iodine concentration (μg/L).

Sufficient (100–299 μg/L)		Deficient (< 100 μg/L)	Excess (>300 μg/L)	Insufficient data
Austria	Macedonia	Albania	Armenia	Andorra
Azerbaijan	Montenegro	Belgium	Georgia	Israel
Belarus	Netherlands	Estonia		Malta
Bosnia and Herzegovina	Poland	France		Monaco
Bulgaria	Romania	Hungary		San Marino
Croatia	Serbia	Ireland		United Kingdom
Czech Republic	Slovakia	Latvia		
Cyprus	Slovenia	Lithuania		
Denmark	Spain[a]	Moldova		
Finland	Sweden	Norway		
Germany	Switzerland	Portugal		
Greece	Turkey[a]	Russian Federation		
Iceland	Turkmenistan	Tajikistan		
Italy[a]	Uzbekistan	Ukraine		
Kazakhstan				
Kyrgyzstan				
Luxembourg				

[a] National coverage of iodized salt in these countries is incomplete and some regions likely remain deficient.

ulations would require modification of salt iodine levels in countries.

5. Conclusion

Several actions should be implemented to eradicate iodine deficiency in Europe. Methods for effective control programmes should be standardized by harmonization of relevant legislation and regulations in the countries of an enlarged European Union (EU), including the surveillance of the iodine status of national populations. Use of iodized salt by the food industry should be strongly encouraged. Education of health authorities and the public on the need to prevent iodine deficiency by consuming iodized salt should take into account policies to reduce salt consumption. Iodine supplementation for the most susceptible groups – pregnant women and young infants – may be useful where there is insufficient iodized salt. Many of these issues could be addressed within the EU by a coalition of WHO, Unicef and the International Council for the Control of Iodine Deficiency Disorders (ICCIDD), in cooperation with groups such as the European Thyroid Association, national endocrine societies, and the European Salt Producers Association. The recent Lancet series on child development [9], as well as the World Bank [10], recommend governments put a high priority on salt iodization to promote health and economic development. Although this recommendation was aimed at developing countries, it applies equally well to Europe.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References

[1] Zimmermann MB, Jooste PL, Pandav CS. The iodine deficiency disorders. Lancet 2008;372:1251–62.
[2] Vitti P, Delange F, Pinchera A, Zimmermann M, Dunn JT. Europe is iodine deficient. Lancet 2003;361(9364):1226.
[3] World Health Organization, WHO. expert consultation on salt as a vehicle for fortification. Geneva: World Health Organization; 2008.
[4] Vitamin and Mineral Nutrition Information System [Internet]. Database on iodine deficiency disorders. World Health Organization: 2009 [cited 2009 Nov 01]. Available from: http://www.who.int/vmnis/en/.
[5] World Health Organization. United Nations Children's Fund & International Council for the Control of Iodine Deficiency Disorders. In: Assessment of iodine deficiency disorders and monitoring their elimination. 2nd ed. Geneva: WHO; 2007.
[6] de Benoist B, McLean E, Andersson M, Rogers L. Iodine deficiency in 2007: Global progress since 2003. Food Nutr Bull 2008;29: 195–202.
[7] Zimmermann MB, Connolly K, Bozo M, Bridson J, Rohner F, Grimci L. Iodine supplementation improves cognition in iodine-deficient schoolchildren in Albania: a randomized, controlled, double-blind study. Am J Clin Nutr 2006;83:108–14.
[8] Gordon RC, Rose MC, Skeaff SA, Gray AR, Morgan KM, Ruffman T. Iodine supplementation improves cognition in mildly iodine-deficient children. Am J Clin Nutr 2009;90:1264–71.
[9] Walker SP, Wachs TD, Gardner JM, Lozoff B, Wasserman GA, Pollitt E, et al. International Child Development Steering Group. Child development: risk factors for adverse outcomes in developing countries. Lancet 2007;369(9556):145–57.
[10] McGuire J, Galloway R. Enriching lives. Overcoming vitamin and mineral malnutrition in developing countries. Washington, DC: World Bank; 1994.