Association between Social and Environmental Stressors and Cardiometabolic Health in Middle-Aged Population of Czechia

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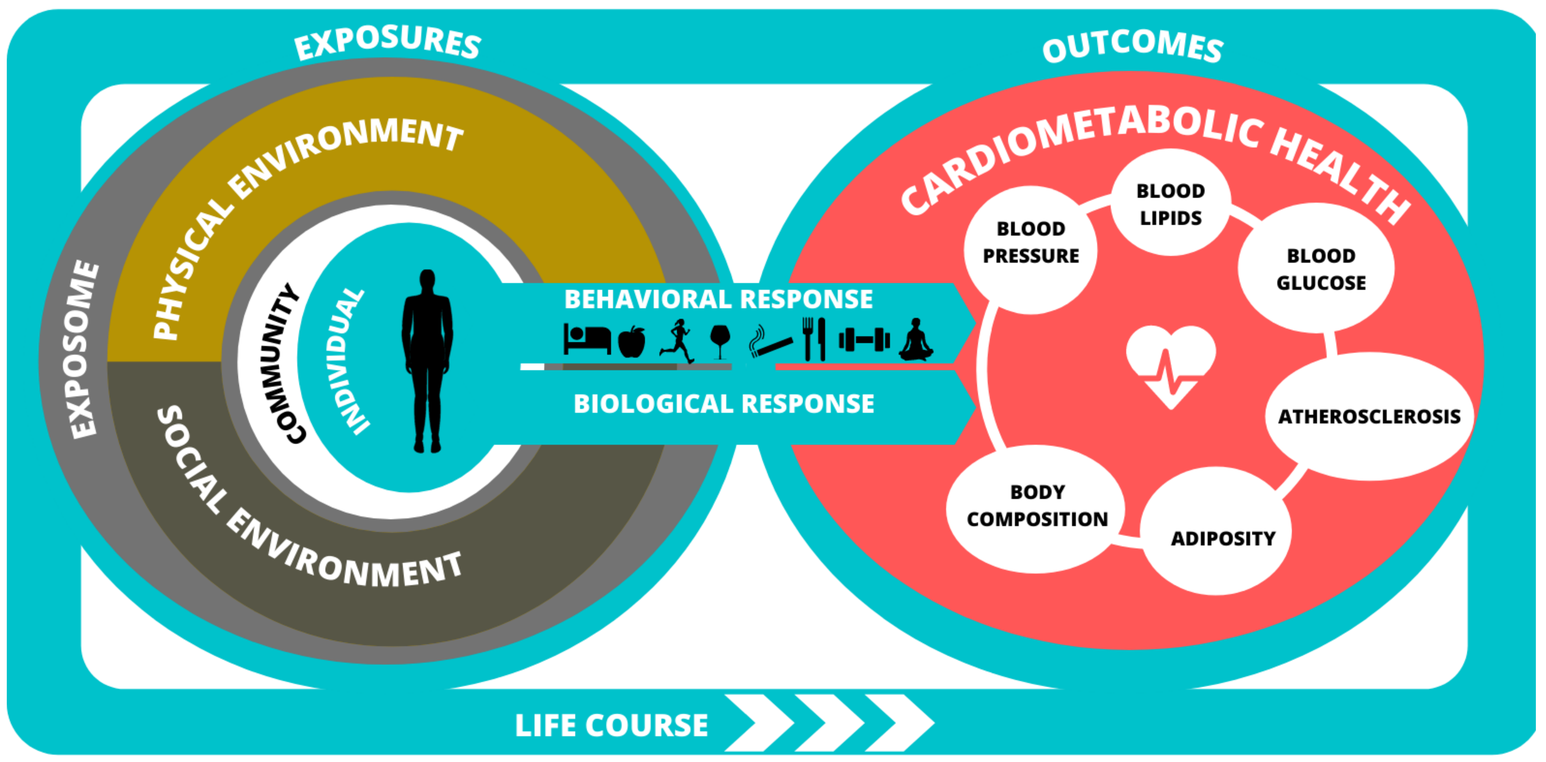
State of the art: A large proportion of the etiology of chronic diseases is related to social and environmental factors, as demonstrated by the ubiquitous health inequalities in human populations. People from disadvantaged environments have higher rates of poor health and disabilities and are at a higher risk of premature death. The main cause of disability-adjusted life years (DALYs) in Czechia in 2019 was cardiovascular disease (CVD), responsible for 23.6% of DALYs. Although the overall impact of CVD on DALYs declined in recent years, the burden of increased adiposity and dysglycaemia in the population is increasing. Previous research found an independent association of environmental and social stressors and cardiometabolic health, however, the impact of stressors is enhanced by their cumulation and the complex approach of their evaluation (as part of the exposome approach) will provide innovative results to describing the paths of stressors affecting cardiometabolic health in the Czech middle-aged population.

Aim: To model a network of environmental and social stressors and describe the paths of their influence on cardiometabolic health in Czechs.

Population: The data source is the Kardiovize study, which is an ongoing population-based study performed in the International Clinical Research Centre (ICRC) in St Anne's University Hospital in Brno. The Kardiovize study started in 2014, evaluating health with an emphasis on the cardiovascular health of the adult population in Brno. In total, 2160 subjects aged 25-65 years participated in the first evaluation, and the ongoing second evaluation (re-examination) completed at the end of 2021.

Data analysis plan: Advanced statistical methods will be applied using Stata 16.0 software (College Station, Texas, USA). General structural equation modeling will be implemented to describe the paths and structural relationships of the stressors. The performance of stressors to predict cardiometabolic risk will be assessed using elastic net regression. The elastic net regression approach creates a sparse model with good prediction accuracy while encouraging a grouping effect. Different stressor models will be developed and their performance to predict cardiometabolic risk will be tested in receiver operating characteristics (ROC) analysis.



Project impact: Complex modeling of the stressors influencing cardiometabolic health will help to understand the network and focus public health strategy on the specific parts to improve cardiometabolic health in the Czech population.

Achievements so far

Published papers

Polcrova A, Pavlovska I, Maranhao Neto GA, Kunzova S, Infante-Garcia MM, Medina-Inojosa JR, et al. **Visceral fat area and cardiometabolic risk: The Kardiovize study**. Obes Res Clin Pract. 2021;15:368-74. DOI: 10.1016/j.orcp.2021.03.005

Pavlovska I, Polcrova A, Mechanick JI, Brož J, Infante-Garcia MM, Nieto-Martínez R, et al. **Dysglycemia and Abnormal Adiposity Drivers of Cardiometabolic-Based Chronic Disease in the Czech Population: Biological, Behavioral, and Cultural/Social Determinants of Health**. Nutrients. 2021;13:2338. DOI: 10.3390/nu13072338.

Papers in preparation

Comparison of Social Disparities in Cardiometabolic Health in Czechia and Venezuela Using the Allostatic Load Model

Explaining Educational Disparities in Adiposity by Socioeconomic, Lifestyle, and Mental Health Pathways

Conferences

Oral abstract presentation: Visceral Fat Area and Cardiometabolic Risk: The Kardiovize Study at European Congress on Obesity (ECO Online 2021). 28th Congress, 10-13 May, 2021.

Poster: Health literacy in phases of health information processing in the Czech population. At 14th European Public Health Conference 2021 10-12 November 2021

Submitted abstract: Comparison of Social Disparities in Cardiometabolic Health in Czechia and Venezuela Using the Allostatic Load Model at 15th European Public Health Conference 2022