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# Association Between War and Childhood Malnutrition

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**Research Article**

**Keywords:** child stunting, armed conflict, undernutrition, public health, country-year panel, fixed effects

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# Association Between War and Childhood Malnutrition

**Abstract**
Childhood stunting, an indicator of chronic undernutrition, may be affected by armed conflict through disruptions to food systems, health care, household means, and other determinants of childhood growth. This exploratory analysis examines the relationship between state-based conflict and modeled stunting prevalence among children aged less than five in Bangladesh, Ethiopia, Niger, and Nigeria over the years 2000-2024. Annual national stunting estimates were based on the UNICEF/WHO/World Bank Joint Child Malnutrition Estimates, and country-year conflict status was derived from the Uppsala Conflict Data Program's Organized Violence country-year dataset. Ordinary least squares regression included country and year fixed effects, with standard errors clustered by country. Results revealed an adjusted increased prevalence in stunting of 4.83% (95% CI, 1.21-8.45, nominal p=0.02) during the conflict years vs non conflict years.

**Keywords:** child stunting; armed conflict; undernutrition; public health; country-year panel; fixed effects

## 1. Introduction

Childhood stunting is height for age more than two standard deviations below the median of the WHO Child Growth Standards. This is an indicator of undernutrition and reflects the magnitude of poor nutrition, diseases and living conditions that the child has been exposed to. The Joint Child Malnutrition Estimates by UNICEF, WHO and the World Bank provide harmonized estimates of child malnutrition in countries.

A conflict can affect nutrition in children through various interconnected channels. Insecurity can result in problems in agriculture, marketing, transport, livelihoods, health care, water, sanitation, and humanitarian assistance. These problems can affect the availability of food in the family, the quality of diet, infections, and health care services for mothers and children.

Prevalence of stunting in a nation may vary over many decades due to changes in economic status, education, public health, sanitation, nutritional practices, and other factors. One nation may experience a gradual decline in stunting despite having more cases in conflict years than non-conflict years.

## 2. Methods

This observational ecological panel analysis used annual country-level data from 2000 through 2024. The unit of analysis was the country-year. The four-country subset comprised Bangladesh,

Ethiopia, Niger, and Nigeria, with 25 observations per country and 100 country-year observations overall.

The outcome was annual national prevalence of stunting among children under five, expressed as a percentage, from the supplied UNICEF/WHO/World Bank JME workbook

Country-year conflict status was taken from the Uppsala Conflict Data Program (UCDP) Organized Violence Country-Year dataset, version 26.1. The binary exposure was coded as 1 when the dataset's state-based conflict indicator was present and 0 otherwise. This definition does not capture every form of political violence, insecurity, displacement, or local disruption. Ethiopia was coded as experiencing state-based conflict in all 25 years, leaving no within-country non-conflict years for descriptive comparison.

The exploratory model was an ordinary least squares regression of stunting prevalence on the binary conflict indicator, country fixed effects, and year fixed effects. A t-test with three degrees of freedom was chosen. Statistical analysis was done with the assistance of Claude, and results were later verified independently.

Descriptive statistics were done on the number of conflict and non-conflict years as well as the mean of stunting prevalence in each status group for each country. Longitudinal analysis was done by comparing 2000 and 2024 figures to indicate changes over time; endpoint comparisons are different from conflict versus non-conflict comparisons.

This analysis involved the use of aggregated estimates per country level and no individual participant was considered.

## 3. Results

There were 100 country-year observations, with 76 of those being conflict years and 24 non-conflict years for four countries. Country-specific trends were different. The mean stunting prevalence was 39.68% during conflict years and 36.59% during non-conflict years in Bangladesh (+3.09 percentage points difference). In Niger, mean estimated stunting prevalence was 46.17% during conflict years and 48.82% during non-conflict years (-2.65 points difference). In Nigeria, estimated mean stunting prevalence was 36.01% during conflict years and 40.71% during non-conflict years (-4.70 percentage points difference). Ethiopia was experiencing conflict throughout the period; its mean estimated stunting prevalence is 43.95%, and thus the within-country comparison was impossible.

Estimated stunting prevalence decreased between 2000 and 2024 in all four countries: from 54.9% to 25.1% in Bangladesh (−29.8 percentage points), from 56.9% to 35.5% in Ethiopia (−21.4 points), from 52.1% to 48.3% in Niger (−3.8 points), and from 41.8% to 33.8% in Nigeria

(−8.0 points). Endpoint differences are not contradictory to country-year differences since the latter compares all conflict years to all non-conflict years, not only the first and the last years.

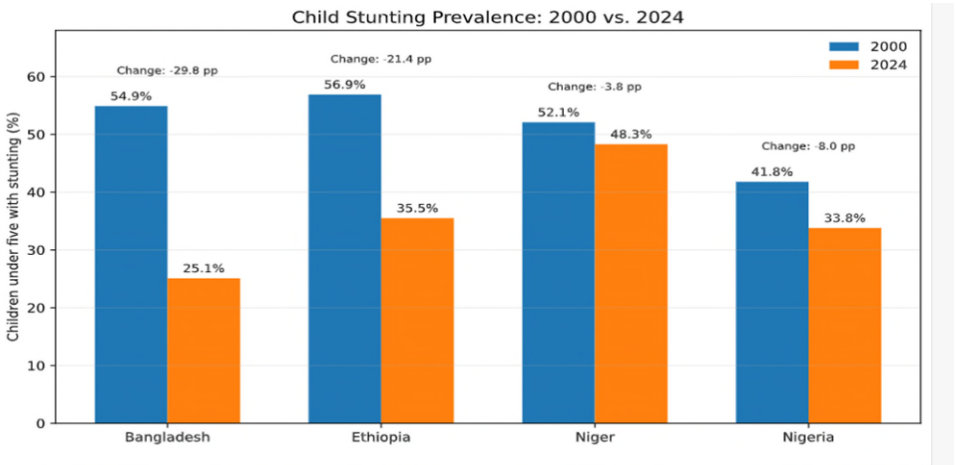
For the four-country model chosen, the incidence of state conflict was found to be related to an increase in the rate of stunting by 4.83 percentage points once the variables of country and year fixed effect were introduced (nominal p = 0.02; 95% CI [1.21,8.45]). The finding should thus be considered a statistically significant indicator.

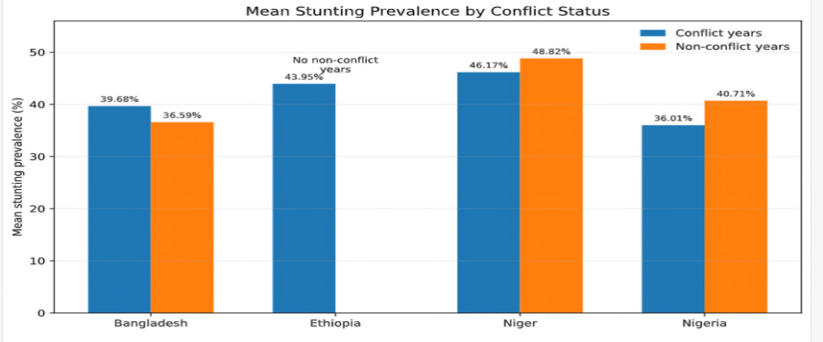
This positive adjusted coefficient contrasts with the pooled mean values, which were smaller during the years of conflict. This is possible since the regression makes comparisons conditional on the fixed effect of country and year, while raw means make comparisons across observations at different country and year compositions.

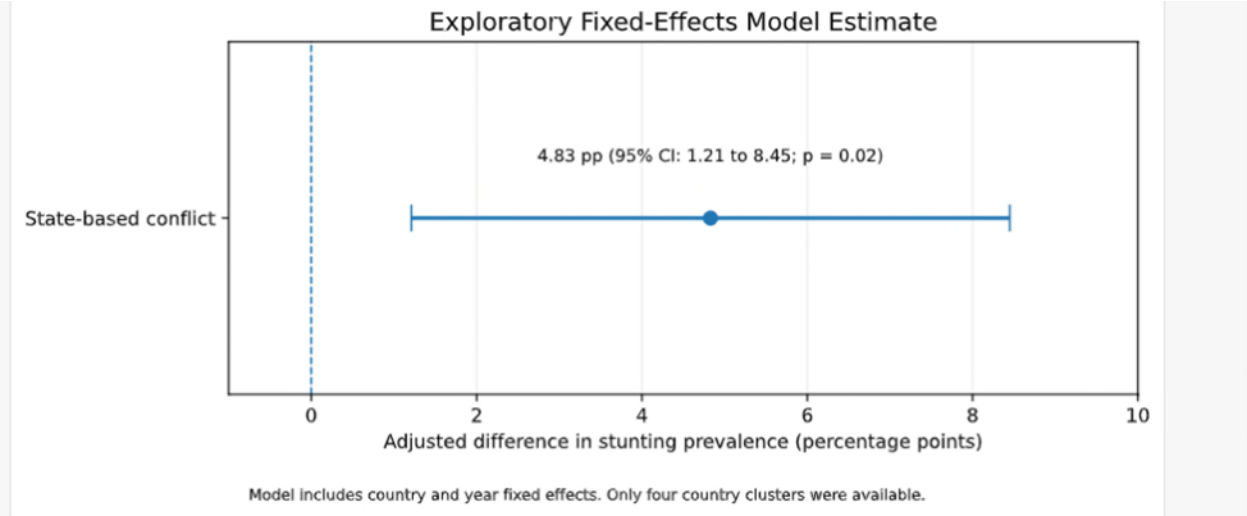
**Table 1. Country-level descriptive statistics**

| Country | Conflict years | Non-conflict years | Conflict mean (%) | Non-conflict mean (%) | 2000 (%) | 2024 (%) |
|---|---|---|---|---|---|---|
| Bangladesh | 18 | 7 | 39.68 | 36.59 | 54.9 | 25.1 |
| Ethiopia | 25 | 0 | 43.95 | — | 56.9 | 35.5 |
| Niger | 15 | 10 | 46.17 | 48.82 | 52.1 | 48.3 |
| Nigeria | 18 | 7 | 36.01 | 40.71 | 41.8 | 33.8 |

Note. Conflict status uses the UCDP state-based conflict indicator. Ethiopia had no non-conflict years. Estimates are national-level modeled values and descriptive averages.






## 4. Discussion

The descriptive variance observed across the four nations where conflict-year mean stunting was higher in Bangladesh, but the reverse trend appeared in Niger and Nigeria further underscores the complexity of chronic malnutrition. In countries like Niger and Nigeria, the paradox of lower mean stunting during conflict years may deeply reflect this exact time-lag effect. If stunting takes several years to show, a country experiencing a sudden spike in conflict may not show elevated stunting rates until years later, potentially falling into what the dataset classifies as a “non-conflict” year.

The finding that conflict is associated with an adjusted overall 4.83-percentage-point increase in stunting prevalence underscores the deeply entrenched and chronic nature of the nutritional deprivation caused by war. Unlike acute malnutrition (wasting), which can manifest rapidly during a crisis, stunting reflects long-term, cumulative growth failure. Because stunting requires

a prolonged period of inadequate nutritional intake, frequent illness, or sustained stress to manifest physically, its prevalence often peaks several years after the active height of conflict.

Consequently, evaluating child health strictly during a conflict or immediately after a ceasefire will fail to capture the full scope of the damage. The true nutritional toll of violence ripples outward, manifesting as stunting years later when a child's critical "first 1000 days" window has already been severely compromised.

Dynamics within a country play a massive role as well. In large nations such as Nigeria, intense, concentrated conflicts (e.g., in the Northeast) can devastate child health in that region, but their impact may be diluted when averaged with the rest of the nation. This highlights a critical limitation of relying solely on national, country-year reports for chronic conditions and reinforces the need for highly customized, subnational humanitarian efforts.

These insights highlight the need for a shift in how humanitarian organizations allocate resources. Generally, aid is heavily front-loaded onto active conflict zones to treat acute starvation. While vital, this exploratory study sheds light on the need for extended, post-conflict developmental funding.

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