Towards the global elimination of brain damage due to iodine deficiency—the role of the International Council for Control of Iodine Deficiency Disorders

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An extensive report on the global programme for the elimination of brain damage due to iodine deficiency is outlined in a recently published book ‘Towards the Global Elimination of Brain Damage due to Iodine Deficiency’, which was reviewed recently by the IJE.1

This book is addressed to a broad multidisciplinary audience from the international community concerned about the global problem of brain damage due to iodine deficiency and its elimination by the consumption of iodized salt.

Iodine deficiency is the most common preventable cause of brain damage in the world today with an excess of 2 billion at risk in 130 countries.

This book reports the progress of the global programme since the elimination goal was adopted by the World Summit for Children, meeting at the UN, New York in 1990.

By the year 2000, significant progress had been achieved with almost 70% of households having access to iodized salt compared with 20–30% in 1990.

Therefore, there is a continuing challenge both to increase the coverage and to sustain the coverage already achieved and so achieve the new UN elimination goal, which was accepted for 2005.

Critical to the progress achieved has been the development of an international non-government organization (NGO)—the International Council for Control of Iodine Deficiency Disorders (ICCIDD). This organization has been modelled on the IEA, which is international with individual membership. However, the ICCIDD is multidisciplinary with a range of necessary expertise required for national iodine deficiency disorder (IDD) elimination programmes.

I have found that three steps are necessary for a successful strategy to meet the challenge of iodine deficiency as a major international public health problem.

(i) The establishment of a scientific base, for re-conceptualization of the problem with a suitable acronym for mass communication—IDD;
(ii) Bridging the gap to a public health programme, with the creation of a non-government organization, the ICCIDD,

The iodine deficiency disorders

The results of recent research required a re-conceptualization of the main effect of iodine deficiency from the common lump in the neck (goitre) to a general effect on growth and development, especially brain development.

To this end in 1983 I proposed the term ‘iodine deficiency disorders’ (IDDs), a term now current throughout the world.2

The term IDD refers to all the effects of iodine deficiency on growth and development in both human and animal populations, which can be prevented by correction of the iodine deficiency. These include goitre, stillbirths, neonatal and other types of hypothyroidism, but the most important effect is that of fetal brain damage.2

Effects on brain function occur at all stages of life, from early fetal damage to hypothyroidism in the neonate, child, or adult. The iodine deficient mother is unable to produce the extra thyroid hormone required to cross the placental barrier during the first half of pregnancy. At this time rapid growth of the fetal brain is taking place for which the maternal thyroid hormone is essential. Deficiency of iodine causes maternal hypothyroidism, leading to irreversable fetal brain damage, which can be totally prevented by correction of the iodine deficiency before pregnancy.3

A meta-analysis of research has reported a total of 18 studies in which comparison was made between iodine deficient populations with suitable control populations with a similar social and cultural background.4

These studies revealed that the mean score for the iodine deficient group was 13.5 IQ points below that of the non-iodine deficient groups. These data further indicate the major population dimension of the effect of iodine deficiency on neuropsychological development.

Social and economic effects result from iodine deficiency in both human and animal populations. In humans there is reduced school performance in children and reduced productivity and quality of life in adults.

This is the experience that had to be communicated to the people and the politicians of 130 IDD affected countries.
The International Council for Control of Iodine Deficiency Disorders (ICCIDD)

The ICCIDD, which I initiated with international colleagues in 1985 was formally inaugurated in Kathmandu in 1986 with personal support from the Director General of WHO and the Executive Director of UNICEF in 1986.

From the beginning, the ICCIDD adopted the policy of assistance to national programmes through regional meetings of multidisciplinary groups of public health professionals, in collaboration with WHO and UNICEF throughout the world.

The ICCIDD has the specialized scientific expertise necessary for successful public health programmes. WHO and UNICEF have limited scientific resources—they cannot carry the level of expertise required within their own necessarily limited staff establishments over to the wide range of problems they are called on to meet.

The ICCIDD has been recognized as an expert advisory group to the UN Agencies and has formal NGO status with WHO.

The ICCIDD is now an international multidisciplinary network of more than 700 professionals from 100 countries. This network includes epidemiologists, endocrinologists, a great variety of public health professionals as well as technologists, expert on all aspects of iodized salt and the determination of urine iodine.5

The work of the ICCIDD has developed at three different levels, global, regional, and national.

Global activities

At the global level the ICCIDD has been successful in greatly increasing the awareness of IDD as an international health problem of major importance within the UN System and beyond. It is now recognized by WHO that iodine deficiency is the single most important preventable cause of mental defects in the world today.

The ICCIDD has participated fully in a series of meetings with WHO and UNICEF concerned with different technical aspects of control programmes such as the methods of assessment and the criteria for elimination.6 The ICCIDD plays a special role in adapting scientific information for public health recommendations.

Other activities include applied research (oral dosage of iodized oil, simplified method for urine iodine) and training programmes (laboratory method for urine iodine excretion). The ICCIDD maintains a databank on country programmes (CIDDS), which is continuously updated. It provides monitoring details on progress towards the goal of elimination.

Finally, publications have been very important for the creation of an informed group of professionals throughout the world. These include the IDD Newsletter published quarterly by the ICCIDD since 1985 (edited by Dr JT Dunn) with a circulation of 4400. Since 1985 the IDD Newsletter has provided a unique series of reports on IDD at country level as well as scientific and technical developments. A series of books have been published by the ICCIDD on all aspects of IDD.1

Regional activities

The ICCIDD has regional coordinators for Africa, America, Asia Pacific, South East Asia, China and Far East, West and Central Europe, Eastern Europe and Central Asia, and the Middle East.

In Africa four subregional coordinators are responsible for countries in the West (one each) for Anglophone and Francophone, Central and South-Eastern Regions. Each regional and subregional coordinator is a member of the Board of Directors and makes an annual report on IDD activities in the region and also takes appropriate initiatives including consultancies to individual countries to promote national programmes.

A significant factor in the development of national programmes has been a series of regional meetings held since 1986 throughout the world by the ICCIDD with the support of WHO and UNICEF. These meetings have been attended by country representatives, from the Ministries of Health and other important sectors, such as the salt industry and media in relation to national programmes. These meetings took place in Yaounde (Cameroon) 1987, Delhi (India) 1989, Dar es Salaam (Tanzania) 1990, Tashkent (former USSR) 1991, Brussels (Belgium) 1992, Alexandria (Egypt) 1993, Quito (Ecuador) 1994, Dhaka (Bangladesh) 1995, Harare (Zimbabwe) 1996, Munich (Germany) 1997 and Beijing (China) 1998. More recently a regional meeting was held in Chiang Rai (Thailand) 2003, and in Lima (Peru) 2004.

It is through these regional meetings that the experts within the ICCIDD network have been able to communicate with professionals from many countries. This has subsequently developed further with consultancies and further contacts designed to identify obstacles to progress and remove them.

Progress has been notable in Africa. At the first African regional meeting (Yaounde, Cameroon in 1987), only 22 countries were represented. Subsequent participation was facilitated by the creation in 1987 of the IDD Task Force for Africa by the ICCIDD. In 1996, 45 countries were represented including Angola, Mozambique, and Eritrea in spite of the occurrence of civil war in these countries.1

The expertise required includes nutrition, endocrinology, epidemiology, laboratory technology (salt iodine, urine iodine), advice regarding planning, education, communication, management, iodized salt, and other iodine technologies relevant to national programmes. This is met by the ICCIDD multidisciplinary network.

At these regional meetings a model for a national programme (the ‘wheel’ model) has been presented to show its multisectoral nature and the relation between the different elements.

National IDD elimination programmes

The national programme is now seen as a social process with a number of components. Notable among these components is political will, which has been obviously lacking both in the past and the present. Another feature is the need for communication and education of the community about the problem of IDD. This is all-important because as soon as possible, developing countries need to take on total responsibility for funding as well as the administration of these programmes.

The ‘wheel’ model

The various components involved in the social process can be shown in the form of a wheel (Figure 1). The Wheel must be kept turning to indicate an effective programme.5
Political decision, which includes the allocation of the necessary funds from the government resources within the country supplemented by external funds from bilateral and/or multilateral sources. As already indicated, recent estimates indicate the cost of iodized salt is up to 7 cents per person per year (less than the cost of a cup of tea in many countries) and for iodized oil, 20 cents per person per year. These costs for salt iodization are indeed modest when compared with the benefits and they should be readily absorbed by the salt industry with only minor increase in cost. 

This 'wheel' represents the continuous ‘feed back’ process involved in the national IDD programme. All ‘actors’ in the programme need to understand the whole social process. A continuous series of steps are required to achieve success.

(i) Assessment of the IDD problem with estimates of the population at risk, the prevalence of goitre and cretinism, evidence of iodine deficiency from measurement of urine iodine excretion in school children and also in women of reproductive age and pregnant women. Early morning samples of urine should be collected from 40 or more subjects to give the median levels. The normal median level is 100 µg/litre. In addition, the nature and operation of the salt industry must be assessed to enable planning to proceed for salt iodization.

(ii) Communication of the problem to the public and the politicians in terms they can understand—effects on growth and development of children, including the prevalence of the handicapped, reduced school performance, and reduced productivity and quality of life in adults. The effects on livestock can also be pointed out because this has an immediate economic return with correction of iodine deficiency.

(iii) The development of a plan including the salt industry, the education system, and the media as well as the public health professionals. Consumers should be represented. This requires an intersectoral commission or coalition, with a chairman carrying sufficient political authority to implement the plan once it has been approved by the government.

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(v) Implementation, including the organisation of the supply of iodized salt, iodized oil (if necessary), appropriate training, and education programmes. An emergency phase using iodized oil may be required for a region with cretinism and severe iodine deficiency for the immediate prevention of cretinism and lesser degrees of brain damage.

(vi) Monitoring and evaluation of the programme. This requires process indicators on delivery of iodized salt, checking its iodine content in the factory, on arrival at the destination and in the home. It includes the determination of iodine in the population by measurement of urine iodine as already described.

The final responsibility for the national programme rests on national governments and the role of the international agencies is to work with national governments to assist them with appropriate advice, funding, and training. But from the beginning the country concerned will be involved in expenditure from its own, often very scarce, resources.

This means that IDD control must compete with other health problems for priority. The recognition of the significance of IDD in social and economic terms is critical to IDD control receiving such priority attention.

These considerations are very important in rallying political support for IDD control. The remarkable cost benefit from the prevention of IDD was noted in the 1992 World Bank Report on Health and Development and emphasized in a subsequent report from the Bank. An investment of $1.00 in IDD prevention leads to a return of $28.00.7

Conclusion

The ICCIDD has substantially fulfilled the hopes expressed in 1986 in a previous annotation in the IJE.8

Our experience indicates that the NGO model can indeed be effective in assisting a global public health programme in making it initially effective and sustainable. We hope this experience will assist the establishment of other NGOs in order to assist other global programmes in collaboration with the UN Agencies in other areas of public health.

References


