

Original Article

Sources of household salt in South Africa

Pieter L Jooste PhD

Nutritional Intervention Research Unit, Medical Research Council, Tygerberg, Cape Town, South Africa.

Marketing of non-iodized salt through unconventional distribution channels is one of the factors weakening the national salt iodization program in South Africa. The aim of this study was therefore to quantify the various sources of household salt, and to relate this information to socio-economic status. Questionnaire information was collected by personal interview during home visits from a multistage, cluster, probability sample of 2164 adults representative of the adult population. Nationally 77.7% of households obtained their table salt from the typical food shops distributing iodized salt. However, in the nine different provinces between 8 and 37.3% of households used unconventional sources, distributing mainly non-iodized salt, to obtain their household salt. These alternative sources include distributors of agricultural salt, small general dealer shops called spaza shops, in peri-urban and rural townships, street vendors and salt saches placed in the packaging of maize meal bags. Countrywide around 30% of low socio-economic households obtained their salt from unconventional sources compared to less than 5% in high socio-economic households, emphasizing the vulnerability of low socio-economic groups to the use of non-iodized salt. Intervention strategies should mobilize all role players involved in unconventional marketing channels of household salt to provide only iodized salt to consumers, as required by law.

Key Words: iodine, salt, household salt, socio-economic status, South Africa.**Introduction**

In South Africa, like in most countries of the world, it is critical that the population obtain small amounts of additional dietary iodine through iodised salt to prevent and control iodine deficiency and its grave consequences such as impaired cognitive development, loss of IQ, reduced educability, hypothyroidism, and endemic goitre.¹ Because iodine deficiency has existed in the country for many years,² voluntary iodisation of table salt was introduced in South Africa in 1954, and it was made mandatory, in 1995, at a higher iodine concentration (40-60 ppm) than before. Since then remarkable progress has been made in eliminating iodine deficiency in the country.^{3,4}

However, it is also true that there are still significant shortcomings in the salt iodisation program preventing vulnerable sub-groups in the population from obtaining adequately iodised salt.^{5,6} It is known that salt is an excellent carrier of iodine in the South African situation because 95% of households use salt regularly and another 2.9% occasionally.⁵ Currently 86.4% of households use iodised salt and 62.4% use adequately iodised salt containing 15 ppm iodine or more.⁵ The challenge to health authorities, salt producers and other role players, is to reach the remaining 37.6% of households with adequately iodised salt.

Some of the factors responsible for the use of under-iodised or non-iodised salt in households appear to be related to the unconventional distribution channels of household salt from the salt producer to the consumer. For the purpose of this study, sources other than the usual or conventional food shops for obtaining household table salt were considered unconventional distribution channels. For

example, in a previous study it was found that some households use non-iodised agricultural salt for cooking.⁵ For proper planning and management of a national salt iodisation program of a country, it is important to identify these unconventional distribution channels and estimate the magnitude of its usage. The aim of this study was therefore to quantify the usage of various sources of household salt in a representative sample of the population.

Methods

Questionnaire information was collected by personal interview in a cross-sectional survey of the adult South African population (16 years and older) during home visits to quantify the usage of various sources of household salt in the country. Data was collected by an experienced market research organization as part of a regular countrywide household survey.

The visiting points were drawn by means of a multi-stage, cluster, probability sample design of 2208 households, based on the 1996 South African national population census figures. The study sample was selected proportional to the population size in each of the nine provinces, stratified according to nine residential categories representing

Correspondence address: Dr PL Jooste, Nutritional Intervention Research Unit, Medical Research Council, PO Box 19070, Tygerberg 7505, Cape Town, South Africa.
Tel: + 27 21 938-0370; Fax: + 27 21 938-0321
Email: pieter.jooste@mrc.ac.za
Accepted 11 February 2005

the full range of residential categories in the country. These residential areas included traditional tribal rural areas, and, in both metropolitan and non-metropolitan areas, informal settlements, hostels, townships, towns and cities. Exceptions to proportional sampling were required to achieve a minimum of 100 households per province and a minimum of 100 Asian households that was fixed beforehand in order to generate sufficiently stable estimates for the provincial and overall national study sample. Census enumerator areas ($N=295$) were used to form clusters, with either eight or four respondents drawn per enumerator area.

Within these enumerator areas the households and respondents were selected using a random grid, and respondents interviewed at their homes. Only one respondent per selected household, aged 16 years or older, was included in the study. Substitution of the visiting point was allowed in case of refusal, empty premises, nobody on the stand qualifying for the study, if the designated respondent could not be found after three visits, inability to communicate due to foreign languages, or due to physical or mental limitations.

Fieldworkers collected the data by means of a structured questionnaire during March and April 2002. Information was obtained on socio-demographic characteristics of the respondent, and they were specifically asked where they usually buy or get the salt that they use for preparing food in the house. Fieldworkers had at least 12 years of schooling and were bilingual or multilingual to be able to conduct the interview in the language of the respondent. Fieldwork coordinators checked at least 20% of questionnaires for correct completion during the data collection stage, and the office contacted a further 15% of respondents to ensure that correct fieldwork procedures were followed during data collection. It was explicitly stated at commencement of the interview that respondents were not obliged to answer any of the questions, that their participation was voluntary, and that all personal information will be kept confidential. This study was conducted in accordance with the internationally agreed ethical principles for the conduct of medical research.

Data analysis

To correct for over sampling introduced to generate stable estimates, provincial and national data were adjusted in a weighted analysis using the 1996 census distributions to achieve representative population profiles. Summary statistics were generated, including frequencies, proportions, and means. A composite index reflecting socio-economic

status on a ten-point scale, the living standard measure (LSM), was created from the biographical information in the questionnaire. Low LSM values reflected low socio-economic status and high LSM values, high socio-economic status. Biographical data used for this calculation included the availability of household appliances (e.g fridge, freezer, washing machine, tumble dryer, dishwasher, sewing machine, vacuum cleaner, microwave oven, electric stove, television, hi-fi, radios, cell phone, home computer, one or more cars), household facilities (e.g electricity, domestic servant, home security, piped water, hot running water, flush toilet), geographical area, and whether the respondent lived in a hut. The LSM was then graphically related to the proportion of people who obtained their household salt from alternative sources to define the groups in the population making use of unconventional distribution channels when obtaining their household salt. The significance of this association was determined by means of the Spearman correlation.

Results

Overall 2164 respondents, representing a national response rate of 98%, participated in the study (Table 1). In terms of biographic data the weighted study sample consisted of 74.7% black, 9.1% coloured (mixed race), 2.9% Asian and 9.1% white people, while 47.1% were male and 52.9% were female, reflecting the ethnic and gender profiles of the country. The percentage of respondents aged 16 to 24 years was 28.1%, 25.2% was 25 to 34 years old, 18.5% was 35 to 44 years, 11.4% was 45 to 54 years, and 16.9% was 55 years and above.

In the national sample 77.7% of respondents purchased their salt in typical food shops like the big chain stores and superettes (Table 2). In the 3 northern provinces, Mpumalanga, Limpopo and North West, this percentage varied between 62.7 and 66.1%, indicating that approximately one third or more of the population in these provinces obtained their household salt from sources other than the conventional food stores. From Table 2 it is evident that these alternative sources include agricultural salt obtained through farmers, agricultural wholesalers or elsewhere, spaza shops in rural and peri-urban settlement areas, street vendors, and small salt saches placed in bags of maize meal.

Although only 2.4% of respondents in the national sample used agricultural salt for domestic purposes, this percentage was as high as 13% of respondents in North West Province and 7% in Northern Cape. The percentage households purchasing their household salt from spaza

Table 1. Provincial and national sample sizes and response rates

Characteristic	Provinces									National sample
	West Cape	East Cape	North Cape	Free State	KwaZulu-Natal	Mpumalanga	Limpopo	Gauteng	North West	
Number of enumerator areas	35	35	17	25	52	22	21	59	29	295
Sample size	264	240	125	176	383	167	166	436	207	2164
Weighted sample size	230	307	46	147	435	144	226	450	180	2164
Response rate (%)	100	96.8	100.8	100	95.8	97.1	101.2	96.5	99.5	98.0

Table 2. Frequency (%) of respondents purchasing their household salt at various sources, by province and nationally

Source of household salt	Provinces									National Sample %
	West Cape %	East Cape %	North Cape %	Free State %	KwaZulu -Natal %	Mpuma -Langa %	Limpopo %	Gauteng %	North West %	
Shop	89.4	84.2	80.5	92.0	79.2	62.7	66.1	77.3	63.2	77.7
Agricultural salt	0	1.4	7.0	0.7	1.6	5.0	2.1	0.2	13.0	2.4
Spaza shop*	5.3	12.6	11.4	0.9	16.1	23.6	11.4	16.0	13.2	13.1
Street vendor	0	1.5	0	0	0.5	0	11.6	1.2	0.3	1.8
Bag of maize meal	0	0	0	0	0	0.3	6.4	0	6.2	1.2
No salt in household	0	0	0	0	0	0.6	0	0.8	0	0.2
Do not know	5.3	0.3	0.2	4.0	1.4	7.7	2.4	3.8	2.5	2.9
Other	0	0	0.9	2.4	1.2	0.1	0	0.7	1.7	0.7

* Spaza shop = small general dealer shop in rural or peri-urban townships.

shops varied from 0.9% in Free State to 23.6% in Mpumalanga, with a national average of 13.1%. Similarly, the practice of purchasing salt from street vendors varied in the provinces as can be seen from the fact that none of the respondents said they purchased their household salt from vendors in four of the nine provinces, whereas 11.6% of respondents in Limpopo obtained their salt from this source. In addition, a significant percentage of households in Limpopo and North West Provinces, just more than 6%, obtained their salt in saches placed in the maize meal package (Table 2).

Figure 1 shows that generally decreasing proportions of households obtained their salt from alternative sources (agricultural salt, street vendors, spaza shops, in maize meal package) with increasing LSM values ($r = -0.95$, $P < 0.001$). It was thus apparent that the respondents with low LSM values, reflecting low socio-economic status, were more likely to obtain agricultural salt, salt from spaza shops, vendors and in maize meal packaging compared to respondents with high LSM values.

Discussion

In this national survey the sources of household salt varied considerably in the various geographical areas as well as in different socio-economic strata of the population. In areas where a high proportion of households purchased their salt from food shops, that are legally obliged to distribute only iodised salt, the likelihood is higher that consumers will obtain adequately iodised salt compared to areas where alternative sources of salt are in operation. To illustrate this point, the three provinces in this study with the highest proportion of households obtaining their salt from alternative sources were also the same three provinces with the highest proportion of households using inadequately iodised salt in an earlier study.⁵

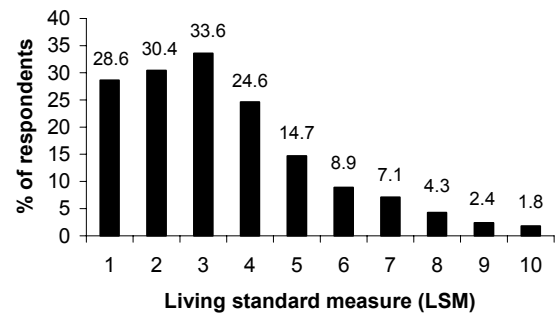


Figure 1. Proportions of people within each of the Living Standard Measure (LSM) categories, as a composite index of socio-economic status, that obtain their household salt from alternative sources

It is known that agricultural salt is not iodised in this country⁵ and it is most likely that none of the other alternative sources distribute iodised salt, perhaps with the occasional exception of spaza shops, of which a few may sell iodized salt. Small-scale traders usually obtain non-iodised salt or agricultural salt in bulk directly from salt producers or from agricultural wholesalers, which is then repackaged and distributed. Although not quantified, it has been observed that owners of small rural spaza shops in the northern provinces repackage agricultural salt to be sold to the local communities. This data therefore suggest that the practice of using alternative sources of household salt, such as agricultural salt, salt from spaza shops, street vendors or salt in maize meal packaging, represents factors weakening the national salt iodisation programme. More research is, however, needed to investigate the iodine content of these alternative sources of household salt.

Spaza shops appear to be a significant distribution point of household salt in most of the provinces. Because

of the potential impact the salt distributed by these small shops may have on the iodine status of poor communities in peri-urban townships or rural areas, special attention should be paid to these outlets. This means that the iodine content of salt sold in these small shops needs to be monitored as part of retailer monitoring exercises, that the owners or managers of these spaza shops need to be made aware of the benefits of selling only iodised salt, and that wholesalers or salt producers supply only iodised salt to these spaza shop owners.

Street vendors selling household salt seem to be active only in some geographical areas. It is suspected that these vendors purchase non-iodised salt in bulk from producers or wholesalers and then repackage the salt to be sold in the informal business sector. Similar to the small packets of salt being put in the packaging of some brands of maize meal, this practice is probably operated by people not aware of the importance of using adequately iodised salt and not aware that they are transgressing the law. In fact, they are unknowingly depriving women and children of the opportunity of using iodised salt. Again, appropriate intervention strategies should target those responsible for distributing non-iodised salt in these ways, including the salt producers or suppliers of the salt.

Low socio-economic groups in a population are more likely to be exposed to low concentrations of iodine in household salt.⁵ This situation could partly be related to the positive association between the general level of education and awareness of the benefits of iodised salt reported in a Turkish study.⁷ In the present study around 30% of people from the lower end of the socio-economic spectrum, as indicated by their low LSM values, obtained their household salt from alternative sources compared to the less than 5% in high socio-economic categories. In addition to the low educational level, usually encountered in low socio-economic groups, these people are also price sensitive and will more likely opt for the cheapest salt available. These informal and cheap sources of household salt are invariably not iodised, aggravating the vulnerability of low socio-economic sub-groups in the population to inadequately iodised salt.

Alternative, or unconventional, sources of household salt should thus be considered one of the factors contributing towards the difficulty in reaching the last portion of populations with adequately iodised salt. Invariably this portion of the population includes communities in remote or rural areas, or low socio-economic communities on the periphery of cities. As these sources of household salt may differ from country to country, intervention strategies should be tailored according to the country situation.

References

- 1 Delange F. The disorders induced by iodine deficiency. *Thyroid* 1994; 4: 107-128.
- 2 Steyn DG, Kieser J, Odendaal WA, Malherbe H, Snyman HW, Sunkel W, Naude CP, Klintworth H, Fisher E. Endemic goitre in the Union of South Africa and some neighbouring territories. Pretoria, Union of South Africa, Department of Nutrition, 1955.
- 3 Jooste PL, Weight MJ, Lombard CJ. Short-term effectiveness of mandatory iodization of table salt, at an elevated iodine concentration, on the iodine and goitre status of schoolchildren with endemic goitre. *Am J Clin Nutr* 2000; 71: 75-80.
- 4 Immelman R, Towindo T, Kalk WJ, Paicker J, Makuraj S, Naicker J, Omar S. Report of the South African Institute for Medical Research on the iodine deficiency disorders survey of primary school learners for the Department of Health, South Africa. Department of Health, Pretoria, March 2000.
- 5 Jooste PL, Weight MJ, Lombard CJ. Iodine concentration in household salt in South Africa. *WHO Bull* 2001; 79: 534-540.
- 6 Jooste PL. Assessment of the iodine concentration in table salt at the production stage in South Africa. *WHO Bull* 2003; 81: 517-521.
- 7 Çan G, Ökten A, Green J. The role of local mass media in promoting the consumption of iodized table salt. *Health Education Research* 2001; 16:603-607.