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Ministry of Health of Azerbaijan
Azerbaijan Medical University

REPORT

«Iodine Nutrition of the Azerbaijan Population, Coverage and Quality of Iodized Salt on Household and Market (Wholesale and Retail) Levels»

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Content

ABSTRACT

Monitoring survey has been conducted in Azerbaijan in 2009 with support of UNICEF. This survey was conducted in 15 clusters (regions) of the country that were randomly selected among the 30 cluster that were pre-selected in 2007 for national representative survey.

Spot urine samples were collected from 452 schoolchildren and 152 pregnant women and tested for iodine using conventional cerium- arsenite method. Median UI levels in general population (135.4 mcg/l) and in pregnant women (151.4 mcg/l) corresponded to adequate iodine nutrition of the entire population of Azerbaijan. However, compared with results of 2007 assessment median UI levels in schoolchildren decreased by 36% and in pregnant women - by 22%. However, both in schoolchildren and pregnant women median UI levels were still in the optimal levels (i.e. between 100 and 199 mcg/l and 150 and 249 mcg/l respectively).

During field assessment 1380 salt samples were collected from households, markets and salt production enterprises. Compared with results of 2007 survey, the proportion of households in Azerbaijan using iodized salt increased from 85.8% to 93.2%. Median levels of iodine salt in 2009 (20.1 mg/kg) were lower than in 2007 (23.3 m/kg), indicating that quality of iodized salt in Azerbaijan did not improve and even slipped down parallel to the decrease of urinary iodine levels. Compared with results of 2007 survey, the proportion of adequately iodized salt (iodine level > 15 mg/kg) also decreased from 77% to 63%.

There was great variety of salt on the Azerbaijan market: 33.4% of salt samples were produced in Ukraine, 26.2% - in Turkey, 14% - in Russia and only 12.6% of samples were produced locally in Azerbaijan. The lowest mean iodine level (13.2 mg/kg) was found in domestically produced salt, while in iodized salt from Russia, Ukraine and Belarus the mean levels of iodine in salt were significantly higher (from 25 to 30 mg/kg). Thus, quality of imported iodized salt that is usually produced by large and well equipped enterprises in Ukraine, Russia, Belarus and Turkey is much higher than those produced by small scale produces in Azerbaijan. The problem with quality of iodized salt in Azerbaijan could be solved by improved production of iodized salt after construction of new salt refinery on Masazyr Lake.

1. Introduction

Over the past few years Azerbaijan has reached significant progress in elimination of iodine deficiency through universal salt iodization (USI). Before gaining independence in 1991 Azerbaijan had limited capacity for salt production and most of iodized salt was supplied from other regions of the Soviet Union.

Estimated annual demand for iodized salt for Azerbaijani population is 30-40 thousand tones. In addition to local production significant amount of iodized salt is imported, mainly from Ukraine, Turkey, Russia and Iran. In 2001 the Parliament of Azerbaijan passed the law on Prevention of Iodine Deficiency Disorders. This law provided the legal basis for introduction of nationwide system of IDD elimination through USI. Articles of this Law (effective as of January 2003) stipulate that import, sale and production of non-iodized salt for nutrition and fodder purposes on the territory of Azerbaijan shall be prohibited.

In May-June 2007 a national epidemiological representative 30 clusters school-based survey of 932 children aged 8-10 and 314 pregnant women was carried out in Azerbaijan covering all territory of the country except Naxicevan Autonomous Republic. The objective of this survey was to evaluate the progress in elimination of iodine deficiency in Azerbaijan through USI. In the framework of the national survey in Azerbaijan urinary iodine (UI) levels were determined in 932 schoolchildren and 314 pregnant women. The survey results show adequate levels of iodine nutrition in Azerbaijani population: median UI levels in both schoolchildren (204.4 mcg/l) and pregnant women (200.1 mcg/l) fall into the optimal range of 100 to 300 mcg/l. The use of iodized salt has improved dramatically: totally 85.8% of households are consuming iodized salt, but only 65% of households are using quality iodized salt with iodine level above 15 mg/kg.

In 2007-2008 some measures were taken to improve coverage of population with iodized salt and increase it quality. Construction of a new modern salt factory has been launched on Masazyr Lake. This enterprise could potentially cover all demands of population and food industry in quality iodized salt and compete with small-scale salt producers that are supplying low quality product.

To evaluate present status of IDD elimination program, the Ministry of Health of Azerbaijan with UNICEF support decided to conduct intermediary assessment of iodine nutrition of Azerbaijan population and quality of iodized salt on household, retail and salt producer's levels.

2. Materials and Methods

Assessment was conducted in 15 clusters, including 11 regions of the country (Агдаш, Имишли, Губа, Гусар, Геокчай, Джалилабад, Масаллы, Биласувар, Сабирабад, Хачмаз, Гобустан), and 4 regions of Baku (Бинагади, Хатаи, Насими, Сабаил). Since previous representative national assessment was conducted in 2007 and also taking into account some financial limitations, this study was limited to 15 clusters that were randomly selected among the 30 clusters that had been randomly selected in for 2007 assessment. At the same time, the design of the present

study was in line with monitoring recommendations of WHO, UNICEF and ICCIDD[1]. In each cluster 30 schoolchildren and 10 pregnant women (from households in the same area) were surveyed (urinary iodine and iodine content in salt).

Totally 604 urine samples were tested for iodine using cerium-arsenite method modified by J.Dunn et al. This method has sensitivity of 5 mcg/l, high accuracy (CV – 13.6%), and analytical recovery – 80 – 104%. Determination of iodine in urine and salt was conducted in the laboratory of the Chair of nutrition and communal hygiene of AMU. Internal quality control (QC) was conducted using 3 pooled control urine samples with low, medium and high iodine levels (Table 1). These samples were tested with each batch of urine samples during the entire study.

Table 1. Internal quality control of urinary iodine determination

ANALYTE	QC POOL ID	Abs 1	Abs 2	Mean Abs	Log (Abs * 1000)	UI Conc. (ug/L)
URINARY IODINE (ug/L)	Low	0,795	0,783	0,789	2,897	78,0
	Medium	0,530	0,489	0,510	2,707	175,6
	High	0,282	0,300	0,291	2,464	300,7

External quality control was conducted with support of Laboratory of Clinical Biochemistry of Russian Endocrinology Center in Moscow. This Laboratory is member of International Network of Iodine Laboratories (IRLI) that is functioned with support of CDC, Atlanta, USA.

“Refreshment workshop” was conducted for all members of the survey team who were trained for the assessment in 2007.

[1] Assessment of iodine deficiency disorders and monitoring their elimination. A guide for program managers. 3rd Edition, WHO, Geneva, 2007

3. Status of iodine nutrition of Azerbaijan population in 2009

Urinary iodine (UI) levels are the most reliable indicator of iodine nutrition of population. Spot urine samples were collected from 452 schoolchildren and 152 pregnant women and tested for iodine levels. Median and mean UI levels for both groups are presented in Table 1.

Table 2. Median and mean UI levels (mcg/l) in schoolchildren and pregnant women in the 15 surveyed clusters.

Group	Median	Mean	Minimal value	Maximal value	Number of samples
Schoolchildren	135,4	156,6	2,3	751	452
Pregnant women	151,4	166,2	14,7	477,7	152

Median UI levels in schoolchildren and in pregnant women correspond, in general, to adequate iodine nutrition of population in Azerbaijan. Frequency distribution patterns of UI in both groups are presented in Table 2 and Fig 1 and 2.

Table 3. Frequency distribution (in %) of UI levels in schoolchildren and pregnant women in Azerbaijan (2009).

Group	Urinary iodine levels (mcg/l)						
	< 20	20-49	50-99	100-199	200-299	300-499	>500
School-children	1,5%	6,6%	21,7%	45,6%	16,6%	6,4%	1,5%
Number of samples	7	30	98	206	75	29	7
Pregnant women	0,7%	9,9%	17,8%	44,7	16,4	10,5%	0%
Number of samples	1	15	27	68	25	16	-

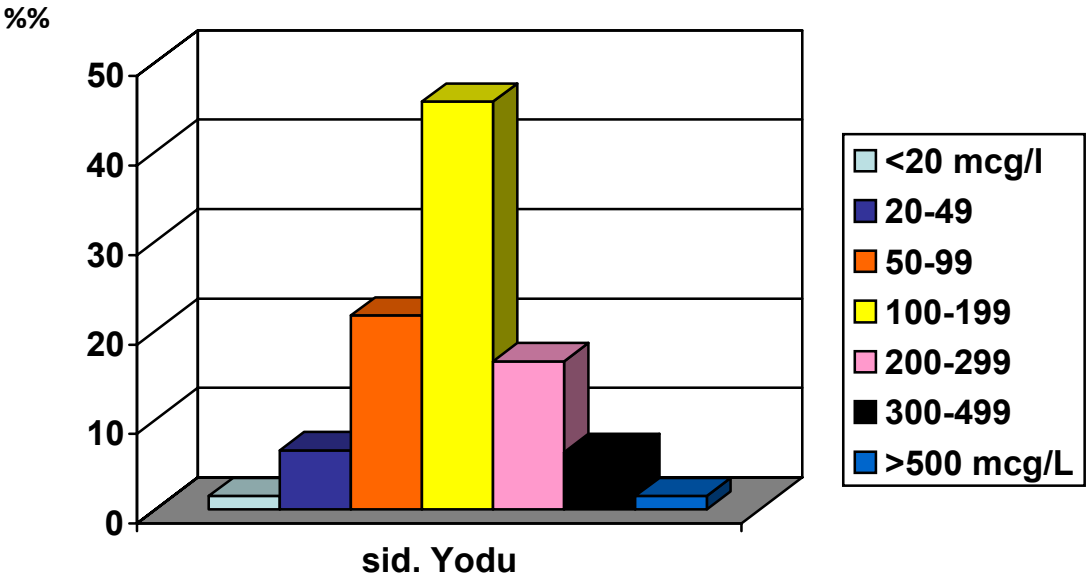


Рис. 1. Frequency distribution of UI levels in schoolchildren in Azerbaijan (2009). Median UI level – 135.3 mcg/l.

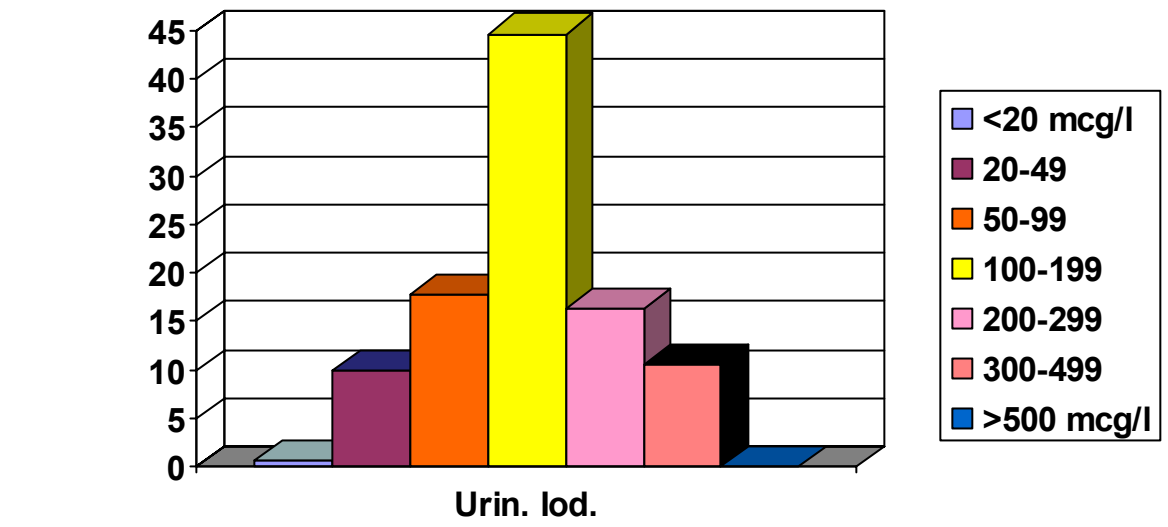


Рис. 2. Frequency distribution of UI levels in pregnant women in Azerbaijan (2009). Median UI level – 151.4 mcg/l.

Table 4. Median UI levels and number of urine samples collected from schoolchildren and pregnant women by cluster (region) of Azerbaijan

№	Cluster (region)	Median UI in schoolchildren	N of samples	Median UI in pregnant women	N of samples
1.	**Агдаш**	**144,5**	30	**168,5**	10
2	**Имишли**	**190**	30	**208,8**	10
3	**Губа**	**140,3**	30	**188,9**	10
4	**Гусар**	**168,9**	32	**89,8**	10
5	**Геокчай**	**134,6**	30	**145,8**	10
6	**Джалилабад**	**126**	30	**184,3**	10
7	**Масаллы**	**136,6**	30	**180,6**	10
8	**Биласувар**	**122,1**	30	**145,7**	10
9	**Сабирабад**	**90,5**	30	**174,3**	10
10	**Хачмаз**	**135,2**	30	**148,6**	10
11	**Гобустан**	**199,1**	30	**131,1**	10
12	**Бинагади**	**108,9**	30	**114,6**	12
13	**Хатаи**	**122,1**	30	**134,3**	10
14	**Насими**	**111,9**	30	**124,9**	10
15	**Сабаил**	**139**	30	**129,4**	10
	Median for entire group	**135,4**	452	**151,4**	152

Table 4. Median UI levels in schoolchildren and pregnant women by clusters (results of 2007 and 2009 surveys)

№	Cluster (region)	Schoolchildren		Pregnant women	
		2007	2009	2007	2009
1.	**Агдаш**	249.3	**144,5**	259,1	**168,5**
2.	**Имишли**	428.8	**190**	275,4	**208,8**
3	**Губа**	249.8	**140,3**	264,9	**188,9**
4	**Гусар**	200.3	**168,9**	210,2	**89,8**
5	**Геокчай**	239.1	**134,6**	216,6	**145,8**
6	**Джалилабад**	258.4	**126**	309,3	**184,3**
7	**Масаллы**	239.5	**136,6**	119,3	**180,6**
8	**Биласувар**	251.0	**122,1**	238,4	**145,7**
9	**Сабирабад**	173.4	**90,5**	158,7	**174,3**
10	**Хачмаз**	165.7	**135,2**	134,3	**148,6**
11	**Гобустан**	237.2	**199,1**	290,4	**131,1**
12	**Бинагади**	173.7	**108,9**	196,9	**114,6**
13	**Хатаи**	133.0	**122,1**	98,5	**134,3**
14	**Насими**	213.6	**111,9**	153,6	**124,9**
15	**Сабаил**	164.7	**139**	126,9	**129,4**
	Median for entire group	**211,2**	**135,4**	**194,7**	**151,4**

In all clusters (except Sabirabad) median UI levels in schoolchildren were above 100 mcg/l; this reflects adequate iodine nutrition of the entire population. However, in 9 out of 15 clusters median UI levels in pregnant women were below 150 mcg/l. It should be mentioned, however, that median UI levels by individual clusters are not representative and can not provide information of iodine nutrition in each individual region (cluster).

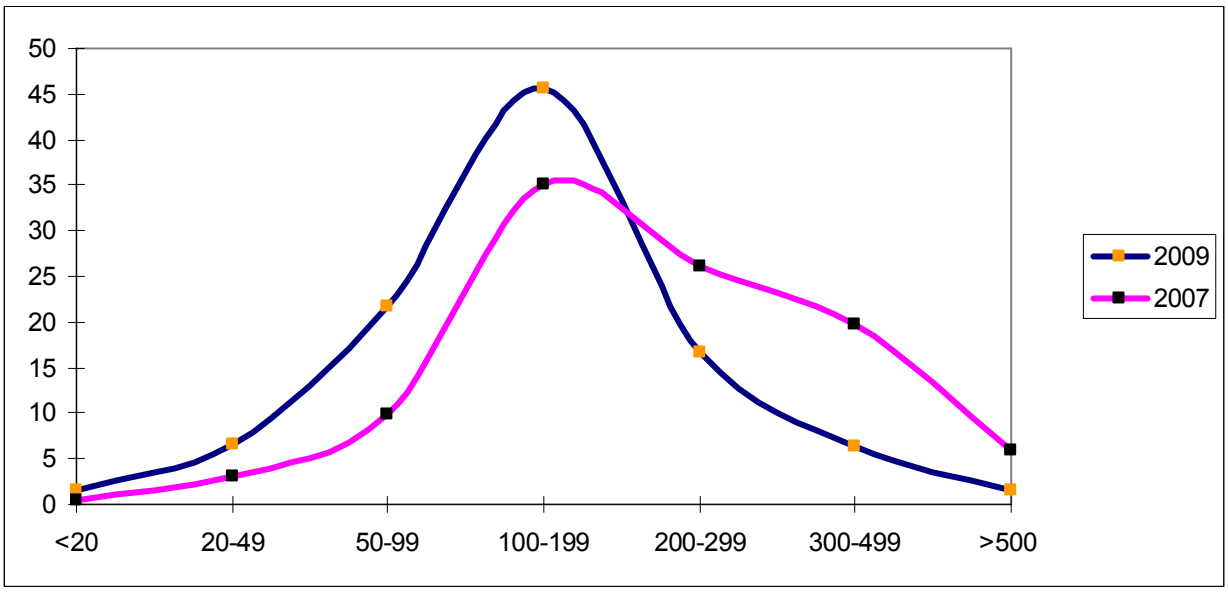


Fig. 3. Distribution pattern of UI levels in schoolchildren in Azerbaijan obtained in 2007 and 2009 surveys.

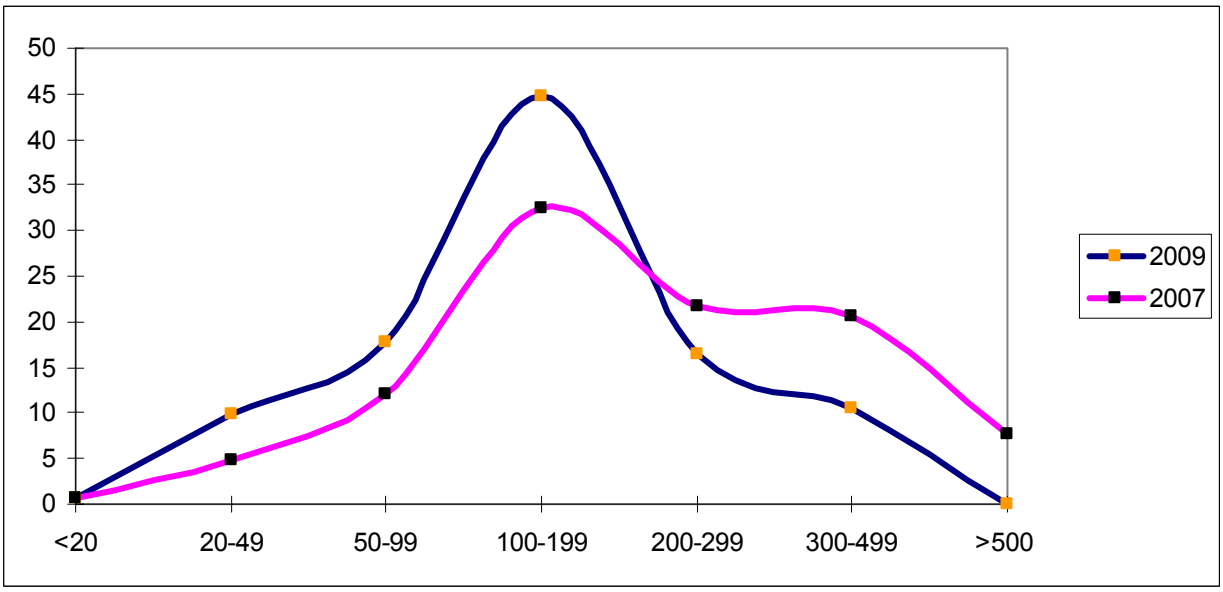


Fig. 4 Distribution pattern of UI levels in pregnant women in Azerbaijan obtained in 2007 and 2009 surveys

According to recent recommendations of WHO and UNICEF[2] the following criteria should be met with regard to the population's iodine status for countries that have successfully eliminated iodine deficiency:

1. The median urinary iodine concentration in the general population should be within the range 100–199 μg/l.
2. The median urinary iodine concentration in the pregnant women population should be within the range 150–249 μg/l.
3. The most recent monitoring data (national or regional) should have been collected within the last five years.

Compared with results of 2007 assessment median UI levels in schoolchildren decreased by 36% and in pregnant women - by 22% (Table 5). However, both in schoolchildren and pregnant women median UI levels were still in the optimal levels (i.e. between 100 and 199 mcg/l and 150 and 249 mcg/l respectively).

Moreover, in 2007 there was a clear shift of UI (both in pregnant women and in schoolchildren) towards higher values (to the right). The 2009 distribution curves in both groups are much more "normal" compared to those in 2007 (Fig 3 and 4).

Thus, despite some decline in median UI levels in schoolchildren and pregnant women, iodine nutrition of entire population of Azerbaijan, including pregnant women remained at the optimal level.

[2] Assessment of iodine deficiency disorders and monitoring their elimination. A guide for program managers. 3rd Edition, WHO, Geneva, 2007

4. Iodized salt assessment: coverage of population and quality of iodized salt

During field assessment 1380 salt samples were collected from households, markets and salt production enterprises (Table 6). All these samples were first checked by rapid test kits (RTK) for presence of iodine. All salt samples that checked positively (blue of purple staining) for iodine were considered as "iodized salt". These samples were tested again by quantitative methods (titration) in the laboratory of AMU in Baku.

Table 6. Number of samples collected from households, markets and salt production enterprises and tested by RTK and titration.

4.1. Coverage of population with iodized salt

In this study we have assessed coverage of population with iodized salt using qualitative testing

	Households		Retail	Salt producers	Total
	School-children	Pregnant women			
Number of collected salt samples	459	155	751	15	**1380**
Number of samples tested by rapid test kits (RTK)	459	155	751	15	**1380**
Number of samples tested by titration	222	80	700	15	**1017**

with RTK ("yes" or "no"). As RTK is not a reliable tool for measuring iodine levels in salt (even in "crude" manner – below or above 15 mg/kg), iodine concentration in salt was tested by titration and only in samples that had been considered as "iodized" by RTK.

Data on qualitative iodized salt testing by RTK are presented in Table 7. Overall data on iodized salt coverage of population of Azerbaijan was quite promising: on average, only about 7% of samples in households (schoolchildren and pregnant women) did not contain any iodine ("negative staining") bringing overall coverage of population to **93.2%**. About the same proportion of salt samples collected on the wholesale and retail (market) level did not contain iodine.

Table 7. Results of qualitative iodized salt testing by rapid test kits (RTK)

№	Cluster (region)	Schoolchildren		Preg. Women		Retail	
		N samples	N negative	N samples	N negative	N samples	N negative
1.	**Агдаш**	30	2	10	-	50	3
2.	**Имишли**	31	2	11	1	50	3
3.	**Губа**	31	1	10	-	50	-
4.	**Гусар**	33	2	10	-	50	-
5.	**Геокчай**	31	1	10	2	50	-
6.	**Джалилабад**	30	2	10	-	50	2
7.	**Масаллы**	30	2	10	1	50	7
8.	**Биласувар**	30	4	10	1	50	14
9.	**Сабирабад**	30	4	10	1	50	5
10.	**Хачмаз**	30	1	10	-	50	1
11.	**Гобустан**	31	8	12	5	51	2
12.	**Бинагади**	31	-	12	-	50	1
13.	**Хатаи**	30	-	10	-	50	-
14.	**Насими**	31	5	10	-	50	4
15.	**Сабаил**	30	-	10	-	50	9
	Total (abs. numbers)	**459**	**34**	**155**	**11**	**751**	**51**
	Total (in %)		**7,4%**		**7,1%**		**6,8%**

During the 2007 survey 1,227 salt samples were tested for iodine by the same kind of RTK. No staining for iodine was recoded in 175 salt samples (14.2%) while 1052 samples (**85.8%**) were considered as “iodized”.

Thus, compared with results of 2007 survey the proportion of households in Azerbaijan using iodized salt slightly increased (**to 93.2%**). The 2006 Demographic Health Survey (DHS) data showed that **94.6%** salt samples were iodized. The differences between the surveys conducted in 2006, 2007 and 2009 may be in part explained by different methodology employed in these surveys.

There were also some fluctuations of iodized salt supply to the market over this period. Most importantly, over past 4 years there was a steady and sustainable supply of iodized salt to Azerbaijan population leading to virtual elimination of iodine deficiency.

4.2. Quality of iodized salt on household's level

For quantitative measurement of iodine in salt we took roughly 50% of salt samples that were tested positively for iodine by RTK (302 samples out 0f 614).

Median iodine levels in salt (SI) collected in 2007 and 2009 surveys are presented in Table 8. Overall, median SI levels in 2009 (**20.1 mg/kg**) appeared to be even slightly lower than in 2007 (**23.3 m/kg**). This indicates that quality of iodized salt in Azerbaijan did not improve and even slipped down parallel to the decrease of UI levels.

Table 8. Median iodine levels in salt and urine in schoolchildren and pregnant women (comparison of results of 2007 and 2009 surveys)

№	Clusters (regions)	Median SI levels (2007)	Median SI levels (2009)	Median UI schoolchildren		Median UI pregnant women	
				2007	2009	2007	2009
1.	**Агдаш**	27	34,9	249.3	**144,5**	259,1	**168,5**
2.	**Имишли**	28,6	14,8	428.8	**190**	275,4	**208,8**
3	**Губа**	31,7	30,7	249.8	**140,3**	264,9	**188,9**
4	**Гусар**	24,9	27,5	200.3	**168,9**	210,2	**89,8**
5	**Геокчай**	21,2	16,9	239.1	**134,6**	216,6	**145,8**
6	**Джалила-бад**	36	8	258.4	**126**	309,3	**184,3**
7	**Масаллы**	19,1	21,2	239.5	**136,6**	119,3	**180,6**
8	**Биласувар**	18	18	251.0	**122,1**	238,4	**145,7**
9	**Сабирабад**	32,3	23,3	173.4	**90,5**	158,7	**174,3**
10	**Хачмаз**	21,2	15,4	165.7	**135,2**	134,3	**148,6**
11	**Гобустан**	14,3	13,8	237.2	**199,1**	290,4	**131,1**
12	**Бинагади**	24,4	15,9	173.7	**108,9**	196,9	**114,6**
13	**Хатаи**	27	34,4	133.0	**122,1**	98,5	**134,3**
14	**Насими**	20,7	19,6	213.6	**111,9**	153,6	**124,9**
15	**Сабаил**	19	28,6	164.7	**139**	126,9	**129,4**
	Entire group	23,3	20,1	**211,2**	**135,4**	**194,7**	**151,4**

Table 9. Proportion of salt samples with iodine levels below and above 15 mg/kg

Iodine levels in salt	Number of samples	%
0	19	6,3%
1-14.9 mg/kg	92	30,5%
> 15.0 mg/kg	**191**	**63,2%**
Total	302	100%

Among 302 salt samples that stained positively for iodine by RTK, only 191 samples (63.2%) had iodine level of 15 mg/kg or above. When this proportion was recalculated for the entire amount of samples collected and tested during the survey, including salt samples with no iodine, the proportion of adequately iodized salt decreases to **59%**. By definition, only salt with iodine levels of 15 mg/kg or above is considered as "adequately iodized"; 30.5% of samples had iodine levels below 15 mg/kg and 6.3% of samples showed zero iodine levels.

Compared with results of 2007 survey, the proportion of adequately iodized salt decreased from **65% to 59%**. Based on DHS data, the proportion of adequately iodized salt in2006 was 53.8%. Thus, over past 4 years there was no positive trend in quality of iodized salt on household level in Azerbaijan.

National Azerbaijani salt standard requires salt iodization at the level of 40±10 mg/kg. However, only **23.8%** of salt samples had iodine concentration between 30 to 50 mg/kg (Table 10). Most of salt samples (65.9%) had iodine levels below 30 mg/kg and only few (4%) – above 50 mg/kg. Compared with results of 2007 survey the proportion of salt iodized to the requirements of national standards decreased from 29.1% to 23.7% in 2009.

Table 10. Proportion of salt iodized to national standard in Azerbaijan

Iodine levels in salt	Number of samples	%
0	19	6.3%
1 – 30.0	199	65,9%
30.1-50.0	**72**	**23.8%**
> 50.1	12	4,0%
Total	302	100%

According to WHO and UNICEF recommendations to reach sustainable elimination of iodine deficiency availability and use of adequately iodized salt (from 15 to 40 mg/kg) must be guaranteed. This must be demonstrated by its use by more than 90% of households. Conditions demonstrating successful use of salt as vehicle for eliminating IDD are:

1. 95% of salt for human consumption must be iodized according to government standards for iodine content as determined by titration, at the production or importation levels;
2. The percentage of food-grade salt with iodine content of between 15 and 40 mg/kg in a representative sample of households must be equal to or greater than 90% as determined by RTK and by titration in a sub-sample.

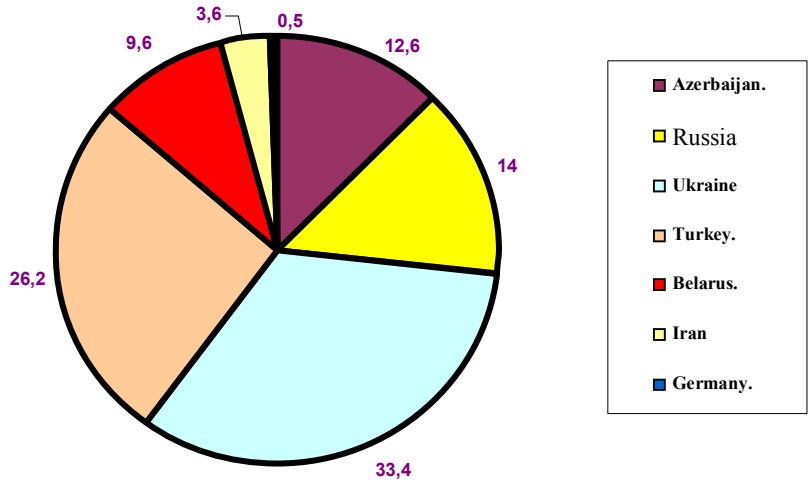
At this point, Azerbaijan did not reach the requirement for quality of salt iodization.

4.3. Quality of iodized salt on the markets (wholesale and retail sale)

According the protocol of the assessment salt samples were collected on the markets (wholesale and retail outlets) in all 15 surveyed regions of Azerbaijan. All types and sorts (trade marks) of salt that were exhibited for salt in trade outlets were taken for further evaluation of iodine content.

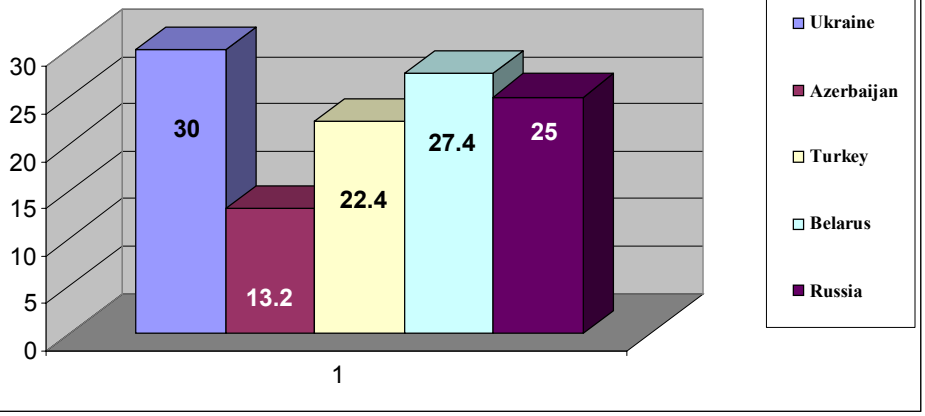
Totally 751 samples of salt were tested by RTK; 700 samples of salt were tested quantitatively for iodine content by titration.

Fig. 5. Proportion of salt tested on the markets by country of origin (production)



There was great variety of salt on the Azerbaijan market: 33.4% of salt samples were produced in Ukraine, 26.2% - in Turkey, 14% - in Russia and only 12.6% of samples were produced locally in Azerbaijan (Fig. 5). It should be mentioned, however, that Azerbaijan salt market is characterized my presence locally produced counterfeited salt that reproduce brand names and packaging of popular salt producers from other countries. It is not clear what proportion of imported salt was in fact low quality copycat.

Fig. 6. Mean iodine levels in salt of different origin on Azerbaijan markets



There was a considerable difference in iodine levels in salts of different origin (country of production). The lowest iodine level (13.2 mg/kg) was found in domestically produced salt, while in salt from Russia, Ukraine and Belarus mean levels of iodine in salt were significantly higher (from 25 to 30 mg/kg, Fig. 6).

Thus, quality of imported iodized salt that is usually produced by large and well equipped enterprises in Ukraine, Russia, Belarus and Turkey is much higher than those produced by small scale produces in Azerbaijan. National standards in Russia, Ukraine and Belarus require 40±15 mg/kg iodine in salt on production, wholesale and retail level. Over past few years quality of iodized salt production in these countries has dramatically improved. Results of monitoring conducted by national sanitary-epidemiological services show that only 4% of salt in Russia and less that 1% of salt in Belarus was not meeting these standards.

Results of present study show that on market level 76.7% of salt was adequately iodized (iodine level > 15 mg/kg); 14.3% had iodine level below 15 mg/kg and 9% of samples did not have iodine at all (Table 11). In 4 regions (Гусар, Сабирабад, Бинагади and Хатаи) more than 90% of salt samples were adequately iodized while highest proportion of salt with no iodine was found in Хачмазе and Биласуваре regions.

The origin of such differences is not quite clear and most likely reflects different patterns of salt supply by individual regions. Results of previous (2007) survey clearly indicated lower levels of iodine in salt in Baku and surrounding regions of the Absheron Peninsular that are mainly supplies by locally produced salt.

Table 11. Proportion of adequately iodized salt in Azerbaijan (nationally and by individual clusters)

№	Clusters	0 mg/kg		<15 mg/kgr		>15 mg/kg	
		N	%	n	%	n	%
1.	Агдаш	4	8	7	14	39	78
2.	Имишли	3	6	7	14	40	80
3	Губа	0	0	20	40	30	60
4	Гусар	0	0	4	8	46	92
5	Геокчай	0	0	6	12	44	88
6	Джалилабад	2	4	12	24	36	72
7	Масаллы	7	14	6	12	37	74
8	Биласувар	14	28	3	6	33	66
9	Сабирабад	5	10	0	0	45	90
10	Хачмаз	14	28	8	16	28	56
11	Гобустан	4	7,8	11	21,6	36	70,6
12	Бинагади	1	2	0	0	49	98
13	Хатаи	1	2	2	4	47	94
14	Насими	4	8	3	6	43	86
15	Сабаил	9	18	18	36	23	46
Total		68	9	107	14,3	576	76,7

Table 12. Proportion of iodized salt produced according to the requirements of the national standard (nationally and by individual clusters)

№	Кластеры	0 *мг/кг*		1-30 *mg/kg*		30,1-50 *mg/kg*		> 50,1 *mg/kg*	
		n	%	n	%	n	%	n	%
1.	Агдаш	4	8	20	40	26	52	0	0
2.	Имишли	3	6	42	84	5	10	0	0
3	Губа	0	0	50	100	0	0	0	0
4	Гусар	0	0	14	28	6	12	30	60
5	Геокчай	0	0	20	40	30	60	0	0
6	Джалилабад	2	4	25	50	23	46	0	0
7	Масаллы	7	14	12	24	28	56	3	6
8	Биласувар	14	28	34	68	2	4	0	0
9	Сабирабад	5	10	0	0	45	90	0	0
10	Хачмаз	14	28	34	68	2	4	0	0
11	Гобустан	4	7,8	36	70,6	11	21,6	0	0
12	Бинагади	1	2	19	38	21	42	9	18
13	Хатаи	1	2	28	56	21	42	0	0
14	Насими	4	8	34	68	8	16	4	8
15	Сабаил	9	18	39	78	1	2	1	2
	Total	68	9	407	55%	229	30%	47	6%

National standard of Azerbaijan requires salt iodization at the level of 30 to 50 mg/kg of production, wholesale and retail levels. However, only 30% of salt samples checked for iodine content during this survey conforms this requirement (Table 12). There was very big variation in proportion of salt iodized to national standard by regions (clusters) in this survey – from 0% in Guba region to almost 90% in Sabirabad. The origin of these differences is not clear and may also reflect the pattern of supply of iodized salt from different producers. In general, regions that were supplied mainly by imported salt had higher proportion of salt samples conforming the national requirements.

5. Conclusions and recommendations

In 2007 WHO and UNICEF updated their recommendations on assessment and monitoring of IDD elimination programs. In countries that have successfully eliminated iodine deficiency the median urinary iodine concentration in the general population should be within the range 100–199 μg/l. At the same time, the median urinary iodine concentration in the pregnant women population should be within the range 150–249 μg/l.

Based on results of 2009 survey, the population of Azerbaijan has optimal iodine nutrition. Median urinary iodine in schoolchildren (reflecting iodine status of the general population) was 135.4 μg/l and in pregnant women – 151.4 μg/l. It should be noted, however, that compared to 2007 these median values dropped by 36% in the general population and by 22% in pregnant women.

This decrease in median UI levels of Azerbaijan population is linked to progressive lowering of iodized salt quality. While coverage of population with iodized salt (i.e. proportion of population that is consuming iodized salt with normal or inadequate iodine levels) remained high (94%), median iodine levels in salt in 2009 (20.1 mg/kg) appeared to be lower than in 2007 (23.3 m/kg). This indicates that quality of iodized salt in Azerbaijan over the past 2 years did not improve and even slipped down causing the decrease of UI levels. From 2007 to 2009 the proportion of adequately iodized salt decreased from 77% to 63%.

In terms of iodized salt quality and coverage Azerbaijan did not reach WHO and UNICEF criteria for sustainable use of adequately iodized salt: the percentage of food-grade salt with iodine content of between 15 and 40 mg/kg in a representative sample of households must be equal to or greater than 90% as determined by RTK and by titration in a sub-sample; 95% of salt for human consumption must be iodized according to government standards for iodine content as determined by titration, at the production or importation levels.

It should be noted that proportion of iodized salt on the markets was at the same level (93%) as in households (93.2%). At the same time, on the market level the proportion of adequately iodized salt (>15 mg/kg) was much higher (77%) than on household level (63%). Since no assessment of iodized salt in markets was conducted in 2007 it is not possible to assess changes in quality of iodized salt over past few years.

Quality of locally produced iodized salt remained extremely low: mean iodine content in locally produced salt was only 13.2 mg/kg, way below mean iodine levels in imported salt (from 25 to 30 mg/kg) and below national standard for salt iodization (from 30 to 50 mg/kg).

It is obvious that local small scale salt producers in Azerbaijan are not paying attention to quality of iodized salt. Routinely they only monitor existence of iodine in salt (by RTK) and are not willing or capable of quantitative monitoring of iodine in salt.

The problem with quality of iodized salt in Azerbaijan could be solved by improved production of iodized salt after construction of new salt refinery on Masazyr lake.

Recommendations:

- Periodic surveys are currently the only reliable tool for assessment of status of iodine nutrition, coverage and quality of iodized salt in Azerbaijan. Such surveys should be conducted or regular basis, preferably every 3 years.
    - Next survey should be conducted not less than 12 months after beginning of full scale production of iodized salt by the new modern production facility on Masazyr Lake.
    - Based on results of this survey, revision of government standard for salt iodization should be considered to bring these requirements to internationally recommended levels of 20 to 40 mg/kg.
- Efforts should be made to improve government monitoring of iodized salt (Ministry of Health, Ministry of Economy, etc.) at the production, distribution and household levels.
    - Only quantitative methods should be used for quality control of iodized salt on the production level. All enterprises that are incapable or unwilling to introduce stringent quality control should be denied with the production license.
    - Ministry of Health and Ministry of Economy should redouble their efforts to improve quality control of iodized salt on wholesale and retail levels though licensing and effective monitoring.
    - Coverage of iodized salt on household level should be assessed every 2-3 years though periodic surveys.
- UNICEF in collaboration with Ministry of Health, Ministry of Economy, “Azersun” company and other partners should conduct re-advocacy event and press-conference in early 2010 to communicate results of these surveys to specialists and general public. An illustrative brochure with results of 2009 survey could be published and distributed on these and other meetings.