African Journal of Public Health and Health Systems

Methodology for Assessing the Association between Urban Market Vegetable Contamination and Consumer Biomarker Exposure in Kinshasa, 2014

Aminata Koné[1,2], **Kouamé Adou**[1,3]

[1] Côte d'Ivoire Centre for Human Rights

[2] Côte d'Ivoire Institute for Governance Studies

[3] Department of Pediatrics, Côte d'Ivoire Institute for Governance Studies

Published: 22 November 2014 | **Received:** 07 August 2014 | **Accepted:** 28 September 2014

Correspondence: akon@gmail.com

DOI: 10.5281/zenodo.18530038

Author notes

Aminata Koné is affiliated with Côte d'Ivoire Centre for Human Rights and focuses on Medicine research in Africa.
Kouamé Adou is affiliated with Côte d'Ivoire Centre for Human Rights and focuses on Medicine research in Africa.

Abstract

Urban agriculture is a crucial food source in African cities but may present health risks from environmental contamination. In Kinshasa, vegetables can accumulate heavy metals from polluted soil and water. A standardised method for directly linking contamination in market-sold vegetables to internal exposure in consumers is required. This article details a methodology to assess the association between heavy metal contamination in vegetables from Kinshasa's urban markets and biomarkers of exposure in consumers. The primary objective was to create a reproducible protocol for concurrent environmental sampling and human biomonitoring. The methodology used a cross-sectional design. It comprised: 1) stratified random sampling of vendors from major urban markets; 2) collection and laboratory analysis (via atomic absorption spectrometry) of common leafy vegetables for lead, cadmium, and mercury; 3) recruitment of regular consumers for questionnaire-based interviews and collection of blood and urine samples for biomarker analysis; and 4) statistical analysis using multiple regression to model the association between vegetable contamination and biomarker concentrations, controlling for confounders such as occupation and other dietary sources. As a methodology article, this paper presents no empirical research findings. The described protocol was successfully piloted, demonstrating feasibility with a high participant recruitment rate among approached vendors and consumers. This methodology provides a systematic framework for investigating the direct pathway from contaminated market vegetables to human exposure in an urban African context. It addresses a gap in public health research by enabling quantification of this specific environmental health risk. Researchers adopting this methodology should prioritise community engagement to aid recruitment and account for seasonal variation in vegetable sourcing. Successful implementation requires access to local laboratory capacity for heavy metal analysis. methodology, heavy metals, biomonitoring, urban agriculture, food safety, environmental exposure, public health, Democratic Republic of the Congo This work provides a novel, integrated methodological protocol for public health researchers and environmental scientists investigating the vegetable contamination–exposure pathway in similar resource-limited urban settings.

Keywords: *Biomarkers of exposure, heavy metal contamination, urban agriculture, Sub-Saharan Africa, cross-sectional study, food safety, environmental epidemiology*