PHYSICAL ENVIRONMENTAL INFLUENCE ON HIGH IODINE INTAKE AMONG SAHARAWI REFUGEES IN THE SAHARA DESERT TINDOUF, ALGERIA

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Background

- Refugees in harsh environments in the Sahara desert more than 30 years
- Cease-fire in 1991
- Total dependency on food aid as well as all other needs for survival
- Water: a considerable scarcity
- Health problems such as undernutrition, anaemia and goitre are common

Objective

- Assess the prevalence of goitre among women and children
- Assess urine iodine concentration
- Identify sources of iodine

Method

Randomly selected households in four refugee camps, households n=92, women (15 – 45 years) n=398, children (6-14 years) n=416

- Assessment of goitre on women and children using ultrasound
- Collecting urine from women and children
- Samples collected in the household:
  - Drinking water, n=92
  - Ground salt, n=81 (rock salt, n=53 fine or coarse, n=28;)
  - Local milk, n=19 (goat, n=16; camel, n=3)
- Determined of iodine concentration in:
  - Water and urine by Sandell-Kolthoff reaction
  - Milk by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS).
  - Salt by standard iodometric titration.

Results

Prevalence of enlarged thyroid gland measured by ultrasound

- **Women:** 22 % (cut-off volume thyroid gland > 12.5 ml)
- **Children:** 86 % (international reference values (thyroid gland volume - Tvol) for BSA with cut-off point at the 97 percentile)

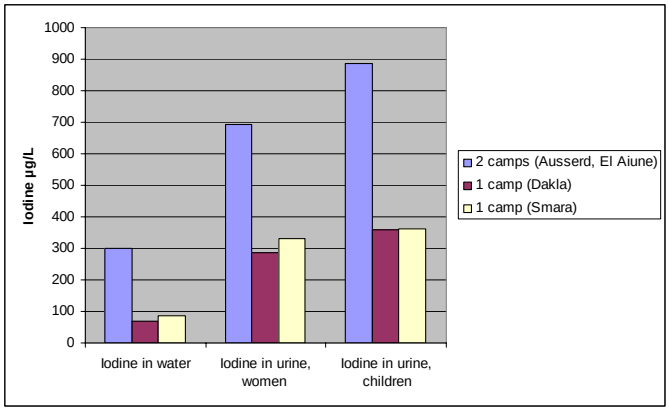
Excretion of iodine in urine

- **Women:** Median 466µg/L (range 54-3,640)
- **Children:** Median 565 µg/L (102-3,594)

Iodine in water

- **Median all camps:** 108µg/L (range 55-545)
- **Median for 2 camps (Ausserd and El Ajune):** 300µg/L (range 55-545)
- **Median for Dakla :** 70µg/L (range 55-96)
- **Median for Smara :** 87µg/L(range 55-127)
- **Median for tea water:** 148µg/L (range 29-367)

Figure 1 Median iodine content (µg/L) in water and urine (women and children)



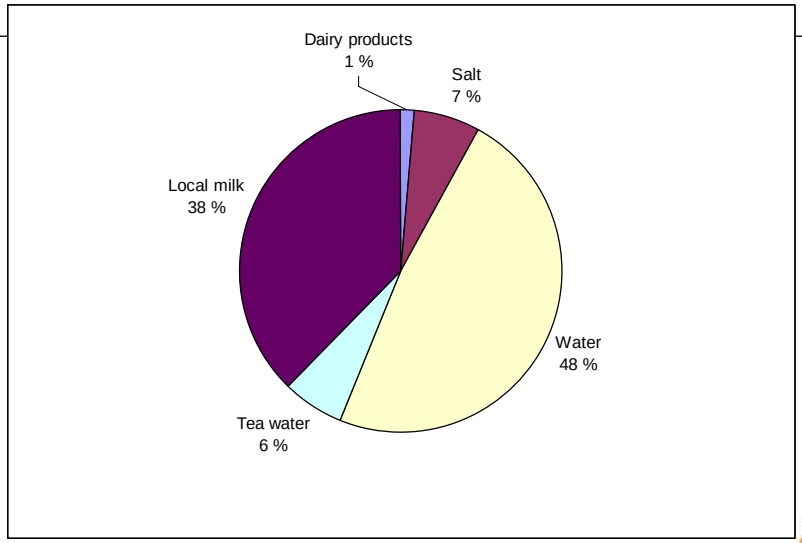
Local salt

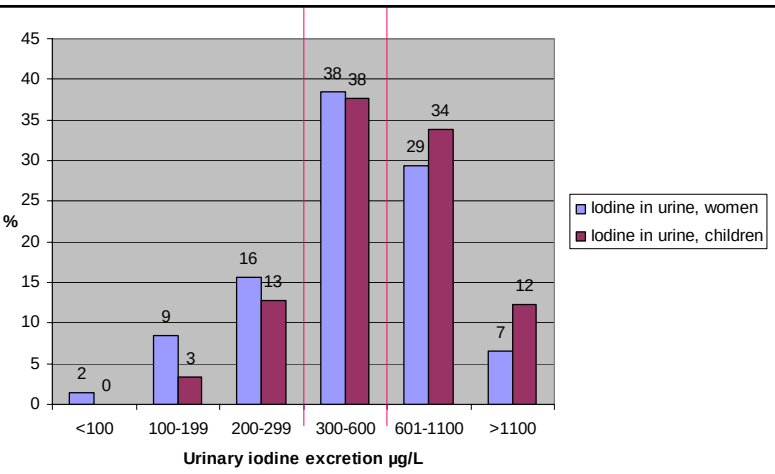
	Iodine µg/g, median (range)
Rock salt, (n=53)	4.4 (0-33.2)
Fine or coarse salt, (n=28)	11.8 (0-50.8)

Local milk

- **Goat milk** (n=16)
  - Content of iodine: median 370 µg/L, (70-13.071)
- **Camel milk (n=3)**
  - Content of iodine in the 3 samples 540 µg/L, 4.170 µg/L and 11.980 µg/L

Sources of the iodine intake among women





600 µg iodine/day: Proposed safe upper level for adults (Scientific Committee on Food in the European Union, 2002)

1100 µg/day: Tolerable upper level of daily iodine intake for adults (Food and Nutrition Board, USA, 2006).

Conclusion

- The prevalence of enlarged thyroid gland was severe, especial for the children
- The majority of the Saharawi refugee women (74 %) and children (84%) had excessive intake of iodine
  - It was differences between the camps:
    of those with iodine excretion more than 600 µg/L
    88 % of the women and 91% of the children came from the two camps Ausserd and El Ajune
- The content of iodine in local milk was extremely high and need to be more investigated
- The high concentration of iodine in water are affecting the humans directly and probably also indirectly through the local milk