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**Chapter 5: Iodine Deficiency Disorders (IDD) Pages 54 – 59**

## CHAPTER 5. IODINE DEFICIENCY DISORDERS

This chapter provides estimates on the burden of iodine deficiency in non-pregnant women of child bearing age (15-49 years) and the coverage of iodized salt in Papua New Guinea.

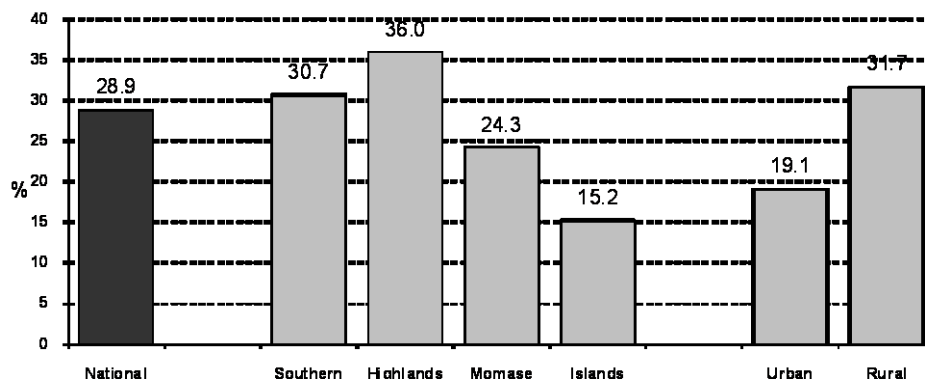
### 5.1 Background to Papua New Guinea Universal Salt Iodization

In 1995, PNG amended the Pure Food Standards making it mandatory for all salt imported into the country to be iodized with potassium iodate and iodine content at 30 ppm. According to the PNG Food Sanitation Regulations 2007 the iodine content of table salt should not be less than 40 ppm. The PNG Food Sanitation Regulations 2007 have maintained these standards.

### 5.2 Iodine status

WHO defines the iodine deficiency disorders (IDD) as a public health problem when greater than 50% of a population have UI  $<100\mu\text{g/L}$  or greater than 20% have UI  $<50\mu\text{g/L}$  (WHO/UNICEF/ICCIDD, 2001). In PNG the median urinary iodine (UI) of  $170\mu\text{g/L}$  among non-pregnant women of childbearing age is well above the cut-off of  $100\mu\text{g/L}$ . Although there is some concern in the scientific community that the cut-off for all women should be higher, as women of reproductive age are likely to become pregnant. The median urinary iodine results for women in all four regions were all adequate ( $>100\mu\text{g/L}$ ), but the Island women have the highest iodine nutrition ( $290\mu\text{g/L}$ ) and the Highlands have the lowest ( $129.5\mu\text{g/L}$ ) (Figure 5.1 and Table 5.1).

**Figure 5.1 Proportion of non-pregnant women with urinary iodine  $<100\mu\text{g/L}$  by region and urban and rural localities, PNG National Nutrition Survey 2005.**



**Table 5.1 Urinary iodine in non-pregnant women 15-49 years, PNG National Nutrition Survey 2005**

Demographic Characteristic	Prevalence (%) of urinary Iodine concentrations ( $\mu\text{g/L}$ )					Median
	N	<50 CI 5%	50-99.9 CI 95%	100 -149.99 CI 95%	$\geq 150$ CI 95%	
<b>National</b>	<b>690</b>	<b>12.6</b> <b>9.1, 17.3</b>	<b>16.3</b> <b>13.3, 19.9</b>	<b>14.9</b> <b>12.5, 17.7</b>	<b>56.1</b> <b>50.4, 61.7</b>	<b>170.0</b>
<b>Region</b>						
Southern	243	12.5 8.4, 18.4	18.3 13.3, 24.7	15.0 10.8, 20.3	54.2 45.0, 63.0	159.0
Highlands	150	15.3 8.2, 26.8	20.7 15.5, 27.0	18.7 14.2, 24.1	45.3 35.9, 55.2	129.5
Mamose	152	13.2 7.9, 21.1	11.2 6.0, 19.8	13.8 9.5, 19.7	61.8 48.4, 73.7	223.0
Islands	145	4.1 1.3, 12.1	11.0 96.5, 18.1	6.2 3.4, 10.9	78.6 67.6, 86.6	290.0
<b>Residence</b>						
Urban	180	4.6 2.3, 9.2	14.4 10.4, 19.7	18.9 15.1, 23.4	62.1 55.2, 68.5	185.1
Rural	510	14.9 10.7, 20.3	16.9 13.2, 21.3	13.8 11.0, 17.2	54.5 47.6, 61.2	168.2
<b>Age group (years)</b>						
15-19.9 years	116	12.6 6.7, 22.6	17.9 11.2, 27.5	11.6 6.3, 18.7	58.0 45.8, 69.8	176.0
20-29.9 years	117	9.9 5.9, 16.2	17.8 12.8, 24.3	18.6 13.9, 24.4	53.8 46.1, 61.2	163.1
30-39.9 years	133	11.0 6.4, 18.2	17.7 12.0, 25.2	13.9 9.5, 20.0	57.4 48.0, 66.3	182.0
40-49.9 years	115	20.5 13.2, 30.3	10.5 5.7, 17.9	12.7 7.1, 21.7	56.6 45.1, 67.3	182.2
<b>Grade of education</b>						
None	146	19.9 13.0, 29.3	22.6 16.8, 29.6	15.2 10.3, 21.9	42.3 31.3, 54.0	116.5
1-3	384	12.4 8.7, 17.3	16.1 12.5, 20.4	14.9 11.2, 19.6	56.6 49.9, 63.1	172.0
4 +	135	4.0 1.5, 10.2	8.3 4.6, 14.7	16.2 10.7, 23.7	71.4 63.3, 78.4	209.0
<b>Salt in HH</b>						
Salt present	470	7.5 4.7, 11.8	13.9 10.4, 18.2	15.4 12.4, 19.1	63.2 57.8, 68.3	203.5
Salt not present	220	23.9 16.7, 32.9	21.7 17.1, 27.1	13.7 9.6, 19.2	40.7 30.0, 52.4	111.4

Salt in cluster*						
Salt present	640	10.4 7.4, 14.5	15.6 12.5, 19.4	15.1 12.6, 18.1	58.8 53.9, 63.6	182.5
Salt not present	50	35.1 23.3, 49.2	23.3 15.4, 33.8	13.5 5.8, 28.1	28.1 9.8, 58.2	79.5

\*8 of the 97 clusters surveyed had no household salt on the day of the survey  
Weighted analysis to account for complex survey design

In households that did not have salt the median urinary iodine level was much lower than in households which had salt. As most of the salt in PNG is adequately iodized, see section 5.2, this would suggest that households that did not have salt on the day of the survey do not routinely use salt.

During the survey there were eight clusters where none of the households had any salt at all. All of the households that had no salt were in rural areas of PNG. There were 60 women in these clusters and 50 of them provided urine samples for the purpose of this survey. When household heads from these clusters were questioned about the absence of salt most reported that they had no access to it.

The median urinary iodine level in those clusters without any salt present was 79.5µg/L, which is below the cut-off of <100µg/L. In clusters that had salt present the median UI was 182.5µg/L.

When comparing households that have salt vs. households without salt, the prevalence of low urinary iodine <100 ug/L was 45.6% in households without salt compared to 21.4% in households that had salt. In clusters without salt, the prevalence of low urinary iodine was 58.4%.

### 5.3 Household salt coverage

At least one type of salt was present in 61.9% of all of the households surveyed. Most of the salt available in the households was fine Table salt or cooking salt (90.2%). In households that had salt 98.8% of it was purchased. In 53.6% of households the salt was still in its original packaging. Some families reported buying salt refills and adding it to their original container.

The most popular brands of salt are Tru Cook (28.0%) and Jumbo (24.8%), but there is a wide variety of salt available. Table 5.2 presents the brands of salt available in the households included in the survey.

**Table 5.2 Availability and brand of salt (in original containers) in the household, PNG National Nutrition Survey 2005**

	Percent of salt available by region and urban/rural locality (%)						
	Southern	Highlands	Mamose	Islands	Urban	Rural	National
<b>Salt present in household</b>	<b>50.4</b>	<b>64.5</b>	<b>63.8</b>	<b>68.1</b>	<b>79.2</b>	<b>58.5</b>	<b>61.9</b>
<b>Brand of salt</b>							
Crystal	42.4	2.6	19.2	5.7	30.9	10.7	14.7
Jumbo	15.3	43.5	12.3	17.1	14.4	27.5	24.8
King	22.4	3.5	12.3	5.7	17.4	7.7	9.7
Saxa	1.8	0.9	2.3	4.1	12.1	1.4	3.6
Sky	0.0	0.0	16.9	0.0	2.4	6.1	5.4
Tru cook	0.0	34.8	20.0	56.1	11.1	32.2	28.0
Other	8.2	14.8	16.9	11.4	11.6	14.4	13.9

Weighted analysis to account for complex survey design

For a list of the clusters where no salt was available please see appendix 14

#### 5.4 Quality of iodized salt

Salt samples (n=839) from 820 households were qualitatively assessed for iodine content using the WYD checker in the laboratory at the University of Papua New Guinea. Overall, 92.5% of the samples contained  $\geq 15$  ppm of iodine and the median iodine content of the salt was 50 ppm. The distribution of the level of iodine in the salt samples is presented in Table 5.3.

**Table 5.3 Prevalence of various levels of iodine in salt and median iodine levels (ppm) based on WYD analysis, PNG National Nutrition Survey 2005**

Demographic Characteristics	N	Percentage of HHs with various levels of iodine (ppm) in salt**				Median salt iodine (ppm)*
		0 ppm no iodine	>0-14.9 ppm	$\geq 15$ -29.9 ppm	$\geq 30$ ppm	
<b>National</b>	<b>839</b>	<b>0.1</b>	<b>7.4</b>	<b>10.9</b>	<b>81.6</b>	<b>50.1</b>
<b>Region</b>						
Southern	163	0	23.9	25.8	50.3	30.8
Highlands	222	0	0.5	5.9	93.7	54.7
Mamose	217	0.5	10.1	12.4	77.0	46.1
Islands	237	0	2.1	4.6	93.2	55.6
<b>Residence</b>						
Urban	184	0.6	11.4	18.6	69.4	43.1
Rural	655	0	6.3	8.8	84.9	49.9

Weighted analysis to account for complex survey design

\*The median iodine content of salt (in ppm) was based on salt with some measurable level of iodine (i.e., calculation excludes salt samples with no iodine).

\*\* This Table shows all salt samples, including households where two types of salt was available.

The indicator used to assess the coverage of the salt iodization intervention, is the percentage of households using salt containing at least 15 ppm iodine <sup>3</sup>. The target coverage rate for the elimination of iodine deficiency is that 90% of households should be using food grade salt with an iodine content of at least 15ppm. Nationally, PNG met this target; however in the Southern region 23.9% of the salt was inadequately iodized.

Approximately 53.5% of the salt tested had its original salt packaging available and of these, 98.0% were labelled as iodized. Among those, 92.5% of the samples contained at least 15 ppm of iodine. In the Southern region however, only 76.1% of the salt advertised as iodized was iodized with  $\geq 15$ ppm iodine.

### **5.5 Discussion: Iodine**

The median urinary iodine 170.0ug/L in Papua New Guinea is considered acceptable as it is well above the cut off of 100ug/L. However, a major problem identified during the PNG survey is that there were many households that did not have any salt available in the household that could be tested on the day of the survey. There were also several clusters where none of the households in the entire cluster had salt available and when asked, some clusters reported that they often did not routinely have any access to salt.

Overall the salt that was available was adequately iodized ( $\geq 15$ ppm). Except for the Southern region, in the other three regions more than 90% of salt was adequately iodized. In the Southern region only 76.1% was adequately iodized. The results also indicate that there are hotspots around the country, particularly in rural areas where the population may have limited access to iodized salt. More needs to be done ensure access to those rural areas.