Use of Human Biomonitoring in food risk assessment: assessing exposure to bisphenols in Portugal

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BACKGROUND

Bisphenols are among the chemicals with the highest production volume worldwide and are used to make polycarbonate plastic containers for food use, such as beverage containers and plastic dinnerware, and in the internal coatings of food and beverage cans.

According to the scientific literature, small amounts of these compounds migrate from packaging into food resulting in human exposure[1-4]. Although numerous studies have been carried out in order to assess its effects on human health, there are still uncertainties concerning the possible toxic effects of these compounds. Nevertheless, the most commonly used bisphenol, bisphenol A (BPA), is considered an endocrine disrupting compound. As a consequence, current European legislation prohibits the use of BPA in baby bottles, infant sipping cups and in the coating of food containers for children up to 3 years old and significantly tightens the restrictions on the use of BPA in other food contact materials. This has led to the replacement of BPA by other bisphenols, such as BPS and BPF, whose health effects are still largely unknown.

Considering the above and that there is no data on the exposure of the Portuguese population to these compounds, a new project named INSEF-ExpoQuim is currently being developed by the National Health Institute Doutor Ricardo Jorge, in cooperation with the five Regional Health Administrations and the Regional Health Secretariats of the Autonomous Regions of the Azores and Madeira. INSEF-ExpoQuim is part of the European Human Biomonitoring Initiative HBM4EU and aims to assess exposure to bisphenols in the Portuguese population and contribute to the food risk assessment of bisphenols in Portugal.

Here we report the study design and planning of the study INSEF-ExpoQuim - Exposure of the Portuguese Population to Environmental Chemicals: a study nested in INSEF 2015, whose fieldwork is currently ongoing.

METHODS

Study design: INSEF-ExpoQuim is an epidemiological study, whose sample was selected from the participants in the Portuguese National Health Examination Survey (INSEF)[5] developed in 2015.

Target population: Individuals aged 25 to 39 years old, residents in Portugal, not institutionalized and who can speak Portuguese.

Sample size: 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 863 individuals that participated in INSEF eligible for this study were invited to participate.

Ethical issues: Study protocol was approved by INSA's Ethics Committees and by 10 regional ethics committees.

Participants signed an informed consent regarding the interview, urine collection, data linkage and the long-term storage and use of blood samples and data for research purposes in the future.

Fieldwork: June – October of 2019. Guidelines of HBM4EU followed. Data on socio-demographic characteristics of the individuals, living conditions and residential history, habits/lifestyle, nutrition, health, occupation and substance specific information covering nearly all exposure pathways and urine samples for the analyses of bisphenols are being collected.

EXPECTED RESULTS

- At the end of INSEF-ExpoQuim nationally representative quality epidemiological data on the exposure of the Portuguese population to bisphenols will be available.
- INSEF-ExpoQuim will be an important resource for population based environmental health research through its biospecimen collection.
- Project results may contribute to the reduction of the impact on the health of the Portuguese population resulting from exposure to these chemicals, by producing high quality data on the actual exposure of the population, in order to support the development and implementation of policy measures aimed at minimizing exposure.

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