INTERNATIONAL COUNCIL FOR CONTROL
OF IODINE DEFICIENCY DISORDERS

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In this Issue:

Current Status of Iodine Nutrition in Iraq

Fereidoun Azizi ICCIDD Coordinator for the Eastern Mediterranean and North Africa

Iodized salt will be reaching more and more Iraqi children

After surviving years of conflict, deprivation and the effects of sanctions, the 15 million children of today's Iraq now stand to benefit from an increasing focus on controlling IDD.

"I am hoping...efforts will be successful and we will see efficient and sustainable iodine nutrition in Iraq by 2011."
F Azizi, ICCIDD

The ICCIDD coordinator for the Middle East and North Africa, Dr Fereidoun Azizi, completed a visit to Iraq in February 2010, where he discussed matters related to iodine nutrition with authorities of the Ministry of Health. He also spoke at a breakthrough meeting entitled "Iodine Deficiency Monitoring and Control" that was inaugurated by a speech given by Dr. Ishan Jaafar Ahmed,

THE INTERNATIONAL COUNCIL FOR CONTROL OF IODINE DEFICIENCY DISORDERS (ICCIDD) is a nonprofit, nongovernmental organization dedicated to sustained optimal iodine nutrition and the elimination of iodine deficiency throughout the world. Its activities have been supported by the international aid programs of Australia, Canada, Netherlands, USA, and also by funds from UNICEF, the World Bank and others.

the Director General of Public Health Directorate, who spoke about the obstacles faced in achieving adequate iodine nutrition.

Dr. Mohsin Ahmed Jasim discussed the National Program for Control of IDD in Iraq. Covering briefly the history of IDD in Iraq, he pointed out that a study in 1992 showed goiter prevalence of 41.7% among women of childbearing age. A 1993 national survey of 3004 school-age children reported a goiter prevalence ranging between 24-44%, with 51% of children having low urinary iodine levels. Iodized salt production was begun in 1990 and legislation made it mandatory in 1993. The percentage of iodized salt consumption by households varied between 40 and 90% in the late 90's but no data on the amount of iodide in various salts was available. Following the decline of the Saddam regime and current difficulties, the status of iodine nutrition is uncertain. UNICEF supplied KI in 2003 and 2007 for the production of 30 and 5 tons of iodized salt, respectively; this help has been discontinued, despite repeated requests from the Iraqi Ministry of Health. Limited surveys in 2009 have shown that in 2003, of 60 salt factories, only 30 are producing salt and the iodization has been carried out only when KI was provided by UNICEF. Since these factories supply only 10% of the amount of salt needed for Iraq, approximately 90% of salt is imported.

Two small scale surveys in 2008 and 2009 demonstrated that 29 and 22% of households respectively, consume salts that have the required iodine content of 20-80 ppm.

Dr. Mohsen listed the hurdles faced in ensuring effective iodine nutrition:

- Security instability
- Lack of political commitment
- Insufficient data
- Lack of monitoring and evaluation

Dr. Mohsen then summarized the current issues and plans of the national program for control of IDD in conjunction with the ministries of health, industry and UNICEF in the following order:

1. Iraqi specifications for salt have been amended to be mandatory iodised (20-80 PPM). Now health inspections need to be strengthened to ensure only iodized salt on the Iraqi market.
2. Work with MOI to import KI and distribute it to salt factories during 2010.
3. Work with UNICEF to provide the program with KI at least for this year.

The final speaker was Prof. Fereidoun Azizi, who presented an overview of iodine nutrition and the effect of iodine deficiency on brain development, emphasizing the need for proper iodine nutrition throughout life, and during intrauterine life and infancy, in particular. He underscored the vital role played by adequate iodine nutrition during pregnancy and lactation. Discussing the failure of sustainable iodine supplementation, he pointed out the importance of universal salt iodization and listed the major obstacles in sustainability of IDD elimination programs.

1. A lack of national commitment to achieve the goal. While each nation has accepted and pledged to achieve the goal as stated by the Global Summit, by UNICEF and by WHO, there is still a lack of: commitment; political leadership; national oversight; adequate regulatory processes adequately enforced; and honest packaging.

Children living next to Daurra Oil Refinery in Iraq

2. A lack of multi-professional support for the effort. It is still seen as a 'health issue' or a 'nutrition issue' when it is a National Development Issue with economic and productivity consequences when left unaddressed.
3. A lack of national investment as a consequence of lack of interest in: (a) production improvement and market access of iodized salt (b) enforcement of legislation and protection of the consumer and the producer (c) national management of the many elements that comprise a national USI an IDD Elimination effort; (d) adequate and permanent communications efforts to address the issue of the dangers of iodine deficiency and the values of its correction.
4. A lack of persistent, high level, equal discussions between the private sector on the processes that must support the effort (communications, agriculture, education, industry, science, civil society).

Iraq is a country with inadequate iodine nutrition, with mild, moderate and severe iodine deficiency documented in various parts of this country. Iodine supplementation has been flawed, inadequate and hence ineffective. Although a systematic evaluation of current status of iodine nutrition is lacking, studies done in the 90's and limited surveys of 2008 and 2009 yield given enough data to confirm that the problem of IDD does exist and the majority of the population does not receive adequate amounts of iodine. Taking into consideration the current problems of government and people of Iraq, a rapid action plan to combat iodine deficiency was presented, which must be discussed and revised on a yearly basis.

Recommendations

1. Political commitment: This should be renewed and IDD should be reconsidered as a major health problem and accordingly be prioritized as a health strategy for Iraq.
2. National IDD control committee: This committee should be very active and adopt and implement decisions of a High Council for Elimination of IDD, composed of ministers and high level policy makers which meet at least 1-2 times yearly. The committee should involve all stakeholders and sectors involved in the IDD elimination program, including representatives of the ministries of health, industry, commerce, education, radio and TV network and other media, bilaterals, international and non-governmental organizations. Subcommittees on salt iodization, education and advocacy should be established.
3. Universal salt iodization. USI should be scheduled for two periods:

3.1 Currently approximately 90% of salt is imported. Therefore all efforts should be directed towards importing known brands of iodized salts containing 20-40 ppm iodine from neighboring countries. If this is done efficiently and effectively, only 10% of salt produced inside the country will be uniodized.

3.2 During the coming years, efforts should be focused on increasing and ensuring the production of only iodized salt by factories inside Iraq.

4. Education of health personnel should be systematically implemented. Public education, mobilization and advocacy need special attention and should be achieved by the time iodized salt becomes available for general population.
5. An iodine laboratory with technicians, trained in the Research Institute for Endocrine Sciences (RIES) of the Islamic Republic of Iran, has been established in the Nutrition Research Institute. The equipment and supplies needed should be provided by the Ministry of Health, and the quality control of the lab will be monitored and ensured by the RIES.
6. National survey: This should be postponed until iodized salt becomes available for households in a good portion of the country. Measurement of iodine in random samples of salts from imported sites, retailers and households and measurement of urinary iodine in schoolchildren should be planned in a well-designed epidemiologic survey.
7. Cooperation from the salt industry in maintenance of quality control should be sought.
8. The country should be committed to assessment and reassessment of the program of the elimination of IDD.
9. A database with recording of results of regular assessments and monitoring should be initiated and updated on a regular basis.

Progress against IDD in Europe

Aldo Pinchera Regional Coordinator, ICCIDD West Central European Region

Overview

Although West Central Europe is an industrialized and wealthy part of the world, there still remain areas of iodine deficiency in several countries. Legislation also differs widely among European countries. There are those who have established effective legislation while others continue to battle with the authorities to get IDD on the official agenda. Within the region of West Central Europe unfortunately not all countries have been able to successfully establish official governmental iodine deficiency control programs. Slovenia, Hungary, Greece, Portugal, France and Ireland have yet to move in this direction.

Selected Country Update

France

Household salt has been iodised in France since the early sixties. This is done on a voluntary basis and iodized salt for industrial use has been officially barred. Unfortunately the health authorities are not interested in the matter of IDD; a recent application to the National Drug Agency for an iodine supplement to pregnant women was turned down or, rather, accepted in such a limited way that implementation is not feasible. The last national evaluation was carried out in 1999 with results showing mild iodine deficiency but there has been no update of this data. Although there is no current concern by specialists of the iodine status of pregnant women, with no specific national programme being considered, future activities will focus on evaluation and management of the iodine status during pregnancy.

European children increasingly benefit from salt iodization

Finland

The National Institute for Health and Welfare is involved in iodine deficiency control programs together with the National Nutrition Council which provides contact with WHO. Iodine deficiency goitre was eradicated in the 1960s and since then sporadic iodine intake studies have been carried out, the latest assessment of urinary excretion being done in 2002. Finland has had voluntary iodization of table salt since 1949 and legislation since 1972. The food industry uses mainly non iodized salt. An ad hoc working group was appointed in 2008 to propose an iodine/thyroid status monitoring program at the National Institute for Health and Welfare. In 2009 a systematic iodine monitoring program was initiated which will involve measurement of urinary iodine excretion, iodine intake and thyroid function, twice every ten years in random population samples of healthy subjects aged 24-75. The next complete study is planned for 2011.

Poland

Poland has a multi-center program for the elimination of IDD working with all university centers in Poland and financed by the Ministry of Health. The program is supported by the Ministry of Health, the National Institute for Food and Nutrition in Warsaw, the National Institute of Zootechnics in Krakow and the salt mines in Klodawa. The program began in 1994 and in 1992-93 an epidemiological program for the evaluation of endemic goiter was financed by a special government grant. Household salt has been iodized in Poland since 1935 and mandatory since 1996. In 1991 the Polish Council for the Control of Iodine Deficiency Disorders

Wieliczka salt mine, Poland

was established. In 2009 the iodine prophylaxis model was modified with the introduction of new iodine carriers: mineral water, as well as milk, after introducing iodized salt licks for milking cows in cooperation with the Institute of Zootechnics in Krakow. Future activities involve introducing a reduction of salt intake in basic hospital diets and continuing the IDD control program.

Bulgaria

In 1994 a decree was established which introduced: a) obligatory use of iodized salt with 28-55 mg/kg potassium iodate content by the whole population of the country; b) periodic IDD surveys; c) creation of an Interagency Commission with the Council of the Ministers under the leadership of the Minister of Health to coordinate IDD prevention; and d) prohibition of the sale of noniodized salt. In the last 10 years Bulgaria has successfully introduced USI, and goiter prevalence has been reduced from 23.3% in 1989 to 2.6 % in schoolchildren and 2.7% in pregnant and nonpregnant women in 2008. Prevalences of urinary iodine concentrations (UIC) <50 µg/l were 0.8% in school children, 4.1% in young women and 7.3% in pregnant women in 2008. A household salt survey in 2008 showed 84.5% iodized salt consumption. Bulgaria was officially recognized in 1997 to have successfully eliminated IDD using USI by the Network for Sustained Elimination of Iodine Deficiency, ICCIDD, UNICEF and WHO. In 2009, a national study confirmed sustainability of the IDD policy. Future activities involve: 1) continuation of the monitoring of iodized food grade salt; 2) a free registered national iodized salt logo for importers/producers/retailers whose supply in the market and/or food production facilities is more than 85% iodized; and 3) a representative study among pregnant women.

Italian salt works, Sicily

Italy

Since 2005, Italy's IDD representatives have had constant monthly contact with the Ministry of Health and the Superior Institute of Health. A group of experts meet regularly to evaluate actions being carried out in relation to the law on salt iodisation passed in 2005. Following the introduction of the law, the Italian government established a national institution for monitoring iodine prophylaxis to further ensure the effectiveness of the program. The ICCIDD Regional Coordinator, Aldo Pinchera, is part of the Coordinating Activity Group and is responsible for coordinating work on the effectiveness of iodine prophylaxis, including variations in thyroid diseases. The National Centre for the Prevention and Control of Illnesses has financed a 2 year project for the monitoring and prevention of thyroid diseases in Italy, for developing activities of the National Registry of Congenital Hypothyroidism and for establishing a IDD monitoring program. The National Observatory for Monitoring Iodine Prophylaxis (OSNAMI), established by the government following legislation in 2005, operates in tight contact with the National Committee for the Prevention of Goiter. For many years, this Committee has dealt with the consequences of nutritional iodine deficiency in the population with the Ministry of Health and will further be in contact with Italian salt producers.

Slovakia

Iodine prophylaxis has been compulsory in Slovakia since 1965 and there is a government control program for the iodine content of salt, with 350 samples of salt being examined annually. In 2000 a national monitoring commission was established. Between 1995 and 2005 sufficient iodine intake was proved in several surveys, but there has been no progress since.

Netherlands

Compulsory use of iodised salt by bakeries came into force in 1968 and iodized table salt has been available for households for many years. In 1984, use of iodized salt by bakeries was no longer compulsory but since then the iodine content of Jobrozo salt has increased to 100mg/kg. The last survey carried out on Dutch school children was in the 1990s, which concluded the absence of iodine deficiency. A study on the iodine status of pregnant women is currently being considered at the Wageningen University.

Sweden

Sweden has had a recommendation by the Ministry of Health on iodization since 1936 and this is well adhered to with at least 90% of the population purchasing iodised salt. The Swedish Food Board has the overall responsibility to ensure that optimally iodized salt is available and this is widely supported, including by the mass media, who periodically highlight the importance of consuming iodized salt. Researchers working on IDD are involved in supporting a range of low-income countries in their struggle to control IDD; support has mostly come from the Swedish International Development Cooperation Agency, and has been given to China, Tanzania, Zimbabwe, Sudan and Democratic Republic of Congo. In Sweden in the last 10 years there has been stable consumption of optimally iodized salt, adequate iodine content in the Swedish "food basket" and good iodine status of the population. A closer look at iodine status in pregnancy is being considered although the purpose of this is more for refining assessment methods rather than as a concern for iodine status.

Fish in Sweden are a natural iodine source

Romania

Several Ministry of Health programs have been established which have involved the monitoring of urinary iodine concentration in children and pregnant women and the iodine level in iodized salt. UNICEF sponsored a population study in 2005 which was carried out by the Institute of Mother and Child Health regarding the nutritional status of pregnant women and children aged 6-7. A national commission for the control of iodine deficiency was established though the Ministry of Health and was supported financially and logistically by UNICEF. Unfortunately this commission has not been sponsored by UNICEF for two years and is no longer functional, but there are plans to reestablish this monitoring program. The Institute of Mother and Child and SC Simedis Consult SRL has a research project proposal for the Ministry of Research which will aim to evaluate the iodine intake and thyroid status in infants in correlation to diet. There has been resistance by some doctors and the mass media against USI, and the Ministry of Health has in the last 3 years requested material providing arguments for USI. In 2008, a temporary Parliamentary Commission was established which debated USI. Supporting materials were sent to this Commission and USI remains in place.

Turkey

Prevention of IDD and a salt iodization program in collaboration with UNICEF began in 1994-98 and has been strictly adhered to since 2000, with mandatory iodization of table salt. It is supported by the Ministry of Health, Ankara University, the Ministry of Agriculture and the Turkish Society for Endocrinology and Metabolism. UNICEF supports monitoring programs which take place every 5 years, e.g. 2002-2007.

Macedonia

In December 1997, a national program was established based on USI and early recognition of IDD. The program is being implemented by the National Committee for IDD, fully and permanently supported by the Ministry of Health and the Government. They are supported by UNICEF for: monitoring the effects of iodine deficiency in school children, iodine deficiency and thyroid status in pregnant women and breastfeeding women, educational and information activities, equipment for the determination of iodine in urine, as well as expenses for rapid test kits. In 2009, iodine supplementation in pregnant and lactating women was introduced when new research found that despite adding 20–30 mg iodine to 1 kg of salt (applied since October 1999) the iodine requirements of pregnant and lactating women were not being met. Strategically, the National IDD Committee shifted their goal from achieving elimination of IDD to its sustainability through comprehensive action at the policy, institutional, community and family levels.

Croatia

Since 1992 a program for the eradication of goiter and IDD has been in force. It includes the control of iodine in salt at all levels, as well as the control of iodine-caused hyperthyroidism as a possible consequence of an increased level of iodine in salt. The program is supported by the Ministry of Health, the Public Health Institute, the Veterinary Faculty and Croatian salt plants. In 1992 the National Committee for Eradication of Goiter and Control of Iodine Prophylaxis was founded. The structure of the Committee ensures a multidisciplinary approach to the problem. After the introduction of new obligatory regulation requiring 25 mg KI/kg salt in 1996, Croatia reached iodine sufficiency in 2002. In 2009, a survey found an overall median of UIC for schoolchildren in Croatia of 248 µg/L. Thyroid volumes in schoolchildren from Zagreb and the village of Rude were within the normal range. Median of UIC in pregnant women from Zagreb was 159 µg/L, and in non-pregnant women from Zagreb was 136 µg/L.

United Kingdom

The United Kingdom's official IDD control program is coordinated by the Ministry of Agriculture Fisheries and Food (MAFF). The last survey of the iodine content of cow's milk was carried out in 1998/89. Further monitoring has been recommended but unfortunately very little progress has been made in the last 10 years. A study of 15 yr-old school girls is currently in progress and is supported by the Clinical Endocrinology Trust and Society of Endocrinology. The preliminary results of this survey (n = 478) show a median UIC of 62-85 µg/L from 6 cities; overall median was 76µg/L. In 2009 a salt survey in supermarkets was carried out. The last MAFF survey (1999) showed adequate iodine concentration in 220 milk samples and even suggested that young children could exceed the recommended iodine intake, especially in winter. This is not borne out by the recent school girl UI data.

Switzerland

Since 1922 Switzerland has had an official iodine deficiency control program with all cantons being covered since 1950. Salt for human consumption is enriched on a voluntary basis with 20-30 ppm iodine (as KI). Domestic (household) use of salt is 92% and salt for food industry is approximately 50%. The Swiss Academy of Medical Sciences (a body that is independent from the government) appoints 8 to 10 members of the Swiss Fluoride-Iodine Commission (fluoride is included, because prevention of caries also rests on salt as a carrier). The Commission is an advisory body to the Swiss Federal Office of Health, to which it may propose changes in legislation, e.g. on the level of iodine in salt, or on the wording of governmental statements. Iodine sufficiency was demonstrated in schoolchildren in 1999 (first nationwide survey) and confirmed in 2004 (2nd nation-wide survey). The 3rd nation-wide survey in school children in 2009 has established continuing iodine sufficiency with median urinary iodine of 121 µg/L for boys and girls, and 165 µg/L in pregnant women.

Czech Republic

The country's programme for the control of iodine deficiency, which began in 1994-95, is not governmental but is supported by the National Institute of Health. Financial support is received from the Ministry of Health, the Public Health Service and grants from pharmaceutical companies. A national commission was established in 1994 and still monitors the programme including the monitoring of salt iodization, ioduria in selected samples of population and educational activities. Since 2004 the Czech Republic has corrected iodine deficiency according to the criteria of WHO/ ICCIDD (parameters of ioduria, prevalence of goiter). In the future, interest will be focused on pregnant women and seniors, in relation to iodine saturation, autoimmune thyroid disease and validation of thyroglobulin and ioduria levels. Regular conferences for experts are also planned.

Germany

Germany does not have any legally established or official iodine deficiency control programs, but surveys on iodine intake, urinary excretion and goitre incidence supported by the Federal Ministry for Research and Technology (BMFT) and Federal Ministry of Health. The first nation-wide epidemiological survey on iodine status was performed in 1996, supported by BMFT. Mean iodine excretion was 94 µg/l in adults, 83 µg/l in conscripts and 56 µg/l in breast-fed newborns. The second nation-wide survey was carried out on children and adolescents (6-17 y) in 2006 (KIGGS Study), performed by Robert-Koch-Institute supported by Federal Ministry of Health and BMFT, the mean UIE was 117 µg/l. In 1984 the German Task Group on ID ("Arbeitskreis Jodmangel" =AKJ) was established, consisting of scientists and clinicians interested in ID (endocrinologists, pharmacologist, gynecologists, pediatrics and nutrition researchers). The aim is to promote the use of iodized salt in households, restaurants and industry, to convince the government to perform surveys on ID, control ID, and to legalize universal iodized salt. The use of iodized salt in households increased from 70 to 80%, the use in bakeries, slaughter houses and food industry however decreased from 35 % in 1998 to 28 % in 2008. The mean urinary iodine excretion in children and adolescents is now 117 µg/L, in adults it is around 120 µg/L (in 1996: 93 µg/l). In 2009 the Ministry of Health and BMFG approved the sponsoring of further surveys on iodine intake in Germany and discussions on Health Claims with the Ministry of Health and EU representatives took place. An important goal for the future is to legalize salt fortified with iodide as well as iodate in the EU, and to allow the trading of industrial iodized food products within the EU.

Belgium

Belgium does not have an official iodine deficiency control program but there is a working group of experts on micronutrients, which began in 2007, at the Ministry of Health. Among other tasks, this group is responsible for iodine nutrition and monitoring iodine status. In the last 10 years, the main progress has been the official recognition of iodine deficiency as a health problem. In 2005 the Ministry of Health elaborated a National Nutrition and Health Plan (NNHP-B) and requested a strategy to optimise iodine intake. Within the framework of the NNHP-B for 2005-2010, the working group on micronutrients proposed a strategy to increase iodine intake. This strategy has been officially adopted by the Ministry of Health and was implemented in 2009. The main elements of the strategy are that bread will be fortified with iodized salt. In addition to the fortification of bread with iodine, the visibility of iodized salt in the markets will be increased and the utilization of vitamin supplements containing iodine for pregnant and lactating women will be promoted. An agreement between the bakery industry and the ministry of health was signed to implement the fortification of bread with iodized salt but this measure is not currently compulsory. Monitoring will be based on the determination of urinary iodine concentrations in schoolchildren and pregnant women, as well as on the thyroid stimulating hormone (TSH) concentrations in newborns. In 2010 the first national iodine nutrition survey in children and pregnant women will take place. In addition the central database on neonatal TSH will become operational.

Slovenia

Slovenia does not have an official iodine deficiency control program but there is a national commission for the implementation of iodine prophylaxis albeit with sporadic monitoring. The last surveys clearly confirmed that iodine intake is sufficient. In 2009 problems arose with excessive iodine intake due to the iodine content in multivitamin tablets. A further study is planned for 2011.

Hungary

Hungary does not have an official iodine deficiency control program. Related activities have included "Iodine nutrition in schoolchildren according to the results of repeated ThyroMobil studies (1994-2005)". The original ThyroMobil study (carried out in Hungary in 1994) was repeated in the same areas, with the same methods, by the same people in 2005. The low iodine excretion detected in 1994 disappeared in these areas by 2005; the goiter rate decreased significantly according to the previously employed reference values. Explanation for this was the definite increase in the use of iodized salt in households. A country-wide study showed that 42% of infants who are breast feeding have low iodine intake, but the level of iodine in the breast-milk increased compared to the previous results. In the last 10 years use of iodized salt in households has increased substantially to over 50%. Future activities will focus on the use of iodized salt and promoting it though the media.

Greece

Greece does not have a legally established official iodine deficiency control program. In the last 10 years the status of normal iodine intake has been established and in 2009 studies on iodine intake in pregnant women began.

Portugal

Portugal does not have an official iodine deficiency control program but a study on iodine intake in pregnant women and school children was carried out by the Portuguese Endocrine Society. The Portuguese Cancer Institute and the General Direction of Health from the Ministry of Health and the Ministry of Education gave their scientific support to the study. It is not clear what progress has been made in the last 10 years. However, comparing the present data in school children with data obtained 20 years ago in specific regions, there was a huge progress on iodine intake, due to silent prophylaxis. The near future holds the conclusion of the study on pregnant women from the Azores and a study of school children in the Azores and Madeira. Discussions are also envisaged with the Health Authorities on the results of the study in order to implement iodine supplementation in pregnant and lactating women and eventually a universal salt iodization program. It has not been easy to enroll the health authorities in making decisions as IDD is not considered as a priority in Public Health.

Salt works in Mallorca, Spain

Many Bangladeshi adolescent girls and pregnant women are iodine deficient

Gulshan Ara Program Officer, UN World Food Program

Background

The national IDD survey in 1999 revealed that 43.1% of the Bangladeshi population were iodine deficient (urinary iodine <100 µg/L). There was a gender difference: females were more affected, but the prevalence data were not disaggregated for adolescents and pregnant women. In the latest iodine survey, which was part of the National Nutrition Program (NNP) baseline survey, data from Bangladeshi adolescent girls and pregnant women were analyzed. The survey was conducted by the International Centre for Diarrheal Disease Research (ICDDRB), the Institute of Public Health Nutrition (IPHN) and the National Institute of Population Research and Training (NIPORT) in 2004-2005. The survey sample included 360 adolescent girls and 360 pregnant women selected randomly from six administrative divisions by stratified two-stage cluster sampling. The girls and women were generally selected from different households. Spot urine samples were collected and analyzed at the ICCIDD laboratory of the Institute of Nutrition and Food Sciences, University of Dhaka. The iodine content of salt present in the households at the time of data collection was determined by iodometric titration in the same laboratory.

Prevalence of subclinical iodine deficiency

Data from 346 adolescent girls and 254 pregnant women were included in the data analysis. Median UI in adolescent girls was 135 µg/L, varying from 82 µg/L in Rajshahi to 406 µg/L in Kulna. In pregnant women, median UI was 133 µg/L, varying from 76 µg/L in Rajshahi to 191 µg/L in Barisal. The overall prevalence of iodine deficiency was 37% in adolescent girls (median urinary iodine concentration, <100µg/L) and 56% in pregnant women (median urinary iodine concentration, <150µg/L). The prevalence in both adolescent girls and pregnant women was lower in Chittagong and Khulna, which are both closer to the sea. The prevalences were highest in Dhaka and Rajshahi divisions, both situated in flood prone zones. The heavy rainfall and annual flooding consistently leach off soil iodine and make these zones extremely vulnerable to iodine deficiency.

Use of iodized salt

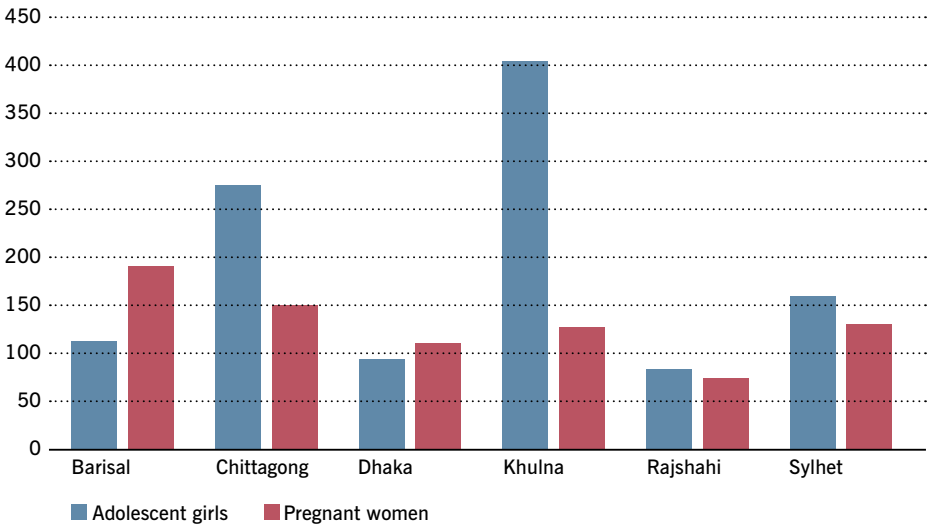
Based on the required amount of 15 µg of iodine per g of salt (ppm), 45% of the households of both adolescent girls and pregnant women were consuming inadequately iodized salt. Variation existed between divisions; 70% of the households of adolescent girls and 60% of the households of pregnant women in Rajshahi division consumed salt with inadequate iodine. One third of households still used unpacked (non iodized) salt. Iodine content of salt was significantly correlated to median UI both in adolescent girls ($r=0.28$, $P<0.05$) and in pregnant women ($r=0.33$, $P<0.05$). Low socioeconomic profile was also related to poor iodine status.

Conclusions

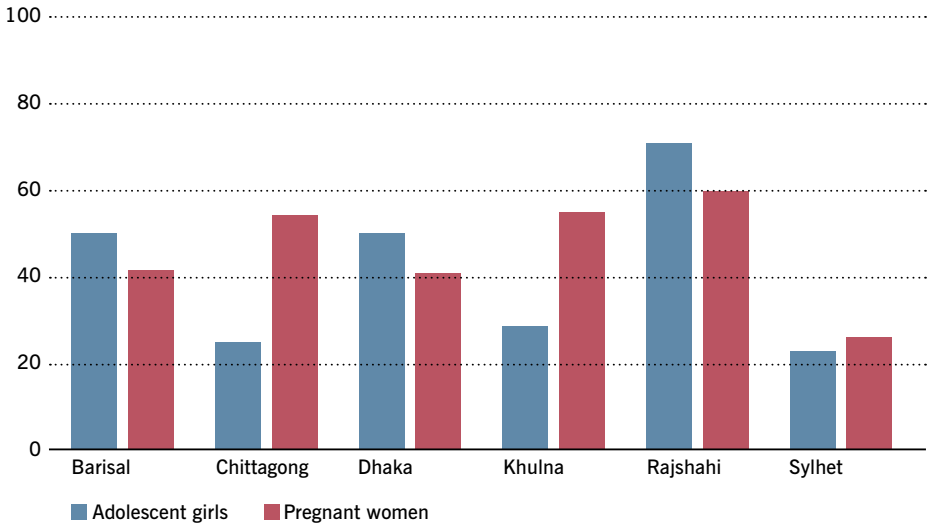
Ecological variation was a strong predictor of iodine deficiency. Use of adequately iodized salt was associated with better iodine status. Adolescent girls and pregnant women in two out of the six divisions, Dhaka and Rajshahi, were highly vulnerable to iodine deficiency. Almost half of households were still consuming table salt containing inadequate iodine concentration. The pregnant women were more vulnerable to iodine deficiency than adolescent girls.

Many pregnant women in Bangladesh are at risk of delivering newborns impaired by insufficient iodine

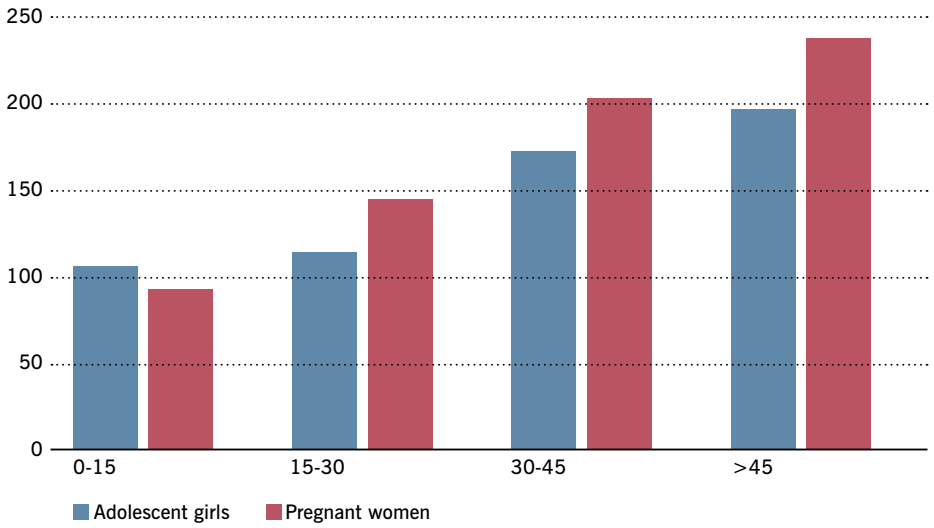
Median UI (µg/L) of adolescent girls and pregnant women per division



Proportion (%) of households with inadequately iodized salt (<15mg/kg) per division



Median UI (µg/L) according to salt iodine content (mg/kg)



Recommendations:

The results show that salt iodization in Bangladesh is still far from satisfactory. The following recommendations are made:

1. Strengthen systems for monitoring capacity of the salt industry in the country for production of iodized salt, quality assurance, adoption and enforcement of appropriate regulations/legislation.
2. Proper monitoring systems at production, retail and community levels should be established in vulnerable areas especially in Rajshahi and Dhaka division.
3. Consumers should be encouraged to use the readily available packed salt instead of unpacked salt. Packaged salt producers should lower the price of their product by way of their social responsibility. One of the means of doing so is to curtail expense on costly advertising in media that is usually accessed by the relatively richer people.

Reference: Ara G. Melse-Boonstra A, Roy SK, Alam N, Ahmed S, Khatun UHF, Ahmed T. Sub-clinical iodine deficiency still prevalent in Bangladeshi adolescent girls and pregnant women. Asian J Clin Nutr 2010;2:1-12.

Prenatal education in Bangladesh should include the benefits of iodized salt

Moving toward the sustainable elimination of IDD in Nepal

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Background

Nepal is land locked country situated between India and China (see map on p.14). It covers 147,181 km^2, divided into three ecological (Mountain, Hill and Terai) regions and five developmental (Eastern, Central, Western, Mid-Western and Far-Western) regions, 14 zones and 75 districts. The Terai region is adjacent to India and Mountain region to China, with the Hill region between them. In the past, IDD was rampant in Nepal as reflected by a 55% total goiter rate (TGR) in 1965, during the first IDD survey in Nepal.

The Government of Nepal has taken the initiative since 1973, after recognizing the importance of iodine to prevent IDD. There were two projects established by Ministry of Health in 1973; the Goiter Control Program and the Goiter and Cretinism Control Project. These consisted of a combination of activities including Universal Salt Iodization (USI) and iodine supplementation through injections and/or oral iodine capsules given to the target populations. The iodized oil injection program (1979-1994) covered 40 districts located in the hill/mountain regions, while iodized oil capsules (1995-1998) were provided to women and children in 45 remote mountain districts. However, since late 1990s, USI became the sole policy to control IDD in this country. The Government established the Salt Trading Corporation Limited (STC) in 1973 to import iodized salt from India and to distribute it throughout the country. In the Mountain region, a small amount of salt is imported from Tibet.

Assessment of iodine status

The Government of Nepal in collaboration with national and international organizations began the assessment of iodine status in 1965 and it has been continuous since that date. National and sub-national surveys were conducted in Nepal by different organizations, including three consecutive national surveys in 1998, 2005 and 2007. In these surveys school aged children were studied and urinary iodine excretion (UIE), TGR and salt iodine content were taken as study parameters. The prevalence of TGR was reduced from 55% in 1965 to 0.40% in 2007 (Figure 1).

Median UIE of the Nepalese population was significantly increased from 144 μg/L in 1998 to 203 μg/L in 2007 (Figure 2), indicating adequate iodine intake and optimal iodine nutrition of the population. There was 19.4% of the population with UIE<100μg/L in 2007, which was decreased from 35.1% in 1998 and 27.4% in 2005. The proportion of households consuming adequately iodized salt (at least 15 ppm at the household level) was increased from 55.2% in 1998 to 77.0% in 2007 (Table 1), showing the positive impact of USI in Nepal.

Himalayan salt is sold worldwide; its pink color is due to its mineral content, but it is usually low in iodine

Pamphlets are distributed to school children on the role of iodine in health.

Iodized salt is distributed in a rural school.

A sub-national level, two district iodine status survey was conducted in Eastern Nepal in 2008 including one Hill and Terai district. That survey showed iodine status of the Terai region was better than in the Hill region. Currently, two sub-national surveys are being done in Eastern Nepal with two major objectives. These are: 1) to increase awareness among school children, their parents and school teachers about the role of iodine in human health by instructional classes, distribution of pamphlets and distribution of iodized salt; and 2) to assess UIE, salt iodine content, thyroid hormone profile, as well as selenium and zinc status among school children.

Conclusion

In a short period of time considerable progress has been made towards sustainable elimination of IDD in Nepal. However, much more can be done to eliminate IDD as a public health problem, including:

- The USI program must be sustained with wider coverage of remote areas.
- An effective monitoring program should be continued to ensure optimal iodine status and protect the population from iodine induced thyroid disease.
- An awareness program should be implemented at the community level.

Figure 1: The prevalence of TGR in Nepalese surveys.

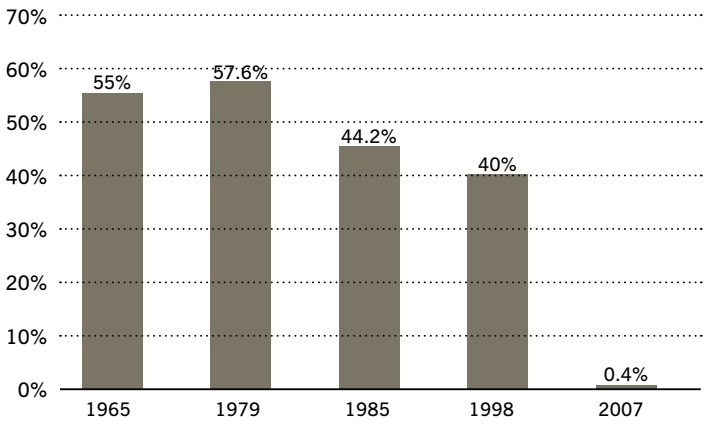

Figure 2: Median UIE (µg/L) of Nepalese population in three national IDD surveys.

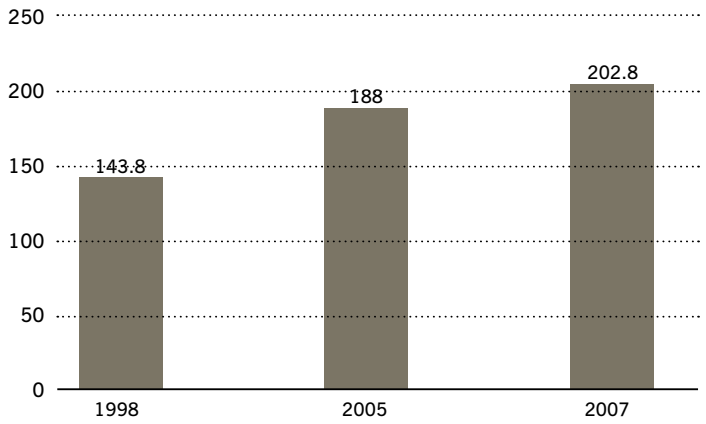

Table 1: Current status of progress towards the sustainable elimination of IDD in Nepal.

Indicators	Goal	1965	1998	2005	2007
TGR	<5%	55%	40%	–	0.4%
Median UIE (μg/L)	100-199	–	143.8	188.0	202.8
Adequately iodized salt coverage	>90%	–	55.2%	57.7%	77.0%
Proportion of population having UIE <100μg/L	<50%	–	35.1%	27.4%	19.4%
Proportion of population having UIE <50μg/L	<20%	–	13.6%	9.5%	2.9%

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Nepalese children learn better due to iodized salt

Salt flats near Shannah Harbor, Oman

An effective iodized salt program in Oman

Izzeldin Hussein ICCIDD Regional Coordinator, Persian Gulf Region. The studies in this report were carried out by **Ali Gaffar** Adviser Health Affairs, supervising DGHA; and **D Al Osfor** Director of Nutrition, Ministry of Health, Oman.

Background

The Sultanate of Oman occupies the south-eastern tip of the Arabian Peninsula. Oman's coastline extends 3,165 km from the Strait of Hormuz in the north, to the borders of the Republic of Yemen in the south and shares its coast with three seas: the Arabian Gulf, the Gulf of Oman and the Arabian Sea. It also includes a number of islands off the coast, among them the islands of Masirah, Halanyat and Salama.

History of IDD in Oman

In 1993-4, the Ministry of Health and Sultan Qaboos University carried out the first national survey on IDD. In this study, 22% of households used iodized salt, 50.2% of schoolchildren had UIC below 100µg/dl, and 1.2% had goiter. In 1996, the salt iodization program was established and several salt iodization monitoring surveys were conducted through schools. The coverage of salt iodization increased to 61% in 1998, 68.5% in 2000 and 78% in 2007.

Initially, legislation in 1996 mandated the iodization of nationally produced household salt with 100-135 mg/kg of potassium iodate. It also mandated the iodization of imported salt with 60-80 mg/kg of iodine (78-105 mg/kg of potassium iodide or 101-135 mg/kg of potassium iodate). Recently, the law was changed and now stipulates the content of iodine in salt should be 15- 40 ppm (WHO, 2007).

USI helps Omani boys develop to their full potential

The 2004 survey

A survey conducted in 2004 found that the median UIC among non-pregnant women of childbearing age was 223 µg/L. The prevalences of UI <100 µg/L and <50 µg/L among Omani non-pregnant women were 17% and 5%, respectively. However, one-third of women (33%) had a UI >300µg/L. Iodine status was inversely associated with the availability and quality of iodized salt in the households. As the iodine content in salt increases, the median UIC increases. The median UIC among women in households with salt iodized at 0-15 ppm was 147 µg/L. However, the median UIC was much higher (454 µg/L) among women from households with salt iodized at 70 ppm or more. In addition, the proportion of women with UIC >300 µg/L increased significantly from 20% among women from households with no iodized salt, to above 70% among women from households with salt iodized at ≥70 ppm.

The same study revealed the median iodine content in salt to be 31 ppm. Approximately 59% of the 390 households surveyed had adequately iodized salt (≥15ppm). Approximately 71% of households had original salt packaging available and of these, almost 96% were labelled as iodized. Among those, well over two-thirds of the samples (72%) contained at least 15 ppm of iodine.

The median UIC among non-pregnant women of childbearing age was 211 µg/L. The prevalence of UIC <100 µg/L was 16.8% and the prevalence of UIC <50 µg/L was 4.9%. There were no significant differences between UIC levels considering marital status, the head of household's education or per-capita monthly income. As expected, the prevalence of low UIC is inversely associated with the availability of iodized salt in the household. However, a high proportion of women (33.6%) had UIC greater than 300 µg/L. Households with a high level of iodine in salt had a significantly higher proportion of UIC >300 µg/L.

The National IDD Program

According to the criteria for IDD elimination (WHO/UNICEF/ICCIDD, 2007), the following programmatic indicators have been achieved by the Sultanate of Oman:

1- A national IDD program manager
2- A national multi-sector coalition responsible to the government for the national program for the elimination of IDD
3- Excellent political commitment headed by H.E Dr. Ali Gaffer, Adviser Health Affairs and supervising DGHA and Ms Deena Al A'sfoor, Director of Nutrtion and reflected by:
   - Inclusion of IDD in the national health program and budget
   - Legislation and supportive regulations on universal salt iodization
   - A national laboratory to provide data on salt and urinary iodine levels

Oman is now in the midst of a 2010 national baseline survey to: 1) update its data on urinary iodine concentrations; and 2) establish a program of education and social mobilization system.

Discussion

To reduce the variability in iodine status of the population, and also to improve the quality of iodized salt, more effort is needed by salt producers and importers, as well as the regulatory agencies, to assure that the iodine content of nationally produced and imported salt meet the Omani standards and WHO criteria. Improvement is needed in developing and implementing an on-going monitoring system for quality assurance and quality control for importation, production, distribution and marketing of iodized salt. Only about 36% of women in households reported awareness of iodized salt.

Pushing for better iodized salt coverage in Timor-Leste

Dr Mu Li ICCIDD, Sydney School of Public Health, The University of Sydney, Australia

Background

The total population in Timor-Leste is 1.1 million with an annual population growth rate of 3.1%. Based on a survey conducted in 1998 prior to the independence, 7 of the 13 districts in the country had a goiter prevalence of 20% or above, indicating moderate iodine deficiency. The coverage rates of adequately iodized salt at household level were reportedly at 72% in 2002 (Multi-indicator cluster survey) and 60% in 2007 (Timor-Leste Survey of Living Standards, TLSLS). It is estimated that 60% of salt in Timor Leste is imported and almost all iodized salt is imported from Indonesia or Australia. However not all imported salt is iodized. About 40% of the national demand for salt is met by locally produced salt, either by small scale salt boilers in several districts (Manatutuo, Liquicia, Bobonara and Covalima) or from a natural salt lake, Lake Laga in Baucau District. The locally produced salt is currently not iodized. In 2004 an assessment on salt production was conducted by Mr Lorenzo Locatelli-Rossi, a salt expert and an ICCIDD board member, and a 'Salt Iodization Program' plan 2004-2007 was prepared. Subsequently, salt legislation was drafted. The implementation of the program was, however, put on hold due to the political upheaval in the country at that time.

Recently, there has been a push to put the IDD control program back on the agenda. The Ministry of Health (MoH) and UNICEF have reached an agreement:

- To establish a National Committee on Control of Iodine Deficiency Disorders (NCCIDD) that was mentioned in the draft legislation prepared in 2005
- To finalize the Salt Iodisation Law
- To establish systems of salt iodization in 2 sites (Lake Laga and Manatuto).

On 2 June 2009 the Ministry of Tourism, Commerce and Industry (MTCI), United Nations Industrial Development Organisation (UNIDO) and United Nations Children's Fund (UNICEF) met to initiate a process to establish systems and services for iodisation of locally produced salt. The findings were:

1. National IDD program

1.1. In the National Nutrition Policy (2004) elimination of IDD is one of the policy objectives. Within the Ministry of Health activities are coordinated through Department of Nutrition.

1.2. The establishment of the National Committee on Control of Iodine Deficiency Disorders (NCCIDD) is a very positive step to re-enact what was left off in 2006. The development of the Terms of Reference of the Committee is still in progress.

2. The iodized salt situation

2.1. Imported salt: It is estimated that about 60% of all salt in Timor-Leste is imported and nearly all iodized salt is imported. The salt enters the country from both the sea and the land (from West Timor, Indonesia). There is no surveillance at port of entry nor documentation of the quantity or quality, ie. iodized or non-iodized of the salt coming in. Furthermore, there does not seem to be one authority in Timor-Leste to oversee the importation of salt and salt is often brought in with other consignment in small quantities. As the country has not officially adopted the Universal Salt Iodization policy, it was

Schoolgirls in Baucau can learn better with enough iodine

said that it would be difficult to enforce salt testing at the port of entry. In essence, there is no accurate data currently on the quantity and quality of iodized salt imported. In shops in Dili and some households in Manatuto, away from the coast, iodized salt has been found ('Kapal' brand in a 250 pack). It costs 0.1 U$/pack or 0.4 U$/Kg.

2.2. Locally produced salt: it is estimated about 40% salt sold in Timor-Leste is produced locally.

2.2.1. There are many existing small boilers along the coast in Manatutuo, Liquicia, Bobonara and Covalima Districts. The number of operators and their production capacity is not known. In order to boil the brine to produce salt, the operators have been cutting down trees for firewood. One operator commented that it is getting harder to gather firewood as trees near by had all been cut, they now need to go up to the mountain to cut trees and have to pay someone to bring the wood back by truck, which costs 25.0 U$ per load. The cost of the boiled salt is 1.0 U$/pack (≈1.0 Kg) or 15.0 U$/bag (≈40.0 Kg).

2.2.2. Each year between August and October (dry season) Lake Laga, a natural salt lake, in Baucau District produces solar evaporated crystal salt. People living in the surrounding areas are allowed to harvest salt for free (only required to share a small portion of their harvest with the local 'king of the ceremony'). Anecdotal report indicates that there is an increase of crystal salt from Lake Laga on the market in recent years, as this has been seen as a good way of making a subsidy to the family income. No data on the total quantity of salt is harvested each year. The cost of the crystal salt is 1.0 U$/pack (≈1.0 Kg) or 10.0 U$/bag (≈40.0 Kg).

2.2.3. The Ministry of Tourism, Commerce and Industry (MTCI) is planning to set up a medium scale industry (60 hectare solar evaporation bed) in Mamatuto District for salt iodization. Negotiation with the local people is still ongoing as this will be managed by the private sector with participation of the local people. Budget has been allocated for production of salt in 2009 and MTCI has already procured machines for iodized salt production. Since there are issues with Laga land ownership, the MTCI also intends to transport salt from Lake Laga to Manatuto for processing and packaging before the land issues are settled. MTCI is hoping to export salt produced in Mamatuto as well as to market locally. The TLSLS 2007 showed there was a wide disparity in iodized salt consumption in the households by district. Five out of 13 districts had iodized salt coverage below 50%.

3. Goiter among women of childbearing age

During the visit to Uma Ita Nian Community Health Centre in Aeilu District and Aeilu District Clinic antenatal clinic Dr Li had the opportunity to examine women of childbearing age, and no goiter was found. Anecdotal reports reveal that in recent 10 years or so large goiters are rarely seen in younger women in Aeilu District, away from the coast, which has one of the highest quality iodized salt coverage rates in Timor-Leste of 90.5% (TLSLS 2007).

Recommendations

1.1. The Goal: The current draft 'IDD elimination objective' states "To attain universal salt iodization (USI) and to increase household consumption of iodized salt in Timor-Leste to 90% by 2010". It is important to set a realistic goal and the goal should be agreed by all key stakeholders.

1.2. Status and Membership of the Committee: The purpose of the Committee is to build a national coalition and to provide leadership for the national IDD control program in Timor-Leste. It, therefore, should sit at a super-ministry level in order to coordinate all partnering ministries. In addition, there should be explicit roles for each member ministry and organization for accountability.

1.3. In order to implement the universal salt iodization legislation an enforcement mechanism should also be considered and put in place.

Universal salt iodization

The UNICEF Timor-Leste country office has engaged Dr Sunawong in a consultancy: (1) to develop an action plan and revise and finalize the salt legislation; (2) to develop a scheme and training program on salt iodization, monitoring, supervision and support of the salt iodization program. The consultancy is ongoing. For imported salt, it is important to set up a surveillance program to gather as much information as possible as to the quantity, as well as the type of salt and the quality of iodized salt coming in. The TLSLS data has shown that as much as 40% of iodized salt in some districts is inadequately iodized. The implementation of USI will enable the surveillance program. For locally produced salt, it is recommended to conduct a local salt producers audit to find out who they are, where they are, how much do they produce, where is the salt sold to, by whom, and at what price. As one of the key stakeholders, it is also important to get local salt producers' view on the feasibility of iodization, technical issues, such as quality control, environmental impact and alternative to fire wood, economic competitiveness, eg. the price of local salt vs. imported salt.

How can ICCIDD assist?

There are two areas identified that ICCIDD could potential work with the TL MOH and international agencies. Urinary iodine concentration (UIC) is the most commonly used indicator for population iodine status. UIC data has never been collected in TL. It is a missed opportunity that iodine nutrition is not included in the current TLDHS. One area is to conduct a small scale survey to explore the iodine deficiency situation in TL, particularly in pregnant and lactating women. TL has one of the highest birth and population growth rates in the world, with the current iodized salt coverage level, potentially thousands of children born each year are not protected from iodine deficiency in TL. Another area is to implement an iodized oil supplementation program to pregnant and lactating women and young children as a short- to medium-term measure.

Acknowledgement

Dr. Li would like to thank all representatives of key stakeholders for providing knowledge and insight on the iodine deficiency situation in Timor-Leste. Special thanks go to Ms Natalie McKelleher, Second Secretary for Development Cooperation, MS Amandina Amaral, Program Officer and Ms Herminia Freitas, Administration/Small Grants Officer AusAID.

Meetings and Announcements

Inaugural session of India International Salt Summit, 2010

India International Salt Summit 2010 in Gujarat

The India International Salt Summit-2010 took place on 22-24th January, 2010, at Ahmedabad, Gujarat. It was organized by the Indian Salt Manufacturers' Association (ISMA) in close collaboration with the Salt Commissioner, Government of India and the Industries and Mines Department, Government of Gujarat. It was supported by the Alkali Manufacturers Association of India (AMAI), the Central Salt Marine Chemicals Research Institute (CSMCRI) and the All India Institute of Medical Sciences (AIIMS). The Summit was held in the state of Gujarat, the leading salt producing state in India. Gujarat contributes 75 % of the country's total salt production. Gujarat is not only the largest salt producer in the country but also excels in productivity, quality and exports. Over 500 Indian and foreign delegates participated, and ICCIDD was one of the knowledge partners for the summit.

The Indian salt industry has made rapid strides during last six decades. From an import-dependant nation at the time of independence, today India ranks 3rd amongst 120 salt producing countries, with an annual production of about 19 million tonnes. After meeting the country's domestic requirements, the industry exports on an average 2 million tonnes to 30 countries. The Summit provided a platform for meetings between Indian and international salt producers and enabled Indian producers, especially the small and medium scale enterprises, to learn and understand the opportunities available for modernization, mechanization and improvement of the quality of salt.

The broad areas covered during the summit were: a) modernization of salt works and salt production; b) upgrading quality; c) learning ways and means of increasing productivity; d) applying modern technology in salt production; and e) interaction between various interests and stake-holders. The following seven technical sessions were held during the summit:

1. Technical Session-I: Emerging Indian Salt Industry
2. Technical Session-II: Mechanization & Modernization, Production & Processing Technologies
3. Technical Session-III: Mechanization & Modernization, Mechanisation of Salt Works
4. Technical Session-IV: Biological Management of Solar Salt Works
5. Technical Session-V: Salt Fortification: Status of USI in India & Global Experience
6. Technical Session-VI: International Trade in Salt
7. Technical Session-VII: Chlor-Alkali Industry
8. Technical Session-VIII: Open House

A summit declaration outlining the future course of action to strengthen the salt industry in India was read out and unanimously adopted by the summit delegates. ISMA will strive to achieve the declaration aims, by seeking active cooperation of all the salt producers, big and small, of all salt sources in India, the Government agencies and other national/international stakeholders. The participants collectively committed themselves to achieve the desired goals for ensuring human welfare for all concerned.

Much of India's salt is produced in Gujarat

Australian expert group recommends iodine supplementation during pregnancy

In a report issued in January 2010, The National Health and Medical Research Council (NHMRC) recommends that all women who are pregnant, breastfeeding or considering pregnancy, take an iodine supplement of 150 micrograms (µg) each day. Women with pre-existing thyroid conditions should seek advice from their medical practitioner prior to taking a supplement.

Abstracts

Perchlorate and thiocyanate exposure and thyroid function in first-trimester pregnant women.

The objective of this study was to determine whether environmental perchlorate and/or thiocyanate exposure is associated with alterations in thyroid function in pregnant women in Cardiff, Wales, and Turin, Italy. During 2002-2006, 22,000 women at less than 16 wk gestation were enrolled in the Controlled Antenatal Thyroid Screening Study. Subsets of 261 hypothyroid/hypothyroxinemic and 526 euthyroid women from Turin and 374 hypothyroid/hypothyroxinemic and 480 euthyroid women from Cardiff were selected based on availability of stored urine samples and thyroid function data. Urinary iodine was low: median 98 μg/L in Cardiff and 52 μg/L in Turin. Urine perchlorate was detectable in all women. The median (range) urinary perchlorate concentration was 5 μg/L (0.04-168 μg/L) in Turin and 2 μg/L (0.02-368 μg/L) in Cardiff. In multivariable linear analyses, log perchlorate was not a predictor of serum FT4 or TSH. Low-level perchlorate exposure is ubiquitous but did not affect thyroid function in this cohort of iodine-deficient pregnant women.

Pearce EN et al.J Clin Endocrinol Metab. 2010 Apr 28. [Epub ahead of print]

Developmental iodine deficiency and hypothyroidism impair neural development in rat hippocampus: involvement of doublecortin and NCAM-180.

Developmental iodine deficiency results in inadequate thyroid hormone (TH), which damages the hippocampus. The authors investigated the roles of hippocampal doublecortin and neural cell adhesion molecule (NCAM)-180 in developmental iodine deficiency and hypothyroidism. Two developmental rat models were established with either an iodine-deficient diet, or propylthiouracil (PTU)-adulterated water (5 ppm or 15 ppm) to impair thyroid function, in pregnant rats until postnatal day (PN) 28. The results show that nerve fibers in iodine-deficient and 15 ppm PTU-treated rats were injured. Downregulation of doublecortin and upregulation of NCAM-180 were observed in iodine-deficient and 15 ppm PTU-treated rats from PN14 on. These alterations were irreversible by the restoration of serum TH concentrations on PN42. Thus, developmental iodine deficiency and hypothyroidism impair the expression of doublecortin and NCAM-180, leading to nerve fiber malfunction and thus impairments in hippocampal development.

Gong J, et al. BMC Neurosci. 2010 Apr 23;11(1):50. [Epub ahead of print]

Association between serum ferritin and goitre in Iranian school children.

The study investigated the role of iron status in the etiology of goiter in school children in Isfahan, Iran. Two thousand three hundred and thirty-one school children were selected by multi-stage random sampling. Thyroid size was estimated by inspection and palpation. Urinary iodine concentration (UIC) and serum ferritin were measured. Overall, 32.9% of the children had goiter. The median UIC was 195.5 μg/L. The prevalence of iron deficiency in goitrous and non-goitrous children was 9.6% and 3.1% respectively (p=0.007). Iron deficiency is associated with goiter in Iranian children.

Hashemipour M, et al. J Health Popul Nutr. 2010; 28(2):137-42.

Iodine deficiency in Australia: is iodine supplementation for pregnant and lactating women warranted?

Recent research has confirmed that Australian children and pregnant women are mildly iodine deficient. It is essential to avoid iodine deficiency in pregnancy. The proposal of Food Standards Australia and New Zealand (FSANZ) - Mandatory Iodine Fortification for Australia (P1003) - has been implemented. FSANZ openly admits P1003 is inadequate for covering the needs of pregnant women. Therefore, health professionals and the public must be properly informed about the limitations of this proposal. Views differ about the most effective measures to prevent iodine deficiency in Australia. We propose that women planning a pregnancy, and pregnant and lactating women should be advised to take an iodine supplement. Women with pre-existing thyroid disease should exercise caution and seek medical advice before taking a supplement.

Gallego G, et al. Med J Aust. 2010;192(8):461-3.

Role of dietary iodine and cruciferous vegetables in thyroid cancer: a countrywide case-control study in New Caledonia.

Exceptionally high incidence rates of thyroid cancer have been reported in New Caledonia, particularly in Melanesian women. To clarify the reasons of this elevated incidence, a countrywide population-based case-control study was done. The study included 293 cases of thyroid cancer and 354 population controls. Using a food frequency questionnaire and a measure of total daily iodine intake based on a food composition table, the role in thyroid cancer of food items rich in iodine-such as seafood-and of vegetables containing goitrogens-such as cruciferous vegetables was studied. High consumption of cruciferous vegetables was associated with thyroid cancer among women with low iodine intake (OR = 1.86; 95% CI: 1.01-3.43 for iodine intake <96 μg/day). The high consumption of cruciferous vegetables among Melanesian women, a group with mild iodine deficiency, may contribute to the high incidence of thyroid cancer in this group.

Truong T, et al. Cancer Causes Control. 2010 Apr 2. [Epub ahead of print]

Endemic goitre and excessive iodine in urine and drinking water among Saharawi refugee children.

The study was undertaken in four refugee camps in the Algerian desert; the subjects were 421 Saharawi children, 6-14 years old. Enlarged Tvol was found in 56 % (Tvol-for-age) and 86 % (Tvol-for-body-surface-area) of the children. The median (25th percentile-75th percentile, P25-P75) urinary iodine concentration (UIC) was 565 (357-887) μg/l. The median (P25-P75) iodine concentration in household drinking water was 108 (77-297) μg/l. The children were suffering from endemic goiter and high UIC caused probably by an excessive intake of iodine. The excessive iodine intakes probably originate from drinking water and milk.

Henjum S, et al. Public Health Nutr. 2010 Apr 1:1-6. [Epub ahead of print]

Biofortification of lettuce (Lactuca sativa L.) with iodine.

The main aim was to study the effect of iodine form and concentration in the nutrient solution on growth, development and iodine uptake of lettuce, grown in water culture. In both a winter and summer trial, dose rates of 0, 13, 39, 65, and 90 or 129 μg iodine/L, applied as iodate or iodide, did not affect plant biomass, produce quality or water uptake. Increases in iodine concentration significantly enhanced iodine content in the plant. Iodine contents in plant tissue were up to five times higher with iodide than with iodate. Iodine was mainly distributed to the outer leaves. Fifty grams of iodine-biofortified lettuce would provide, respectively, 22% and 25% of the recommended daily allowance of iodine for adolescents and adults.

Voogt W et al., J Sci Food Agric. 2010;90(5):906-13.

Survey of iodine deficiency and intestinal parasitic infections in school-going children: Bie Province, Angola.

A cross-sectional study was done in children aged 6-10 years (n=1029) in Bie Province, Angola. There was widespread severe and moderate deficiencies in iodine. In all, 80 % of all children were infected with one or a combination of intestinal helminths and intestinal protozoa. The authors recommend immediately planning and implementation of a strategy to provide sufficient iodine through iodized oil capsules and iodized salt to the iodine-deficient population. National coalitions need to be strengthened among the government, partners and salt producers. It was also recommended that all the children in schools be de-wormed for multiple helminth species at least twice a year.

Tomlinson M, et al. Public Health Nutr. 2010 Mar 26:1-5. [Epub ahead of print]

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