Exposure of the Portuguese adult population to arsenic: preliminary results of a human biomonitoring study

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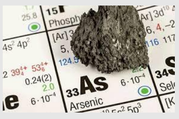
Key findings: Preliminary results point to high levels of exposure to arsenic in the Portuguese population, with 13.2% of the participants presenting high total arsenic urinary levels.

Background

- Although **arsenic** is an element naturally present in the environment it **is highly toxic in its inorganic forms**.
- Exposure can occur through **consumption of drinking water and contaminated food**.
- Long term exposure is associated with negative health outcomes.
- To assess and minimize the risks associated with arsenic exposure it is essential to know whether and to what extent this element is present in the human body. However, data on the Portuguese population's exposure to arsenic is scarce.




- The aim of this work was to **assess the exposure to arsenic in the Portuguese population** using samples collected in the study "Exposure of the Portuguese Population to Environmental Chemicals: a study nested in INSEF 2015" (**INSEF-ExpoQuim**), developed as an aligned study of the **European Human Biomonitoring Initiative**, **HBM4EU** (www.hbm4eu.eu).

Materials and Methods

Study design: INSEF-ExpoQuim was an epidemiologic study nested in the INSEF 2015, the first Portuguese National Health Examination Survey (www.insef.pt).

Target population: individuals aged 28-39 years old, living in Portugal for more than 12 months and able to follow an interview in Portuguese.

Sample size: Total sample size was set at 300 individuals, stratified by sex. To account for the expected response rate (approximately 40%) original sample size was inflated and all 848 participants in INSEF eligible for this study were invited to participate.

Ethical issues: Study protocol was approved by INSA's Ethics Committee and by 10 regional Ethics Committees. Participants sign an informed consent regarding the interview, urine collection, long-term storage and use of biological samples and data for research purposes in the future.

Fieldwork: developed between June 2019 and February 2020. Procedures followed the guidelines of the HBM4EU project. First morning urine samples were collected along with data on socio-demographic characteristics, living conditions and residential history, habits/lifestyle, nutrition, health, occupation and substance specific information covering nearly all exposure pathways.

Recruitment: Selected individuals received an invitation letter and were later contacted by phone to schedule sample collection and the telephone interview.

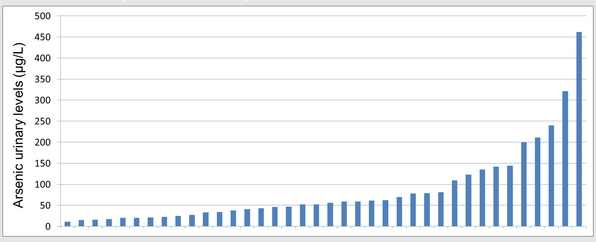
Chemical analysis: Total urinary arsenic is currently being determined by inductively coupled plasma mass spectrometry.

Results

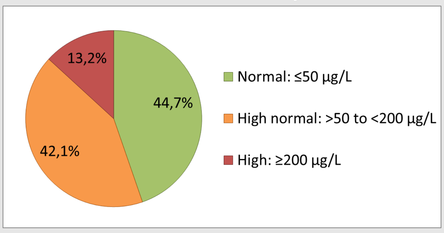
- Participation: 296 individuals (57.8% female and 42.2% male) corresponding to a participation rate of 35%.

Region	Sample size	Accepted to participate	Participants	Participation rate
Norte	141	69	47	33.3%
Centro	113	52	42	37.2%
LVT	118	48	31	26.3%
Alentejo	114	55	47	41.2%
Algarve	83	40	30	36.1%
Açores	166	90	62	37.3%
Madeira	113	51	37	32.7%
TOTAL	848	405	296	34.9%

- Preliminary results for 38 samples yielded total urinary arsenic concentrations ranging from 11 to 462 µg/L with an average of 86 ± 94 µg/L.



- For reporting purposes, NHANES classification* of urinary arsenic levels was used:



Conclusions

- Preliminary results point to high levels of exposure to arsenic in the Portuguese population.
- Results from this study will contribute to the knowledge on the Portuguese population's exposure to arsenic and may support the development and implementation of policy measures aimed at minimizing exposure to this chemical and improving the health of the population.

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References:
* https://data.web.health.state.mn.us/biomonitoring_arsenic