

Original Article

Elimination of iodine deficiency disorders by 2000 and its bearing on the people in a district of Orissa, India: a knowledge–attitude–practices study

Surendra SS Mohapatra MBBS, Gandham Bulliyya PhD, Anna S Kerketta MBBS, Jagajivan JB Geddam MBBS and Ardhendu S Acharya MPhil

Regional Medical Research Centre, Indian Council of Medical Research, Bhubaneswar, India

A knowledge–attitude–practices (KAP) study was conducted along with a prevalence study of iodine deficiency disorders (IDD) between 1998–99 in the district of Bargarh, Orissa state, India. A total of 635 people were interviewed by a pretested structured questionnaire, adopting the probability proportional to size cluster sampling method. The aim was to assess the baseline information on the KAP of the people regarding IDD. Only 37% of the males and 29.3% of the females perceived goitre as a disease. Less than 5% of both sexes knew how goitre is caused. Only 16.4% used iodised salt regularly. The awareness and perception of IDD does not correspond with the time and effort we have spent in education of this disease. The implications of this poor knowledge about IDD and consequent poor use of iodised salt is contrasted to the optimistic target of elimination of IDD. This aspect is discussed in this paper, at a time when we are at the beginning of the new millennium.

Key words: iodine deficiency disorders, iodised salt, knowledge–attitude–practice study, Orissa (India).

Introduction

Iodine deficiency disorders (IDD) refers to a wide spectrum of the effects of iodine deficiency on human growth and development. While goitre is the most visible form to an individual, endemic cretinism characterized by mental deficiency, deaf-mutism and spastic diplegia are its severest forms.¹ It is not merely a public health problem and nutrition issue, but also a major obstacle to human and economic development.²

It is estimated that 1571 million people in the world are at risk of IDD with 686 million affected by goitre and about 20 million are mentally handicapped.³ In India, a conservative estimate suggests that about 167 million people live at risk of IDD and 2.2 million Indian children are estimated to suffer from cretinism.⁴ The problem of IDD exists in 25 states and five union territories of India. The salt iodination programme to control goitre was introduced in India during 1958–62, following the successful demonstration of its effectiveness in reducing the prevalence of goitre in the Kangra valley study.⁵ The programme is currently operated as the National Goitre Control Programme (NGCP). However, the control programme did not yield successful results through its initial 15 years of operation as a result of several reasons.⁶ The programme was rapidly evaluated by the Nutrition Foundation of India (NFI), which revealed that one of the major factors for the failure is public ignorance, besides others.⁷

A global challenge is set for elimination by the year 2000 of IDD, which is a major nutritional disorder for which the techniques of treatment, control and prevention are easily available. All it requires is a strong will, wider awareness and cooperation among those who hold the key to the solution of

this problem.⁸ In Orissa state, although the problem of IDD exists and the state has accepted the universalisation of the iodised salt programme, no information is available regarding the geographical distribution, prevalence and endemicity of IDD; more so about the knowledge, attitudes and practices of the people towards the problem. Therefore, the present study was undertaken to assess the baseline information on these aspects.

Materials and methods

Study area and population

The study was conducted in the Bargarh district of Orissa state, as the pilot survey done by us earlier during 1995, showed a high average total goitre rate of 18% (ranging from 9.2% to 32%) in schoolchildren. The district has a population of 1 207 172, distributed in 12 blocks, spread in an area of about 6000 square kilometres with a population of 207 per square kilometre. The average literacy rate was 51.53% (males 67.66%, females 34.32%). The western part having a common border to the state of Madhya Pradesh has dense forest and hills. The total forest area of the district is 19.4% and there is an urban population of 6.9%. Among the total population, 17% were cultivators and 12% were agricultural labourers. Only 0.2% were engaged in livestock,

Correspondence address: Dr SSS Mohapatra, Assistant Director, Regional Medical Research Centre, Chandrasekharpur, Bhubaneswar 751023, India.

Tel/Fax: +91 674 440076

Email: mohapatrass@hotmail.com

Accepted 21 August 2000

forestry, fishing, hunting and plantation. A meagre 0.4% were engaged in mining and quarrying and 3.5% in household and other industries.⁹

Study design

The probability proportionate to size (PPS) cluster sampling method was adopted using the known prevalence rate of goitre as found by the pilot survey. A total of 30 clusters were selected.¹⁰ For the main IDD prevalence study, 30 primary schools, one in each cluster, were visited and at least 80 children were examined clinically for their goitre status as per the recommendations of WHO/UNICEF/ICCIDD.¹¹ This KAP study was done as an extension of the prevalence study involving 25% of the schoolchildren's parents. Every fourth household was visited and one of the parents was interviewed through a pretested structured questionnaire. Studies using the PPS cluster sampling method have shown that 30 clusters with different number of respondents in each, such as 71 468 or 215, were used successfully.¹² Thus, a total of 635 subjects were included in the study, which constituted 64.6% (410) male and 35.4% (225) female parents who gave their informed consent and volunteered to participate. A team comprising of a medical officer, an anthropologist and other paramedical personnel carried out the interview. The questionnaire was designed to elucidate information on respondents' knowledge, attitude and practices about IDD. It facilitated the collection of data on peoples' knowledge about the causes of goitre, mental retardation, dwarfism, etc. In addition, information was also obtained about the number of persons using iodised salt (IS).

Division of zones

As the district headquarters (DHQ) of Bargarh is not centrally located, the district border on the northern side is just 20 km from DHQ, whereas on the southern side it is 120 km (Fig. 1). It was found that the literacy rate gradually decreased as the distance increased from DHQ. Based on these criteria of literacy rate and distance from DHQ, the study area was arbitrarily divided into four zones: namely, zone A (within 20 km with a literacy rate of 51.5%), zone B (between 21 and 40 km with a literacy rate of 47.8%), zone C (between 41 and 100 km with a literacy rate of 40.5%) and zone D (above 100 km with a literacy rate of 35.9%).⁹ The data were analysed for test of significance by using a proportion test.

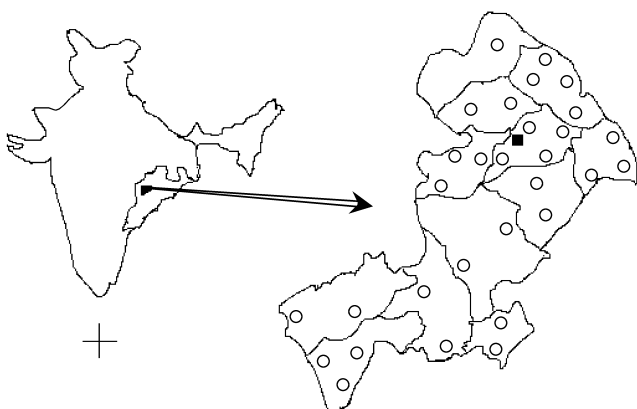


Figure 1. Map of Bargarh district showing study area (not to scale). (■), district headquarters; (○), selected clusters.

Results

Knowledge of the local name for the swelling of the neck

The Table 1 depicts the percentage distribution of respondents' KAP about IDD. The results showed that 33% of the respondents had known that the 'swelling of the neck' is an abnormal condition and is called *galaganda* (local name for goitre). This knowledge among the males varied from 19.7% to 51.3% and among females from 11.3% to 48.9% in different zones.

Perception of goitre as a disease

Goitre was considered as a disease by 34.3% of people. This perception among males varied from 20.8% to 61.5% and among females from 9.8% to 46.8%.

Knowledge about the prevention of goitre

A meagre 9.8% of the people responded that IS can prevent goitre. The proportion of females with this knowledge is significantly less (5.8%) than males (11.9%).

Knowledge that ID causes goitre, stunted growth and mental retardation

A small proportion of 4.4% of respondents knew that iodine deficiency (ID) causes goitre, stunted growth and mental retardation (males 5.9% and females 1.8%). The sex variation is found to be significant.

Availability of iodised salt

Only 23.3% were aware about the availability of IS in their locality. The awareness among males was significantly higher (28.3%) than females (14.2%).

Use of iodised salt

The proportion of people who used IS regularly was very low, being 16.4% with a significant sex variation.

Exposure to media

The media exposure about IS among the respondents was 20.6%. It is observed that the exposure of females in all zones to various audiovisual media like television, radio and newspaper, etc., was significantly less (15.1%) compared with males (23.6%). The details of the exposure of the public to the three important communication media such as radio, television and newspaper are as follows: the male and female exposure rates are 66.7% (28 out of 42) and 33.3% (14 out of 42) to TV, 79.6% (39 out of 49) and 20.4% (10 out of 49) to radio and 75% (30 out of 40) and 25% (10 out of 40) to newspaper, respectively. It is gathered from the respondents that there was no deliberate interpersonal effort so far by any agency to disseminate an IDD control message among the people of this area.

Literacy rate

The total literacy rate among the interviewees was found to be 66.3% (males 79.3% and females 42.7%). The female literacy rate in all zones was observed to be lower than the males.

Knowledge about the cause of goitre

Table 2 shows that a meagre 4.4% of the respondents knew that ID is the cause of goitre and the bulk of 80.1% did

not know it. The rest, 15.4%, came out with vague answers attributing the causes to air, water, food and cold. This knowledge about the cause of goitre among the males was significantly higher than females.

Discussion

In recent times, the need to advocate for good public health is receiving growing recognition. For an effective advocacy, it is essential to look for two channels: the political channel

Table 1. Zone-based percentage distribution of knowledge, attitude and practices about iodine deficiency disorders

Variables	Zone A		Zone B		Zone C		Zone D		All zones		Total
	n = 78 M	n = 47 F	n = 178 M	n = 71 F	n = 69 M	n = 47 F	n = 85 M	n = 60 F	n = 410 M	n = 225 F	n = 635 Both sexes
No. people knowing the local name for 'swelling of the neck'	51.3 (40)	48.9 (23)	19.7 (35)	11.3 (8)	34.8 (24)	38.3 (18)	41.2 (35)	45.0 (27)	32.7 (134)	33.8 (76)	33.0 (210)
No. people consider goitre as a disease	61.5 (48)	46.8 (22)	20.8 (37)	9.8* (7)	39.1 (27)	21.3* (10)	47.0 (40)	45.0 (27)	37.0 (152)	29.3 (66)	34.3 (218)
No. people knowing that iodized salt can prevent goitre	8.9 (7)	4.3 (2)	11.8 (21)	8.4 (6)	11.6 (8)	2.1 (1)	15.3 (13)	6.7 (4)	11.9 (49)	5.8* (13)	9.8 (62)
No. people knowing that iodine deficiency causes goitre, stunted growth and mental retardation	1.3 (1)	2.1 (1)	4.5 (8)	4.2 (3)	15.9 (11)	0.0 (0)	4.7 (4)	0.0 (0)	5.9 (24)	1.8* (4)	4.4 (28)
No. people knowing that iodized salt is available locally	19.2 (5)	19.1 (9)	30.9 (55)	14.1* (10)	37.7 (26)	12.8* (6)	23.5 (20)	11.7* (7)	28.3 (116)	14.2* (32)	23.3 (148)
No. people using iodized salt	19.2 (15)	17.0 (8)	20.8 (37)	16.9 (12)	24.6 (17)	6.4* (3)	11.8 (10)	3.3* (2)	19.3 (79)	11.1* (25)	16.4 (104)
Exposure to media about iodized salt	20.5 (16)	19.1 (9)	24.1 (43)	16.9 (12)	26.0 (18)	14.9 (7)	23.5 (20)	10.0* (6)	23.6 (97)	15.1* (34)	20.6 (131)
Number of literate people	87.2 (68)	44.7 (21)	80.3 (143)	50.7* (36)	66.7 (46)	29.8* (14)	80.0 (68)	41.7* (25)	79.3 (325)	42.7 (96)	66.3 (421)

Figures in parentheses indicate numbers. * Significant ($P < 0.05$).

Table 2. Zone-based percentage distribution of respondent's knowledge about the cause of goitre

Causes	Zone A		Zone B		Zone C		Zone D		All zones		Total
	n = 78 M	n = 47 F	n = 178 M	n = 71 F	n = 69 M	n = 47 F	n = 85 M	n = 60 F	n = 410 M	n = 225 F	n = 635 Both sexes
Iodine deficiency	1.3 (1)	2.1 (1)	4.5 (8)	4.2 (3)	15.9 (11)	0.0 (0)	4.7 (4)	0.0 (0)	5.9 (24)	1.8* (4)	4.4 (28)
Air	1.3 (1)	4.2 (2)	0.6 (1)	0.0 (0)	1.4 (1)	0.0 (0)	4.7 (4)	0.0 (0)	1.7 (7)	0.9* (2)	1.4 (9)
Water	15.4 (12)	4.2* (2)	5.6 (10)	0.0 (0)	7.2 (5)	0.0 (0)	5.9 (5)	1.7 (1)	7.8 (32)	1.3* (3)	5.5 (35)
Food	3.8 (3)	2.1 (1)	5.0 (9)	0.0 (0)	7.2 (5)	0.0 (0)	5.9 (5)	1.7 (1)	5.4 (22)	0.9* (2)	3.8 (24)
Cold	7.7 (6)	4.2 (2)	0.6 (1)	0.0 (0)	2.9 (2)	8.5 (4)	3.5 (3)	20.0* (12)	2.9 (12)	8.0* (18)	4.7 (30)
Don't know	70.5 (55)	83.0* (39)	83.7 (149)	95.8* (68)	65.2 (45)	91.5* (43)	75.3 (64)	76.7 (46)	76.3 (313)	87.1* (196)	80.1 (509)

Figures in parentheses indicate number. *Significant ($P < 0.05$).

(to obtain commitment and to create will) and the communication channel (to create public demand, sustained political will and to inform and enlighten people on the matters of life).¹³ Although the NGCP has been operational in India since 1962 and IDD control is now being given due emphasis in health policies and planning, as a result of a rapid change in scientific and administrative attitude, there is still a paucity of area-specific information about the current status of IDD and people's access to IS in India.¹⁴

It has been realised that for effective implementation of any control programme and for its success, it is essential to ensure people's access to IS. An increased awareness among the public, who are the beneficiaries of the programme, is also needed. Unless this public demand is created first, no control measures thrust on the people, without their active participation, will have the desired effect. Therefore, it is important to evaluate the knowledge, attitude and practices of the people which are the essential key factors in planning the methods for creating such public demand.

Our study shows that people in all the zones, irrespective of sex, were equally ignorant about the condition of 'swelling of the neck'. About one-third of the respondents knew the local name of goitre. The proportion of respondents who considered goitre as a disease was 34.3%. Thus, the majority of the people accepted this condition as normal. Venkatesh Mannar (1994) had also indicated the importance of a well-conceived information-education-communication (IEC) campaign incorporating a social marketing approach to educate consumers, generate demand for and to encourage the use of IS. Citing the example of Bolivia, he observed that a long-standing cultural acceptance of goitre as a normal condition in this country and an absence of knowledge about the less obvious manifestations of IDD had to be addressed in educational strategy.¹⁵

Regarding the cause of goitre, it was observed that hardly anybody knew it correctly, the right answer coming from only 4.4% of the respondents. The majority (80.1%) of the people were found to be oblivious about the precise cause of goitre. The rest (15.5%) attributed it to various irrelevant causative factors like air, water, food and cold.

Although only 9.8% of the people knew the fact that goitre can be prevented by taking IS, a little higher proportion of people were found to use it, indicating that many use it without realising its benefits. Some preferred this to rock salt because of its fine texture and whiter colour.

The most disturbing finding was, that on an average, a meagre 16.4% (ranged from 3.3% to 24.6%) of people in the area are using IS, although 23.3% of people knew that something called IS is available to them locally. The reason for this discrepancy in the knowledge of availability and use of IS are found to be many fold. The most important of them are the higher cost of IS, the availability of non-iodised rock salt on barter (exchange) for 'Mahula' (the local raw material for producing alcohol) and the fact that only an adequate requirement of the salt is needed as the taste in food is met with a smaller amount of rock salt. Zarger *et al.* (1996) have observed that in the Kashmir valley, lack of awareness in a dual market leads the population (specially the rural poor) to choose non-iodised salt, even if it is only marginally cheaper.¹⁶

Chaturvedi (1996) has observed that a proper and efficient communication support is a very essential element of this programme, especially where both types of salt (iodised and non-iodised) are marketed. In major parts of our country, a dual market still exists, where a cheaper uniodised salt competes with the iodised one.¹⁴ This issue was also identified at the Harare conference in 1997 as one of the constraints of obstructive pricing policy where iodised salt is more expensive than non-iodised salt.¹⁷ As revealed in our study, the media exposure of female interviewees through radio is higher than TV and newspaper, in contrast to the males which is higher through TV followed by newspaper and least through radio medium. This discrepancy is due to the fact that almost each household possesses a radio and only a few possess a TV. The higher exposure among males to TV is due to their active movements to different urban areas and frequent viewing in a community centre having a TV. The low media exposure rates in females through newspaper (25%) and the higher rates in males (75%) is due to the discrepancy in their literacy rate. In addition, the females are confined to their household chores and they do not get a newspaper in their houses. This restricts their exposure to the newspaper medium. The males, as a result of their increased outdoor habits, share a newspaper among themselves at the community centre, a teastall, a Betel shop, or at other places of their daily assembly. The average literacy rate of the people was found to be satisfactory being 66.3% (the state and national average being 49.1% and 52.2%, respectively).¹⁸ However, this did not seem to offer any better advantage over the non-educated group so far as the use of IS and the knowledge of IDD as a whole is concerned. Thus, people with close proximity to DHQ were not better off than the far off areas in the dissemination of information. It indicates that the message did not reach adequately to any of the zones.

Van der Haar (1997) has highlighted that while in principle all components such as communication, information, management and laboratory support should integrate and complement them with ongoing efforts for general nutritional improvement, national IDD programmes also have specific needs which require separate arrangements.¹⁹

Ling and Reader-Wilstein have indicated that even when there is a general awareness of IDD and IS is available, its consumption remains unacceptably low.²⁰

Trung and Tolvanen (1999) have discussed the programme of universal salt iodination (USI) in Vietnam. There, the survey of 1997 had shown that over 90% of the population have good knowledge and positive attitude about USI, but to translate this knowledge into equally high-level practice still needs further attention.²¹ In the Munich conference (September 1997), the status of IDD in different states was discussed and in the state of Rumania poor acceptance of IS by the public was recognised as a problem.¹⁷

Thus, even if the knowledge and attitude about the IDD problem is available to the public, the absence of translating this into practice, makes all the difference. In our study area the state of KAP among the public during the period 1998-99 is not comparable to that found in Vietnam during 1997 KAP survey.

Conclusion and recommendations

The overall picture emerging out of this study was that the knowledge about IDD among the people was equally poor in

all the zones. The proximity of DHQ and high literacy rate was not found to have any advantage for effective dissemination of knowledge. This foregoing data on these aspects clearly indicate that much is left to be done for improving the IEC aspect of the health delivery system in this area. The indifferent attitude of the public towards goitre (not to speak of the other invisible spectrum of IDD) and accepting it as a normal condition is a hard problem to cure and requires consistent, sustainable and a continuous health education campaign. An attempt to incorporate the basic knowledge about IDD in the curriculum of primary education will be a rewarding one.

As the children in their growing period and the women in their reproductive years are most vulnerable to the ill-effects of ID, the IDD prevention message should be included in the existing Integrated Child Development Service (ICDS) curriculum, at least for the immediate benefit of the pregnant women. The ICDS scheme which was initiated by the Government of India in 1975 aiming at the delivery of a package of services (supplementary nutrition, immunisation, health check-up, referral services, health and nutrition education and non-formal preschool education in an integrated manner to preschool children, expectant and nursing mothers) could be the right medium for disseminating the IDD prevention message by use of IS.²²

The lack of knowledge about IDD has greatly influenced and restricted the use of IS to a small group. In order to improve this, it is imperative that health education essentially on ID must be taken up urgently in this area. The traders should be particularly advised and appraised of the benefits of IS, so that they can reinforce the message to their customers daily in the village.

Although Orissa state is covered under the ban notification of 1996 prohibiting sale of non-iodised salt for human consumption, the non-iodised salt is available for other use and is preferred by the poor section of people mainly because of the lower cost. This dual status of salt availability is not desirable.

As the media coverage for elimination of IDD appears to be inadequate, this could play a pivotal role in improving the situation. The media coverage aspect should be accelerated and widened to reach each and every person, making them demand the IS. Insufficient advocacy and social communication efforts, because of low public awareness of IDD, inadequate funding for social advocacy, inadequate appreciation of the severity of the problem and low literacy rate in most of the groups at risk have been identified as constraints by a group deliberation at the Harare conference (1997).¹⁷ Dunn (1996) also has addressed this issue of inadequate education (in terms of understanding of the effects of ID and the means for its correction), as one of the seven deadly sins that stand in the way of the goal of sustainable elimination of IDD.²³ With this present situation, the control of IDD in Orissa state, India might appear feasible but the achievement of the goal of global elimination of IDD by the turn of the century appears to be a far distant one to reach.

Acknowledgements. We thank Dr K Satyanarayana, Director of Regional Medical Research Centre for providing facilities and Professor HB Mohapatra, former Head, Department of Social and Preventive Medicine, SCB Medical College, Cuttack, for his guidance. We

acknowledge the sincere cooperation of Mr N Marai (research assistant), SC Rout (laboratory technician), T Maharana (laboratory assistant), K Dhal (census taker) and HK Jena (field attendant) in carrying out field and laboratory work. We particularly thank the 635 persons of Bargarh district who contributed to the success of this study through their willing participation.

References

1. Hetzel BS. Iodine deficiency disorders and their eradication. *Lancet* 1983; 2: 1126–1129.
2. Hetzel BS. Iodine deficiency, a global perspective. Adelaide: International Council for Control of Iodine Deficiency Disorders, 1993; 1–75.
3. Pandav CS. Iodine deficiency disorders in Southeast Asia. In: Hetzel BS, Pandav CS, eds. *SOS for a billion*. New Delhi: Oxford Press, 1994; 220–223.
4. Vir S. Control of iodine deficiency – the National Programme – Current Status. Proceedings of the NIN Platinum Jubilee Symposia and Nutrition Society of India. Hyderabad: National Institute of Nutrition, 1994; 41: 141–148.
5. Sooch SS, Deo MG, Karmakar MG, Kochupillai N, Ramachandran K, Ramaingaswami V. Prevention of endemic goitre with iodized salt. *Bull World Health Organ* 1973; 49: 307–331.
6. Narasinga Rao BS. Salt fortification to control iodine and iron deficiency. Proceedings of National Institute of Nutrition Platinum Jubilee Symposia and Nutrition Society of India. Hyderabad: National Institute of Nutrition, 1994; 14: 149–167.
7. Nutrition Foundation of India. National goitre control programme – a blue print for its intensification. Scientific Report no. 1. New Delhi: Nutrition Foundation of India, 1983.
8. Greaves JP, Alnwick D. The role of International Agencies. In: Hetzel BS, Pandav CS, eds. *SOS for a billion. The conquest of iodine deficiency disorders*. Delhi: Oxford University Press, 1994; 169–179.
9. District Statistical Handbook, Bargarh District. Orissa: Directorate of Economics and Statistics, 1995; 44–53.
10. Bennett S, Woods T, Liyanage WM, Smith DL. A simplified general method for cluster sample surveys of health in developing countries. *World Health Stat Q* 1991; 44: 98–106.
11. Indicators for assessing iodine deficiency disorders and their control through salt iodization. WHO/UNICEF/ICCIDD. WHO NUT/94.6; 1994, 8–10.
12. Yoon SS, Katz J, Brendel K, West KP Jr. Efficiency of EPI cluster sampling for assessing diarrhoea and dysentery prevalence. *Bull World Health Organ* 1997; 5: 417–426.
13. Haxton D. Advocacy for political commitment: an experience in China. *IDD News Letter* 1994; 10: 5–8.
14. Chaturvedi S. Iodine deficiency disorders control and the doctor at community level. *J Indian Med Assoc* 1996; 94: 64–65.
15. Venkatesh Mannar MG. The iodination of salt for the elimination of iodine deficiency disorder. In: Hetzel BS, Pandav CS, eds. *SOS for a billion*. New Delhi: Oxford University Press, 1994; 89–107.
16. Zarger AH, Sofi FA, Masoodi SR, Laway BA, Shah NS, Wani AT, Masood MT. Pattern of salt consumption and awareness about iodine deficiency disorders in Kashmir Valley. *IDD News Letter* 1996; 12: 46–47.
17. Hasler J, Todd C, Mutamba J, Nyamandi T, Jumo D, Ropi F. Africa struggles for independence from IDD. *IDD News Letter* 1997; 13: 1–27.
18. *The Census of India Series 1*. New Delhi: Government of India, 1991.
19. Van der Haar F. The challenge of the global elimination of iodine deficiency disorders. *J Clin Nutr* 1997; 51: 83–88.
20. Ling JCS, Reader-Wilstein C. In: ICCIDD communication guide. *IDD News Letter* 1999; 15: 47.
21. Trung NQ, Tolvanen M. Towards elimination of iodine deficiency in Vietnam. *IDD News Letter* 1999; 15: 8–9.
22. Park JE, Park K. In: Park's text book of preventive and social medicine. Jabalpur: Banarasidas Bhanot Publishers, 1991; 327.
23. Dunn JT. Seven deadly sins in confronting endemic iodine deficiency and how to avoid them. *J Clin Endocrinol Metab* 1996; 81: 1332–1335.