

## Original Article

# Household dietary diversity and child stunting in East Java, Indonesia

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**Background and Objectives:** More than one-quarter of under-five children in the developing world are stunted, and those with poor nutrient intake are at risk of irreversible cognitive impairment. The purpose of this study was to determine the relationship between dietary diversity and child stunting in an Indonesian context. **Methods and Study Design:** Dietary diversity was assessed using a maternal-reported checklist of 12 food groups, summed as a Household Dietary Diversity Score. Stunting was defined as  $\leq -2.0$  height-for-age z-score by WHO-Anthro 2005. Trained interviewers administered the household dietary diversity questionnaire to 768 households with children aged  $<5$  years in East Java, Indonesia. Logistic regression models were constructed to test the association between dietary diversity and child stunting. **Results:** The prevalence of child stunting was 39.4%, and the percentage of households consuming food groups high in protein and calcium, like dairy products (41%), and meat/poultry, (65%) was lower compared with other food groups. The unadjusted model revealed that higher dietary diversity scores were associated with lower likelihood of child stunting (OR=0.89; 95% CI=0.80–0.98). This relationship remained significant after adjustment for family size, maternal literacy, food expenditure, breastfeeding, energy, and protein intake (OR=0.89; 95% CI=0.80–0.99). **Conclusions:** The dietary diversity score was moderate, with consumption of dairy products and meat/poultry lowest among 12 food groups. Hence, population interventions should focus on promoting food groups currently lacking in maternal and child diet, including those rich in growth-promoting nutrients like dairy, meat/poultry. These results, from an Indonesian context, confirm the widely observed protective relationship between dietary diversity and child stunting.

**Key Words:** dietary diversity, child stunting, malnutrition, food pattern, Indonesia

## INTRODUCTION

Childhood stunting is a major nutritional problem in developing countries.<sup>1</sup> Stunting is defined as height-for-age z-score below  $-2.0$ , using the current World Health Organization (WHO) standards from the Multi Growth Reference Study.<sup>2</sup> In 2011, around 26% of world's children under the age of five years were stunted.<sup>2</sup> Based on the United Nations Children's Fund (UNICEF) conceptual framework on malnutrition, nutritional status is influenced by three broad factors: food, health, and care.<sup>3</sup> Stunting is caused by long-term insufficient nutrient intake,<sup>4</sup> and frequent infections.<sup>3</sup> There is an association between childhood stunting and suboptimal brain development, which might impair children's cognitive ability, school performance, and potential earning when they enter the workforce.<sup>1-3</sup> The WHO report of a colloquium on childhood stunting highlighted the importance of the 1,000-day period (from conception to 24 months of age) when the foundation is laid for an individual's physical size, as well as their physiological and intellectual capacities in later life.<sup>1</sup> With detrimental effects of child stunting, many countries affiliated with The World Health Assembly have committed to achieve 40% reduction by 2025 through the Scaling up Nutrition (SUN) program.<sup>3</sup>

Among the three groups of priority policy responses in the SUN framework are nutrition-specific intervention. This intervention has nutritional improvement as the primary goal, and should be accessible to all individuals and their households, especially from pregnancy to the first two years of life, and at times of illness or distress.<sup>5</sup> To prevent a lifetime of lost potential due to stunting, emphasis should be placed on the importance of providing a supportive nutritional environment through timely and appropriate complementary feeding during the first 1,000 days of life,<sup>4-6</sup> that involves a diverse diet.<sup>7-10</sup>

One method of assessing dietary quality employs the dietary diversity score.<sup>11</sup> The dietary diversity score (DDS) measures the sum of diverse food categories, irrespective of the amount consumed individually for the last 24 hours.<sup>12-13</sup> The DDS, as measured by a quantitative num-

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