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Inequalities in education and national income are associated with poorer diet in Europe: pooled analysis across 12 countries

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Malnutrition linked to noncommunicable diseases (NCDs) presents major health problems across Europe. This includes overweight, obesity, cardiovascular disease (CVD) [(1)] and micronutrient deficiency [(2)]. The World Health Organisation encourages countries to conduct national dietary surveys to obtain data to inform public health policies designed to prevent NCDs [(3)]. WHO recommended nutrient intakes (RNIs) of both macro and micronutrients are not widely achieved and few WHO European Member States report intakes by socioeconomic group [(2)]. This research therefore harmonises national individual-level dietary survey data from across the WHO European Region, exploring geographical variations in key nutrient intakes. It investigates between and within-country socio-economic inequalities through measures of country-level Gross Domestic Product (GDP) and individual-level education.

Data on 27334 participants aged 19–64y were harmonised and pooled across nationally representative dietary survey datasets from 12 countries across the WHO European Region. Weighted mean nutrient intakes were age-standardised using the Eurostat 2013 European Standard Population [(4)]. Associations between country-level GDP and key nutrients and nutrient densities were investigated using linear regression. The potential mitigating influence of individual-level educational status was explored.

Higher GDP was positively associated with total sugar intake (5.0% energy for each 10% increase in GDP, 95% CI 0.6%, 9.3%). Scandinavian countries had the highest vitamin D intakes and Central and Eastern European countries generally had lower total folate intakes. Participants with higher educational status had better nutritional intakes, particularly in lower GDP countries. In higher educated individuals a 10% higher GDP was associated with lower total fat intakes (-0.2% energy, 95% CI -0.3%, -0.1%) and higher daily total folate intakes (14μg, 95% CI 12μg, 16μg).

Lower income countries and lower education groups had poorer diet, particularly for micronutrients. We demonstrate for the first time that higher educational status appears to mitigate the effects of poorer diets in lower income countries. Most countries had high energy and macronutrient intakes above the WHO RNIs; lower GDP countries may therefore follow the trajectory of higher income countries and face future elevated levels of obesity-related NCDs. This research reveals individual-level socioeconomic inequalities across WHO Europe, as those with less education generally had lower intakes of nutrients encouraged as part of a healthy diet, particularly iron and total folate. This work illustrates the feasibility and value of harmonising national dietary survey data to inform European policy regarding access to healthy diets, particularly in disadvantaged groups. It specifically highlights the need for strong policies supporting nutritional intakes, prioritising lower education groups and lower income countries to address the public health implications of the effect of GDP and education on nutritional intakes. Increasing educational levels will lead to better nourished populations, and the ability to improve GDP. Policies should therefore be put in place to achieve this.

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