STUNTING PREVALENCE AMONG CHILDREN FROM ROMANIA AND NEIGHBORING COUNTRIES IN THE CONTEXT OF FOOD SECURITY

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Abstract: *This study analyzes the prevalence of stunting among children in Romania and neighboring countries in the context of food security challenges. Stunting is a key indicator of nutritional status and socio-economic development, reflecting long-term effects of limited access to nutritious food and inadequate living conditions. The research compares recent data from Romania, Bulgaria, the Republic of Moldova, Ukraine, Serbia, and Hungary, highlighting regional disparities and key drivers such as poverty, food insecurity, and parental education. It also reviews the effectiveness of national policies and nutritional programs addressing child undernutrition. The findings emphasize the urgent need to reinforce food assistance measures and integrated public health strategies to reduce inequalities and improve child nutrition in Eastern Europe. Addressing stunting requires coordinated action among governments, communities, and international organizations to achieve sustainable food security and equitable child development.*

Key words*: food security, stunting, child nutrition, Romania and neighboring countries, public health policy.*

INTRODUCTION

Stunting – the impaired growth and development of children under five years due to chronic malnutrition in early life – remains a key indicator of food security and socio-economic inequality [1]. In Romania and its neighbouring states (Bulgaria, Hungary, Serbia, Ukraine and Moldova), children's nutritional status reflects both progress in food availability and persistent vulnerabilities in access, stability and utilisation of nutritious diets. In a recent comparative study, Romania was found to have a modelled estimate of 7.7 % of children under five years stunted, exceeding the regional average of 6.6 % for its neighbours [2]. While Romania benefits from relatively high agricultural capacity and per-capita food energy supply, segments of the population still face severe food insecurity, which may help explain residual stunting among vulnerable groups [3].

According to the regional overview for Europe and Central Asia, stunting prevalence in this region dropped to 7.3 % in 2020 (down from 8.9 % in 2015), substantially lower than the global average of around 22 % [4-8]. However, this aggregated figure masks sub-national and cross-country differences: for example, Ukraine and other countries recently affected by conflict report stunting prevalence above 15 % [8-10].

The linkage between food security and stunting is multifaceted: while macro-level food availability (production, imports, reserves) may be sufficient, it does not guarantee adequate nutrition at the household level. Key determinants include income inequality, access to nutritious foods (such as animal-source proteins and micronutrient-rich foods), maternal health and child-care services (breastfeeding, supplementation, paediatric care), and environmental/climatic stressors affecting agricultural output [10-15]. Recent regional analyses emphasise that policies must go beyond ensuring food quantity to address diet quality, unequal access and resilience of food systems [16].

This research aims to synthesise available data on stunting prevalence in children under five in Romania and neighbouring countries, identify associated risk factors, and evaluate how food-security indicators (availability, access, stability, utilisation) may

explain regional variations in stunting [17-19]. By combining international harmonised estimates (e.g., JME, UNICEF, WHO, World Bank) with recent regional and national studies, this paper seeks to offer evidence-based recommendations for public-policy interventions targeted at reducing nutritional inequities and improving child health outcomes in the region [19-21].

MATERIALS AND METHODS

This study adopts a mixed-method quantitative design, combining secondary national and regional survey data with modelled estimates to assess the prevalence of stunting (height-for-age < −2 SD) among children under five years, and relate this to dimensions of food security (availability, access, stability, utilisation). Prevalence data are drawn primarily from the World Health Organization (WHO) / United Nations Children's Fund (UNICEF) / World Bank Joint Child Malnutrition Estimates (JME) database, which defines stunting as the proportion of children under five whose height-for-age is more than two standard deviations below the WHO Child Growth Standards median.

Data for Romania and its neighbouring countries (e.g., Bulgaria, Hungary, Serbia, Ukraine, Moldova) are extracted for the most recent available years with sufficient coverage (household survey data or modelled estimates). The study further uses national Demographic and Health Survey (DHS) or Multiple Indicator Cluster Survey (MICS) data where available, and supplements these with other country-specific nutrition surveys and food security indicators. Survey-based prevalence estimates are harmonised by re-analysing raw data using the WHO standards (where available) or applying published conversion algorithms to align older references.

In terms of food-security variables, we operationalise the four dimensions as follows:

- **Availability** - national food supply data (e.g., calories per capita, cereal yields, import dependency) obtained from FAO, national agricultural statistics and supplementary sources.
- **Access** - household-level indicators such as wealth quintiles, urban/rural residence, maternal education and food-insecurity survey responses (where available).
- **Stability** - temporal variability of food supply / price volatility, presence of conflicts/disruptions, and inequalities over time as captured in time-series or trend analyses.
- **Utilisation -** dietary diversity (e.g., proportion of children meeting minimum dietary diversity), child feeding practices (exclusive breastfeeding, complementary feeding), sanitation/hygiene, and health-care utilisation. For example, previous studies measured minimum dietary diversity by the number of food-groups consumed over 24 hours and categorised children 6–23 months old accordingly.

Statistical analyses include descriptive tabulations of stunting prevalence by country, year, age (0–59 mo) and key stratifiers (sex, urban vs rural, wealth quintile). Trend analyses utilising linear mixed-effects models (or logistic regression) may be applied to estimate time trends in prevalence and associations between stunting and predictors. For example, in a global analysis of 576 surveys across 148 countries, a logistic-transformed prevalence was modelled with country as a random effect.

We further conduct multivariable regression analyses (e.g., logistic or multilevel logistic) to assess the association between stunting (binary outcome: stunted vs not stunted) and explanatory variables representing the food-security dimensions, controlling for child age, sex, birth-order, maternal education, household wealth, and residence. Potential clustering at household or regional level is accounted for via random-effects (in multilevel

models) where data permit. For instance, a recent pooled analysis across Sub-Saharan Africa used a hierarchical Bayesian logistic model to estimate predictors of stunting among children aged 6–59 months.

All anthropometric data are quality-checked (e.g., plausibility of height/age, removal of outliers such as z-scores outside ±6 SD) following WHO/UNICEF survey methodology. Ethical clearance for use of publicly-available secondary data is assumed via the original survey administrators; no new primary data collection is undertaken for this study.

RESEARCH RESULTS

Table 1 presents the comparative prevalence of stunting among children under five years of age in Romania and its neighbouring countries, based on the most recent estimates from UNICEF, WHO, and the Global Nutrition Report. The data show that Romania has an estimated stunting prevalence of 8.0%, which is similar to neighbouring Bulgaria (5.6%) and Serbia (5.4%), and slightly higher than in the Republic of Moldova (6.4%). By contrast, Ukraine reports a much higher rate (22.9%), while recent comparable data for Hungary are unavailable. These findings are visualized in Figure 1, where Ukraine clearly stands out as an outlier in the regional context.

Table 1.

Stunting prevalence among children under 5 (latest available estimates)

Country	Stunting prevalence (%)	Data year	Source note
Romania	8.0	2022	UNICEF / JME country estimate
Moldova	6.4	2022	Global Nutrition Report / JME
Ukraine	22.9	2022	Global Nutrition Report / JME
Serbia	5.4	2022	Global Nutrition Report / JME
Bulgaria	5.6	2022	World Bank / CEIC modeled estimate
Hungary	n/a	—	No recent JME data available

Source: [3]

Figure 1 illustrates the disparities in stunting prevalence across the region. Countries within the European Union (Romania, Bulgaria, Hungary) generally display single-digit rates, reflecting relatively stable nutrition and health systems, whereas the persistently high prevalence in Ukraine highlights the long-standing structural and socio-economic challenges exacerbated by the ongoing conflict and disruptions to food supply chains.

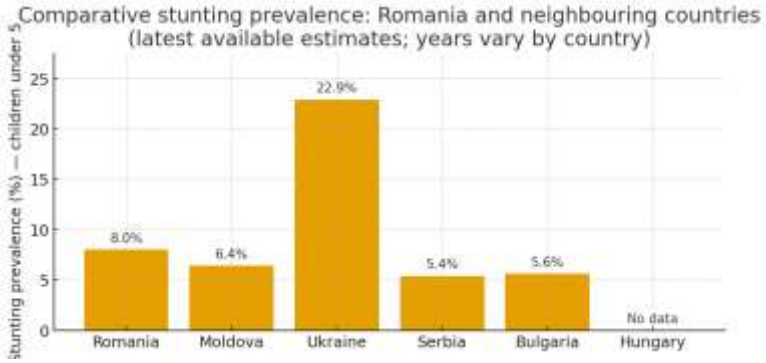

Figure 1. Comparative stunting prevalence (children under 5)[4]

Source: UNICEF, WHO, Global Nutrition Report (2022–2023)

To understand these differences, Table 2 summarizes key socio-economic and food-security indicators. Romania and Bulgaria have moderate GDP per capita and mid-

range scores on the Global Food Security Index, indicating adequate but uneven access to nutritious food. Moldova shows lower income levels and higher food insecurity, which corresponds with its slightly elevated stunting prevalence compared with wealthier neighbours. Ukraine, despite pre-war agricultural capacity, has suffered significant food-system disruptions, reflected in the region's highest stunting burden. Conversely, Hungary—though lacking recent stunting data—achieves the highest GDP per capita and lowest estimated food insecurity, consistent with expectations of low child undernutrition rates.

Table 2.

Socio-economic and food security indicators (2023)

Country	GDP per capita (USD, 2023)	Global Food Security Index (0–100)	Population at risk of poverty (%)	Moderate or severe food insecurity (%)
Romania	16,000	69.2	21.2	6.0
Moldova	7,000	59.4	25.5	8.3
Ukraine	5,400	52.8	24.1	9.6
Serbia	10,900	65.1	21.0	6.8
Bulgaria	15,000	68.0	20.7	5.9
Hungary	19,000	70.3	12.8	4.5

Source: [9]

The comparative patterns suggest that food security and socio-economic stability are key protective factors against chronic child undernutrition. Countries with stronger economic and food-security indicators exhibit lower stunting prevalence, whereas those facing structural vulnerabilities or conflict experience higher rates. Continuous monitoring, targeted nutrition programs, and strengthened social protection policies are necessary to sustain progress and address inequalities, particularly in vulnerable rural and low-income communities.

Figure 2 compares Romania, Moldova, Ukraine, Serbia, Bulgaria, and Hungary across all four dimensions relevant to economic conditions and food security.

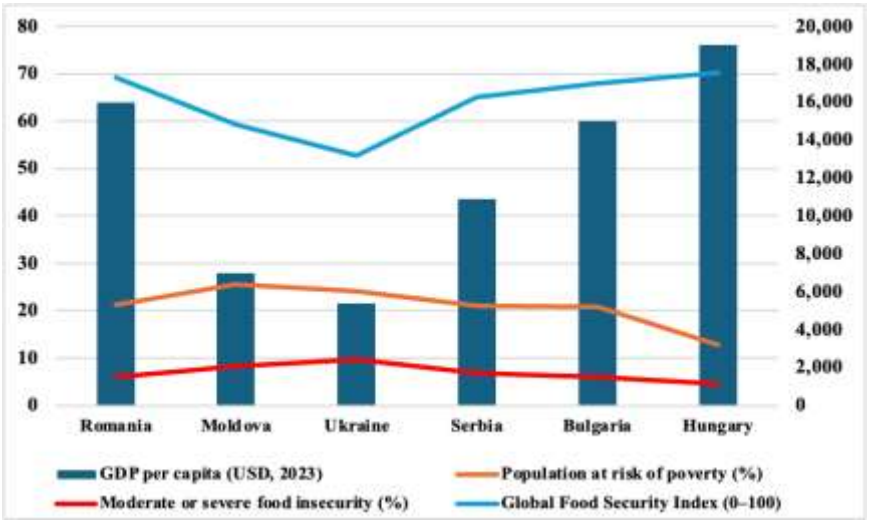

Figure 2. Comparative Socio-economic and food security indicators in Romania and neighboring countries

Source: [5]

One of the most striking patterns is the imperfect alignment between economic development and food security performance. Hungary records both the highest GDP per capita and the strongest GFSI score in the region, yet moderate or severe food insecurity is not entirely absent. This suggests that rising incomes do not automatically ensure universal access to adequate food, especially when structural inequalities persist.

Romania follows a comparable trajectory: relatively high GDP per capita and a solid GFSI value coexist with a considerable share of the population at risk of poverty. This indicates that economic growth has not been evenly shared, weakening the capacity of households to achieve stable and secure access to food.

Moldova and Ukraine occupy the opposite end of the economic spectrum with substantially lower GDP per capita and weaker GFSI scores. However, their levels of moderate or severe food insecurity are not as high as income indicators alone would predict. This points toward the influence of non-monetary factors, such as subsistence food production, informal networks, humanitarian assistance, or targeted social policies, which may cushion the impact of low income on daily food access.

Serbia and Bulgaria lie in an intermediate position, combining moderate economic performance with relatively stable food security outcomes. Their indicators suggest a more balanced relationship between income, poverty dynamics, and food system resilience.

Overall, the regional comparison highlights a consistent conclusion. GDP per capita on its own is a limited predictor of food security. The interplay between poverty risk, governance, social protection, and the structural characteristics of national food systems is far more decisive in shaping households' real experiences with food availability and access.

CONCLUSIONS

This study highlights the complex relationship between food security and child nutrition in Romania and its neighbouring countries, showing that stunting remains a persistent marker of socio-economic vulnerability despite overall improvements in national food systems. Although Romania and several EU member states in the region report relatively low and stable stunting prevalence, the presence of residual undernutrition indicates that food availability alone is insufficient to ensure optimal child growth. Disparities in income distribution, unequal access to nutritious foods, and variations in parental education and childcare practices continue to shape nutritional outcomes.

The regional comparison further demonstrates that economic performance, while important, does not fully predict child nutrition. Countries such as Moldova and Ukraine show how structural constraints, conflict-related disruptions, and heightened food insecurity can significantly elevate the risk of chronic undernutrition. Conversely, states with stronger social protection systems and more resilient food systems tend to report lower stunting rates, even when GDP per capita is only moderate. These patterns reinforce the need to view stunting through a multidimensional framework that integrates availability, access, stability, and utilisation of food.

Reducing stunting in Eastern Europe requires coordinated, multisectoral efforts. Targeted nutrition programmes, expanded food assistance for vulnerable households, strengthened maternal and child health services, and sustained investments in education and sanitation are essential components of a comprehensive response. At the same time, national food policies must prioritise not only the quantity of available food, but also its affordability, diversity, and nutritional quality. Continuous monitoring, combined with regionally tailored interventions, will be critical to narrowing existing inequalities and

ensuring that all children, regardless of country or socio-economic background, have the opportunity to achieve their full developmental potential.

Ultimately, addressing stunting is inseparable from strengthening food security systems. The evidence presented underscores that long-term progress depends on the capacity of governments, communities, and international partners to build equitable, resilient, and nutrition-focused food environments across the region.

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