



Occupational exposure in a contaminated estuarine environment

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Background

Previous environmental studies on Sado river estuary indicated high concentrations of heavy metals (Cu, Zn, Ni, As, Cr, e Pb) in sediments possibly linked to industrial contamination along with non-point anthropogenic sources;

This contamination was already detected on some species living in the estuary which can reflect and amplify local contamination, posing potentially serious health problems to humans;

- Local population has intense fishing activity.
- Along with agriculture products, fishery products of the estuary are daily available for local residents.



Background





Background

No previous studies of human exposure routes and its potential health effects

HERA project
Environmental Risk Assessment of a contaminated estuarine environment: a case study



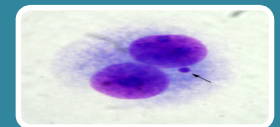
WP 1 - Epidemiological characterization of the target population of the village of Carrasqueira



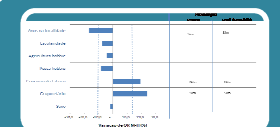
WP 2 - Characterization of the contamination of local agricultural food



WP 3 - Sample collection and laboratorial quantification of sediments contamination and estuarine species bioaccumulation and health biomarkers



WP 4 - Characterization of the genotoxic and endocrine disrupting activities of sediments from areas of fishing activities



WP 5 - Data processing and data analysis for the association between food intake, human and endocrine disrupting genotoxicity and health effects



Objective

HERA project

Environmental Risk Assessment of a contaminated estuarine environment: a case study



WP 1 - Epidemiological characterization of the target population of the village of Carrasqueira

An epidemiological study, was implemented in a small fisherman community living in Carrasqueira Village at Sado Estuary (exposed population) and in Vila Nova de Mil Fontes- VNMF (non exposed).

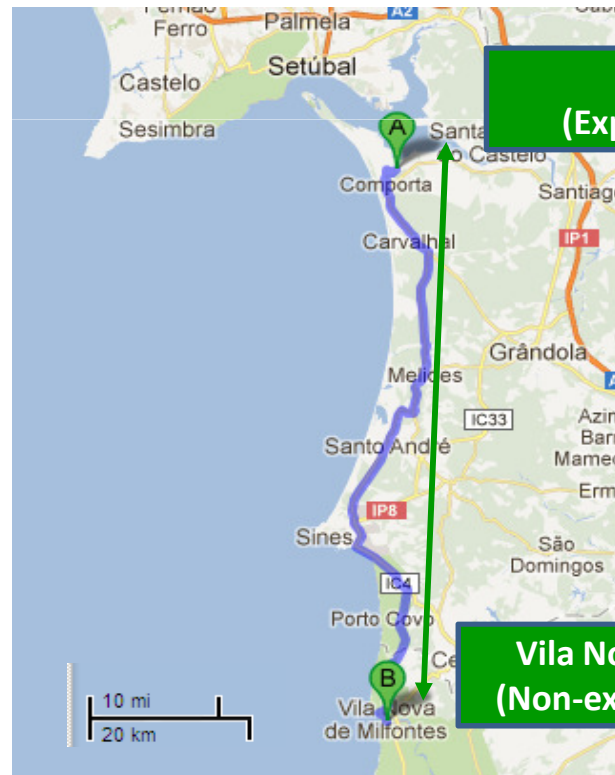
Results to be presented are focused on the analysis of occupational exposure in two populations (exposed and non exposed population)



Material and Methods

Study Design

Cross-sectional comparative study of residents in exposed population (Carrasqueira) and residents in a second different population, Vila Nova de Mil Fontes (VNMF), selected as the non-exposed population



**Carrasqueira
(Exposed Population)**

A small riverside village in the south channel of the **Sado Estuary**

**Vila Nova de Mil Fontes
(Non-exposed Population)**

VNMF sits near another river estuary (Mira estuary) with similar fishing and agricultural activities but with no known industrial or other contamination exposures (considered a pristine estuary)



Material and Methods

Field work

Sampling: All ages and both sex, were selected by simple randomization, using the medical registrations lists of local Health Centers.

Contact with selected participants:

- One week before the scheduled day for data collection, a letter was sent to each selected participant, explaining the purpose of the study and asking for participation of the contacted person.

Data collection: Data collected at home by trained interviewers by face to face interviews of selected individuals using Computed Assisted Personal Interview (CAPI), during June and July 2011.

Participants were included only after a written informed consent.



Material and Methods

Analysis

- Data were checked for completion and consistency of pre-coded information.
- Each respondent was required to describe the tasks inherent to their actual and past jobs and also
- Period of time performing the main profession (or last applied)



Material and Methods

Analysis

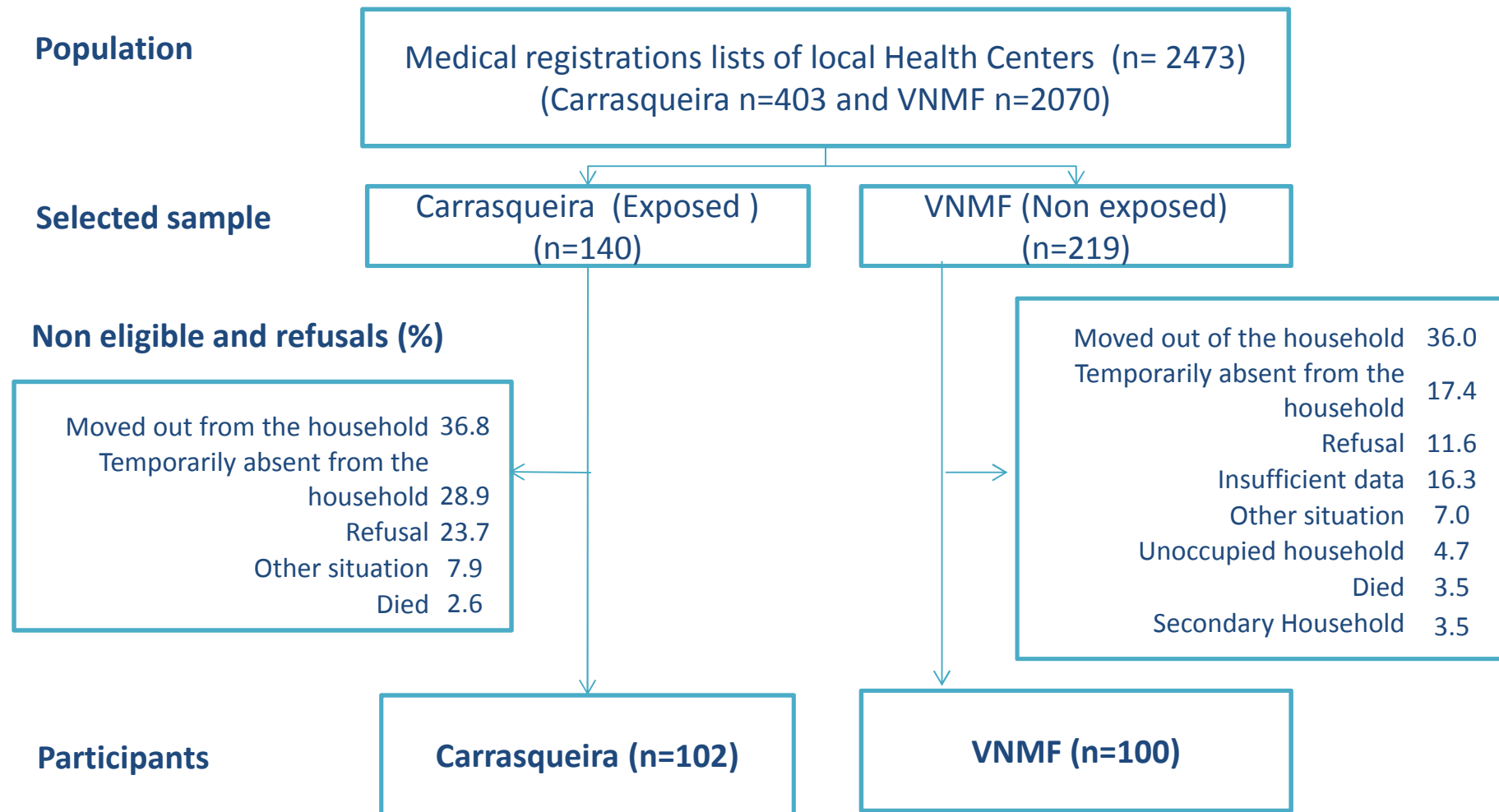
- From this description indicators of a potential route exposure to contaminants were created:
 - a. Direct exposure (fishing inherent tasks);
 - b. Indirect exposure (agriculture inherent tasks),
 - c. Other routes of contamination (tasks with other sources of contamination such as painting).
 - d. The absence of the previous exposures indicates that no relevant exposure existed.

- Statistical analysis was performed using descriptive, Chi-squared test and significance level was set at 5%.



Results

A total of 202 participants were included in the study :102 in Carrasqueira (response rate =72.9%) and 100 in VNMF (response rate =45.7%)





Results

Socio-Demographic Characteristics	Location				p-value
	Carrasqueira (exposed)		VNMF (unexposed)		
	n	%	n	%	
Sex	102		100		0.049
Male		57.8		44.0	
Female		42.2		56.0	
Age group (years)	102		100		0.267
≤17		14.7		14.0	
18- 44		29.4		26.0	
45-64		40.2		33.0	
65- 74		9.8		12.0	
≥75		5.9		15.0	

n, number of valid answers



Results

Socio-Demographic Characteristics	Location				p-value
	Carrasqueira (exposed)		VNMF (unexposed)		
	n	%	n	%	
Education level	99		94		<0.001
No formal education		14.1		11.7	
Primary and lower secondary education		69.7		42.6	
Upper secondary education		10.1		21.3	
Post - secondary or Higher education		6.1		24.5	
Labour status	98		94		<0.001
Self employed		38.8		11.7	
Employee		23.5		34.0	
Fulfilling domestic tasks		5.1		5.3	
Retired		14.3		25.5	
Unemployed		4.1		11.7	
Student		14.3		11.7	

n, number of valid answers



Results

Exposure Factors: Potential routes of exposure

Profession	Location				p-value
	Carrasqueira (exposed)		VNMF (unexposed)		
	n	%	n	%	
	80		84		<0.001
Managers, Professionals and Armed forces occupations		8.8		10.4	
Technicians and associate professionals		12.5		32.9	
Skilled agricultural, forestry and fishery workers; craft and related trades workers; plant and machine operators, and assemblers		67.5		44.5	
Elementary occupations		11.3		12.2	

n, number of valid answers



Results

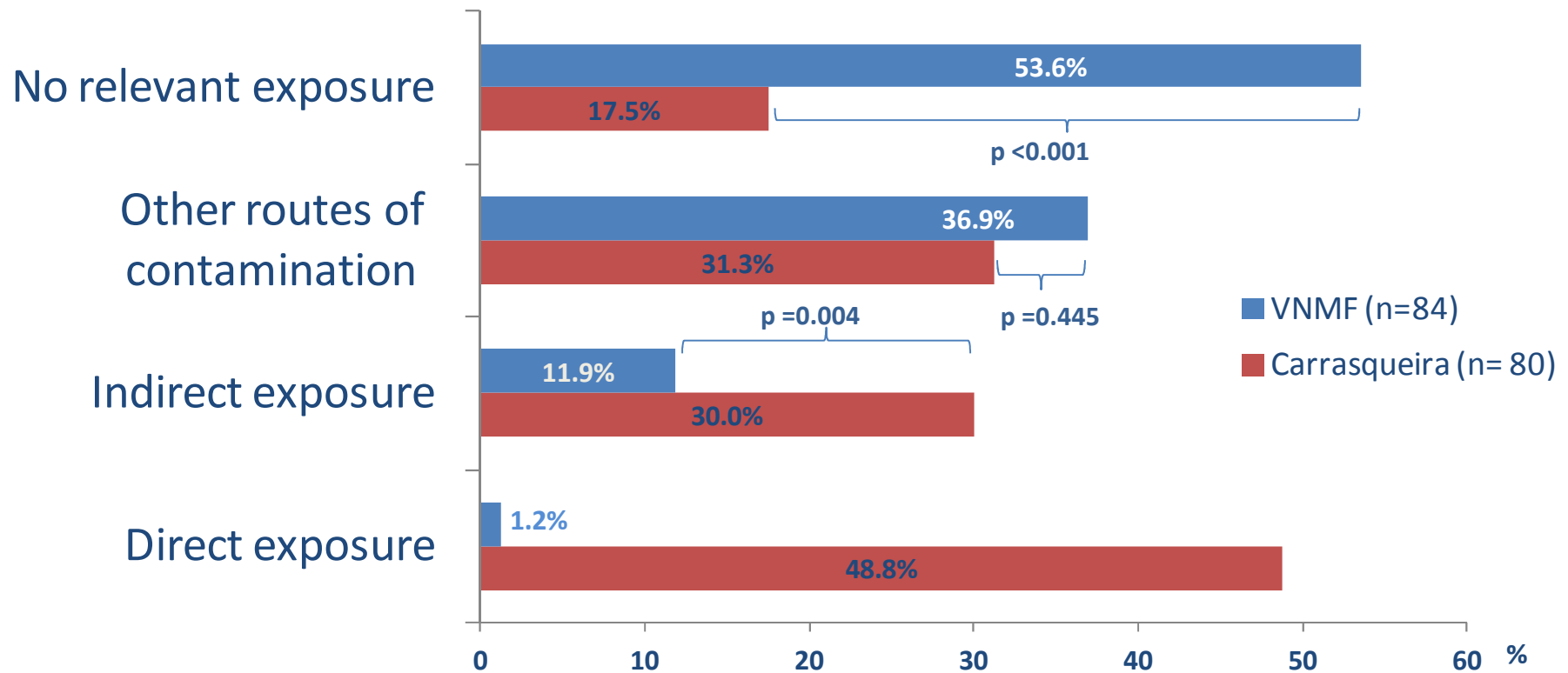
Profession	Location				p-value
	Carrasqueira (exposed)		VNMF (unexposed)		
	n	%	n	%	
	80		84		<0.001
Agriculture and fishing		67.5		22.6	
0-7 yrs	54	9.3	19	15.8	
8-20 yrs	54	20.4	19	15.8	
21-35 yrs	54	25.9	19	21.1	
36 yrs	54	44.4	19	47.4	
Other professions		32.5		77.4	
0-7 yrs	26	42.3	63	34.9	
8-20 yrs	26	19.2	63	38.1	
21-35 yrs	26	26.9	63	20.6	
36 yrs	26	11.5	63	6.3	

n, number of valid answers



Results

Exposure Factors: Potential routes of exposure, analysis of the tasks



n, number of valid answers



Conclusions

The population of Carrasqueira had higher frequency of :

1. Professions like fishers and agricultures that are more likely to have higher risks of exposure to estuary river contaminants (directly or indirectly);
2. Also the period of time that was spent in the fishing and agricultures activities in Carrasqueira was higher than in VNMF ;
3. Tasks inherent to their actual job, promoting direct and/or indirect exposure to contaminants ;



Conclusions

4. There were no significant differences in the other routes of contamination;
5. On the opposite VNMF participants were not exposed to any contaminant route. Similar results were found in the analysis of tasks in previous professions.

The population of Carrasqueira has higher risk of occupational exposure to the estuary contaminants

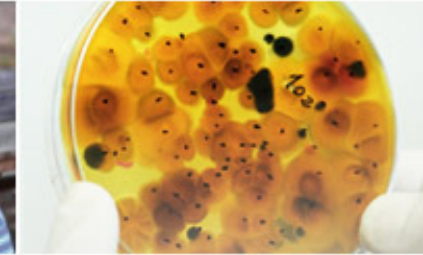


Discussion

The population of Carrasqueira has higher risk of occupational exposure to the estuary contaminants

These results should be analyzed carefully:

- ✓ Small sample size, not dimensioned to the study design;
- ✓ Differences on the non participants in both locations, particularly important in VNMF where the response rate was lower
- ✓ Information was self-reported ;
- ✓ Recall bias



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Thank you