

IODIZED SALT USAGE IN TURKEY*

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ÖZ

Bu makalenin iki amacından ilki, Türkiye'de iyotlu tuz kullanımının yaygınlığını tahmin etmektir. İkincisi iyotlu tuzu kullanan ve kullanmayanlar için nedenleri araştırmaktır. Makalede kullanılan veriler Sağlık Bakanlığı ile UNICEF tarafından ortaklaşa yürütülen bir projeden elde edilmiştir. İyotlu tuz kullanımının yaygınlığını tahmin için ülkeyi temsil eden 12125 hanelik bir örneklem kullanılmıştır ki bugüne kadar bu amaçla kullanılan en büyük örnektir. Örnekteki her hanede kullanılan tuz, Sağlık Bakanlığı tarafından temin edilen test kitleri kullanılarak test edilmiştir. Bu testlerin sonucu Türkiye'de hanelerin yüzde 64'nün iyotlu tuz kullandığı tespit edilmiştir. Bununla beraber iyotlu tuzun mevcudiyetine ve faydalarının bilinme derecesine göre bölgeler ve kırsal-kent arasında kullanımında ciddi farklar olduğu tespit edilmiştir. İyotlu tuz kullanımını tayin eden faktörleri belirlemek için kullanılan logistik regresyon analizi yaşanan yerin coğrafi bölge ve kırsal-kent olarak önemli olduğunu, bunun yanında hanelerde yemekleri yapanların eğitimlerinin, hane büyüklüğünün ve salça yapımının iyotlu tuz kullanımını etkilediğini göstermiştir.

ABSTRACT

This paper has two aims: to estimate the iodized prevalence in Turkey and to understand reasons both for using and not using it. Data were obtained from a project jointly sponsored by the Ministry of Health and UNICEF. To accomplish the first aim, study used a large representative sample of 12125 households which is the largest ever employed in the

* Authors thank to the Ministry of Health and UNICEF authorities for their permission to use the data and Sociology Association for assuming responsibility of managing the project.

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Sosyoloji Araştırmaları Dergisi/Journal of Sociological Research 2006 / 1

country. In each household in the sample, the salt used was tested by tester kit provided by the Ministry of Health. Test results indicated that 64 percent of the households used iodized salt. However, there were vast disparities in iodized salt usage among the regions and rural urban places due to availability of the iodized salt and degree of awareness of its benefits. The logistic regression analysis indicated that region which is vital for the supply and the availability of iodized salt, seems important in determining its use along with residential area as urban and rural, education, household size and tomato paste-making.

INTRODUCTION

Salt iodization has been adopted as the main strategy to eliminate IDD (Iodine Deficiency Disorders) as a public health problem, due to its wide consumption and inexpensiveness. (WHO 1996, WHO, UNICEF, ICCIDD 1994). In the last ten years, worldwide iodized salt consumption has increased considerably, reaching 70% from 20% in 1990. Despite this impressive progress, there are still 35 countries (mostly developing countries) where less than half of the population uses iodized salt. (UNICEF-WHO 1994)

The iodization of table salt in Turkey was initiated in 1968 on a voluntary basis by using potassium iodide. At the outset, only three manufacturers started the iodization of table salt and they iodized only one-fourth of their entire production. In 1994 this figure reached 37% (Yordam *et al*, 1999). The efforts of Turkey to combat iodine deficiency disorders sped up in the 1990s. As a consequence, the production of iodized salt, which was 18% in 1994 (Ustundag, Haznedaroglu and Adıktulu, 2000), reached 57% in 1999. The iodization of edible salt became compulsory on June 9, 1998, excluding industrial salt. One year later, the production of iodized salt began. This legal change was the most important factor increasing the prevalence of iodized salt use in Turkey. In 1999 there were more than 400 salt manufacturers in Turkey, most of whom were small producers using traditional, old-fashioned methods of salt production and lacking the substructure appropriate for salt iodization (Yordam *et al*, 1999). Such problems in the manufacture of iodized salt, the exclusion of industrial salt in iodization, the continuing habits of the people in using non-iodized salt (Caballero and Popkin 2002) and a lack of monitoring on the part of the Turkish state (Mannar and Dunn 1995) prevented the success of the program and lowered the prevalence of iodized salt in the country.

LITERATURE

Despite the large number of studies on goiter and iodine deficiency conducted by medical researchers and epidemiologists since 1935 (Away, 1935; Onate, 1948; Seer 1956, Kelly and Sweden, 1960; Collogue and Collogue 1968, 1977; Urgancioglu and Hatemi, 1989, Serniz *et al*, 2000; Gur *et al*, 2003; Ozkan *et al*, 2004), there are almost no studies dealing with the prevalence of iodized salt use in Turkey on a national scale, just scant evidence and passing remarks. In one review article, Erdoğan and Erdoğan (1997) concluded that goiter was endemic in Turkey for the reason of low iodized salt usage. Drawing on the results of a study done by Arslan *et al* (1996), the Erdogans noted that the prevalence of iodized salt usage was 24.2% in 15 provinces in 1995. In a study investigating the role of the mass media in promoting the consumption of iodized table salt, Çan *et al* (2001) found that iodized salt consumption was 54.5% in Trabzon (a province on the Black Sea, in the northeastern part of Turkey), which increased to 62.4% following the 3-month education program through the local media.

Some studies on iodine deficiency and goiter touch on various aspects of iodized salt use which does provide clues for low prevalence. Yordam *et al* (1999), although not directly dealing with iodized salt prevalence and its sample included people living in a mountain village in Central Anatolia, stressed that “regional variations in iodine status may impede the success of salt iodization programmes, which alone may not be adequate for correction of the problem country-wide.” (p. 501) In a similar fashion, Şimsek *et al* (2003) recommends compulsory iodization of both table and industrial salt. Erdoğan *et al* (2002) note that mandatory iodization of household salt seems to be the essential measure taken for the moment, but this needs to be supplemented by additional measures.

This paper aims at estimating the prevalence of iodized use nation-wide in Turkey and the factors determining its use, dwelling on the consumer characteristics.

Sample and Data

Sample

In 2002, a nationally representative sample, employing two-stage stratified systematic cluster sampling, was drawn by the Turkish State Institute of Statistics. The unit of analysis was a household and the person who engaged in the cooking of the household was interviewed.

The sampling technique used two stratifying criteria. As external stratifying criteria, geographic regions and rural-urban differentiation was used. As internal stratifying criteria, population groups and socio-economic levels of were employed. In areas where the population was more than 2000, blocks containing 25 households were chosen according to the size of the streets and avenues. In this group, 404 blocks (10,100 households) were selected for the sample. In areas where the population was less than 2000, the unit of sampling in the first step was the residential area itself. The unit of sampling in the second step then consisted of the households chosen from that residential area. The total number of blocks in this group was 81 (2,025 households).

The size of the sample was 12,125 households, drawn from 78 out of 81 provinces in Turkey.

Instrument of Data Collection

The data collection instrument, a questionnaire, developed together with UNICEF experts in Turkey, consisted of two parts. The first part involved questions concerning the usage of salt. The second part covered questions related to the characteristics of the respondent (age, education, job status, etc). The last question reports the result of the test applied to determine if the salt used by the household was iodized or not. This was done with a kit supplied from the Turkish Ministry of Health that identifies iodized salt with a color change when drops from a special liquid were mixed with the salt used in the household.

The questionnaire, which took five minutes to administer, was pre-tested in various provinces and revised. Face-to-face interviews and a paper-pencil technique were used in the field.

11 groups consisting of 80 undergraduate and graduate students from the Department of Sociology of Middle East Technical University were employed in the field work, which took place in March 2002.

The most serious problem faced during the field study was the refusal, in large residential areas, to answer the questionnaire. This was because some of the households perceived the interviewers as salespeople and were therefore uncooperative, refusing to answer questions. The same problem was also faced in some villages but quickly solved after the interviewers showed their formal documents. The overall non-response rate was 8 per cent.

The average age for the respondents was 40, with a standard deviation of 13.94. 19% of the respondents were illiterate, which is above the national illiteracy rate (13% in 1996) for Turkey. 48% of the respondents had at least a primary school education. Respondents having a primary school education and lower constituted 72% of the sample. While 8% of the respondents had junior high school education, the percentage for high school graduates was 14% and only 6% of the respondents had university education.

Only 12% of the respondents in the sample were employed and the rest were not. The reason for this high unemployment figure is the fact that most of the respondents were housewives – that is, not in the labor force.

The average size of the households in the sample was 4.59 persons, very close to the average for Turkey which is 4.5 persons.

Results

Usage of Iodized Salt

The most important question in the questionnaire was the one that reported the result of the test on the household's actual salt used and whether the this salt was iodized or not. This was important for two reasons. Firstly was the possibility that salt thought to be iodized turned out to be non-iodized and secondly, conversely, was the possibility that salt thought to be non-iodized turned out to be iodized. Thus, the test results were more important than the actual responses given to direct questions about iodized salt usage.

The salt used by 34% of the total households was non-iodized. However, 64% of the total households did use iodized salt. It is likely that this percentage could be a little higher due to improper keeping of the salt that in time results in a loss of iodine. In 2% of the households, there was no salt to test, and in 0.5 % of households salt was not used.

When inspected by region, it is clear that use of iodized salt is the highest in the Marmara (77%) and Aegean (75%) regions. At least three-quarters of households in these two regions use iodized salt. The Black Sea region was third, followed by the Mediterranean (61%), Central Anatolia (58%), East (48%) and Southeast (37%). As it will be noticed, those regions that are relatively developed usually have a high level of iodized salt usage.

Iodized Salt Usage In Turkey

Table 1 Results of Iodized Test By Region and by Type of Residence

Region ¹ /Type of Residence ²	Colorless-non-iodized	Colored-iodized	No salt at home	Don't use Salt	Total
Mediterranean	597	1027	32	20	1676
	35.6%	61.3%	1.9%	1.2%	100.0%
Aegean	439	1394	33	3	1869
	23.5%	74.6%	1.8%	0.2%	100.0%
Marmara	521	2054	61	20	2656
	19.6%	77.3%	2.3%	0.8%	100.0%
Southeast	744	453	9	3	1209
	61.5%	37.5%	0.7%	0.2%	100.0%
East	612	589	25		1226
	49.9%	48.0%	2.0%		100.0%
Central Anatolia	773	1156	60	11	2000
	38.7%	57.8%	3.0%	0.6%	100.0%
Black Sea	431	1159	21	1	1612
	26.7%	71.9%	1.3%	0.1%	100.0%
Urban	2775	7138	217	55	10185
	27.2%	70.1%	2.1%	0.5%	100.0%
Rural	1342	694	24	3	2063
	65.1%	33.6%	1.2%	0.1%	100.0%
Total	4117	7832	241	58	12248
	33.6%	63.9%	2.0%	0.5%	100.0%

Looking at the differences between rural and urban location, 70% of households living in urban areas and 34% of households living in rural areas use iodized salt. The usage of iodized salt in urban areas is as twice as high compared to rural areas. This result signals an important difference between urban and rural location in terms of iodized salt usage.

Reasons for Using Iodized Salt

The most important reason given by the respondents for using iodized salt was health (30.1%). The respondents thought that iodized salt was good for health in general. The second most important reason (25.1%) was to avoid goiter illness – the expression of a widespread belief in Turkey that iodized salt is good for avoiding goiter. 14% of the households indicated that they did not know why they used iodized salt. In addition, 9% of the households gave the reason that iodized salt usage was advised by their friends and family. The purity, quality, and good taste of iodized salt were the reasons given by 7% of the households. 6% stated that the usage of iodized salt was practical. 4% of the households stated that they used it by habit while 3% mentioned being influenced by the mass media. 2% of those who used iodized salt confessed that they used it because they could not find non-iodized salt. Finally, 0.6 % of the respondents stated that they used iodized salt because its use was advised by their doctor.

When these reasons for usage of iodized salt are inspected by region and by rural-urban separation, it is seen that the most common two reasons for all regions and locations are health in general and the avoidance of goiter.

Reasons for Not Using Iodized Salt

The most important reason for not using iodized salt was a “lack of knowledge about iodine”, which was expressed by 36% of the households. The second important reason was the price of iodized salt, found to be expensive by 24% of the households. 18% of the households stated that they found iodized salt unnecessary. More than 10% of the households mention the unavailability of iodized salt in their local markets. 9% of the households had problems with the taste and odor of iodized salt. A small portion of the households (2.5%) said that they were advised by their doctor not to use iodized salt.

When the reasons for not using iodized salt are inspected by region, some important differences can be observed. 57% of the households from the Southeast region, 41 % from the Black Sea region and 39 % from the Marmara and Central Anatolia regions did not know about iodine. In the other three regions, such households constitute only one-fifth of the total households in each region. A higher price of iodized salt is mentioned mostly by those households in the Mediterranean region (37%), followed by the Southeast and East regions (27% each), Central Anatolia and Black Sea

Iodized Salt Usage In Turkey

regions (20% each). In the Aegean and Marmara regions, the households that complain about the cost of iodized salt was 17%. Those households that do not use iodized salt due to unavailability are relatively smaller in number and was seen more in the Marmara region (17%), followed by the Aegean, Mediterranean and Black Sea regions, each with about 10%. One-third of the households in the Aegean region, 23% of the households in the Mediterranean region and 22% of the households in Black Sea region did not use iodized salt because they found it unnecessary. Those households that did not use iodized salt because of their doctor's advice was relatively low, the highest percentage of this was in the Aegean region (7.5%). The taste and odor of iodized salt seemed to be a problem for 27% of the households in the East Anatolia region, followed by Central Anatolia with 16%. In the other regions, the percent of households stating taste and odor as a reason for not using iodized salt remained less than 10 percent.

When assessment is made according to rural-urban residence, a noticeable difference relates to the availability of iodized salt. While 7% of urban households mention unavailability of iodized salt in their markets, almost three times more rural households (20 %) complain about its absence in their areas.

The other important difference relates to the belief that iodized salt is unnecessary. One-fifth of households in urban areas and one-tenth of households in rural areas do not use it because they see it unnecessary. Although to a smaller degree, there is still a difference between urban and rural households with regard to their evaluation of taste and odor of iodized salt: 11% of urban and 5% of rural households stated this as a reason for not using iodized salt. The observed differences between urban and rural households in general and higher number of urban households claiming that iodized salt is unnecessary and their mentioning taste and odor of iodized salt as a reasons not to use it are interesting and certainly deserves further attention by the authorities.

The Degree of Knowledge about Iodine

One of the factors that affects the usage of iodized salt is the amount of knowledge about its benefits to health. The majority of the households (66%) did not know the benefits of iodine. Little over one-fourth of the respondents stated that iodine prevents goiter. Nearly 5% of the total respondents expressed the view that iodine was necessary for good health. Those households that knew the contribution of iodine to the development of intel-

ligence was only 1.1%. The respondents who knew its contribution to growth was almost 1%. Those households that stated its function for a healthy birth was about one in one thousand. The positive contribution of iodine to squinting and visual dysfunctions is known by a very little portion of the households questioned. It is clear that most of the respondents did not know about iodine and its benefits to good health, and only 44% of the respondents had a general idea about iodine.

The most interesting question to answer was how much iodized salt users knew about the benefits of iodine. 79% of households that mentioned the preventive effect on goiter by iodized salt used it regularly. Similarly, 81% of those households that named the benefit of iodine as "improving intelligence", 75% of those who emphasize its necessity for growth, 100% of those who state that it is good for squinting and visual dysfunctions, 67% of those who see it useful for healthy births and 76% of the household who find it necessary for health were also regular iodized salt users. However, 35% of those who did not know the benefits of iodine were also regular iodized salt users. 22% of those households who see iodine useful for healthy births and necessary for growth, 16% of those who mention the preventive effect of iodine on goiter, 18% of those who find it necessary for health and 12% of households that mention the positive effect on intelligence were among the households that sometimes use iodized salt.

Table 2 Relationship Between Status of Iodized Salt Usage and Knowledge of Iodine

Knowledge about iodine ¹	Always	Sometimes	Do not use	Do not know	Total
Prevents goiter	2229	458	43	88	2818
	79.1	16.3	1.5	3.1	100.0
Improves intelligence	98	15	0	8	121
	81.0	12.4	0.0	6.6	100.0
I don't know	2475	940	256	3340	7011
	35.3	13.4	3.7	47.6	100.0
Necessary for growth	73	21	1	2	97
	75.3	21.6	1.0	2.1	100.0
Good for	2	0	0	0	2

Iodized Salt Usage In Turkey

squint and visual dysfunctions.	100.0	0.0	0.0	0.0	100.0
Necessary for healthy birth	6	2	0	1	9
	66.7	22.2	0.0	11.1	100.0
Necessary for health	392	93	11	21	517
	75.8	18.0	2.1	4.1	100.0
Total	5275	1529	311	3460	10575
	49.9	14.5	2.9	32.7	100.0

If those households that did not know the benefits of iodine are excluded, the majority of those who knew the advantages of iodine were regular users of iodized salt. The position of regular iodized salt users who did not know the benefits of iodine is interesting and can be explained by the fact that there was no other salt available where they lived.

When inspected by region, two responses appear more frequently than others. These were "I do not know what iodine is used for" (66%) and "It prevents goiter" (26 %). The majority of households in each region state the first. As for the latter, only in Southeast Anatolia was the percentage of people knowing the benefits of iodine below 25% (at 8.5%). In all other regions, this percentage was above 25%.

As for location, 63% of urban and 86% of rural households did not know what iodine is used for. It is not surprising to see such a high percentage of rural households in this category, but it is surprising to see such a high percentage of urban households. 29% of urban and 11% of rural households knew that iodized salt prevented goiter.

Ways of Salt Consumption

The amount of pickles, tomato paste and pastry (especially bread) made in the house affected the type and the amount of salt used at home.

In the majority of households (60%), food industry salt, which is not iodized, was used in the making of pickles. Only 15% of the households used salt named as "edible salt" or table salt. The numbers of those who used both types was low (1.5 %). The proportion of the households in which no pickles were made is approximately one quarter.

As for the making of tomato paste, 45% of those households who made it themselves used food industry salt. While the households that use edible salt was 13%, households using both types was approximately 1%. 40 % of the households reported that they did not make their own tomato paste.

Factors Determining Iodized Salt Use

A binomial logistic regression technique was used to find out determinants of iodized salt use. The region of the respondent, the location of residence (rural or urban), age, education, household size, and pickle- and paste-making were used as the possible determinants of iodized salt use. A dependent variable was using and not using (default category) iodized salt. 75% of the cases were correctly classified by this analysis.

Table 3 Logistic Regression Results

Variables	B	Wald	P	Odds ratio
REGION		292.309	0.000	
Mediterranean	-0.562	39.072	0.000	0.570
Aegean	-0.105	1.389	0.239	0.900
Marmara	-0.060	0.496	0.481	0.942
Southeastern	-0.772	62.532	0.000	0.462
East	-0.993	115.404	0.000	0.371
Central	-0.900	118.396	0.000	0.407
Blacksea (Default)				
Urban	1.151	384.326	0.000	3.161
Rural (Default)				
AGE	0.011	38.191	0.000	1.012
EDUCATION		537.525	0.000	
Illiterate	-2.327	227.305	0.000	0.098
Literate but no schooling	-1.726	96.025	0.000	0.178
Primary school	-1.445	97.495	0.000	0.236
JHS	-0.900	30.063	0.000	0.407

Iodized Salt Usage In Turkey

High school	-0.391	5.905	0.015	0.677
University (Default)				
HOUSEHOLD SIZE	-0.110	114.235	0.000	0.896
PICKLE MAKING		0.289	0.962	
Do not make	-0.154	0.259	0.611	0.857
Refined	-0.160	0.272	0.602	0.852
Industry	-0.160	0.284	0.594	0.852
Both (Default)				
PASTE MAKING		91.244	0.000	
Do not make	0.088	0.071	0.790	1.092
Refined	-0.229	0.458	0.498	0.795
Industry	-0.540	2.642	0.104	0.582
Both (Default)				
Constant	2.077	52.969	0.000	7.980
Cox & Snell R Square	0.216			
Nagelkerke R Square	0.299			

Region, which is vital for the supply and the availability of iodized salt, seems important in determining use. Compared to respondents in the Black Sea region, respondents living in the Mediterranean region were 0.5 times less likely to use iodized salt, those in the Aegean region 0.9 times less likely, those in the Marmara region 0.9 times less likely, those in the Southeast region 0.4 times less likely, those in the East 0.4 times less likely and those respondents living in the Central Anatolian region 0.4 times less likely. Urban dwellers are 3.1 times more likely to use iodized salt than rural dwellers. Education has significant effect on the use of iodized salt. Compared to university-educated respondents, all other categories have a less chance to be iodized salt users. Household size also has a significant effect on the use of iodized salt, where one more person in the family reduces chance of using iodized salt 0.8 times. While pickle-making seems to have no effect on the use of iodized salt, tomato paste-making seems to affect the use of iodized salt.

CONCLUSION

64% of the households in the study were found to be using iodized salt whereas 34% of the households were using non-iodized salt in Turkey. The remaining did not know what they used. However, these statistics are encouraging for the country and show that the programs launched since 1994 in order to increase both the production and use of iodized salt have been successful.

However, the differences observed among the regions and rural-urban locations stem mainly from the variations in the availability of iodized salt in different locations and from differences in the awareness of people towards the benefits of iodized salt usage. These differences point out the need for a continuation of those efforts aimed at making the use of iodized salt uniformly widespread in the country.

30% of the households that use iodized salt use it for health reasons, 25% use it to prevent goiter and about 14% can not give any reason as to why they use it. It is clear that the degree of consciousness among iodized salt users is not very high. On the other hand, 36% of the non-iodized salt users do not know what iodine is, 2 % of them find it expensive and 18% see it as useless. More than half of the non-user households are not aware of iodized salt and/or they are not informed enough. Expectedly, there are also differences in the reasons for using and not using iodized salt according to different regions and residential areas. When the households were asked about the benefits of iodine, 66% of the households respond that they do not know about iodine, 27% of them mentioned that they use it to prevent goiter. Those households that knew iodine and its benefits were users of iodized salt on a regular basis.

One of the factors that affects both the type and consumption of the salt was the characteristic of the food prepared in the house. The majority of households still use food industry salt in the making of their own pickles, tomato paste and bread.

As it is the case in other countries, increasing the prevalence of iodized salt usage in a population requires multi-dimensional efforts. The production and distribution of iodized salt and training geared to making people understand its importance are among the first efforts that come to mind. The lesson learned during the fieldwork is simple enough: if the importance of iodized salt for health is well explained, then there is an immediate response of acceptance.

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