



Diet diversity is negatively associated with stunting among Ethiopian children 6-23 months of age

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Abstract

reported that 44% of children under five years-of-age were stunted (i.e., height-for-age z-score (HAZ) below -2) and 11% were consuming minimum diet diversity (DD), a World Health Organization core indicator for infant and young child feeding (1). This analysis was conducted to determine the association between diet diversity score (DDS) and stunting among Ethiopian children 6-23 months of age.

A total of 4100 children 6-23 months of age who participated in the National Food Consumption Survey were included in the analysis. A DDS was calculated for each child by categorizing individual foods consumed in quantities > 5 g in the past 24-hours into the United Nations Children's Fund seven food groups for DD (2). Chi-square test was used to determine in which regions children were consuming minimum DD, defined as ≥ 4 food groups. The association between stunting and diet diversity score (DDS) was determined using logistic regression model.

DD was negatively associated with stunting (OR=1.4, $p < 0.0001$). Nationally, 8.6% of children consumed adequate DD, with highest rates observed in the Addis Ababa (22.4%) and Harari (15.4%) region ($p < 0.001$).

As with other populations, our Ethiopian findings suggest that increasing DD may be one method of reducing child stunting rates. Due to broad variations in regional dietary consumption in Ethiopia, future research will include more specific validation exercises of DD as a marker of dietary consumption in this population.

Introduction

Stunting (i.e., height-for-age z-score (HAZ) below -2) is during childhood is a major public-health problem in underdeveloped and developing countries as a result of chronically not meeting nutrient requirements for growth between conception and 24 months of age (3). The presence of stunting indicates that nutrient intake has been suboptimal not only for growth, but also for other critical functions of the body, such as brain development and the immune system (4).

Findings from the 2011 Ethiopian Health and Demography Survey indicated that 44% of children under five years-of-age were stunted and 11% were consuming minimum diet diversity (DD), a World Health Organization core indicator for infant and young child feeding (1).

Several studies have shown that DD is positively associated with overall dietary quality, micronutrient intake of young children and household food security (5). A higher DD has also been associated with better nutritional status of children in developing countries (6). This association has not yet been explored in Ethiopia, where the prevalence of stunting is high and overall dietary quality is likely to be poor. This analysis was undertaken to determine the association between dietary diversity and stunting among children 6-23 months of age in Ethiopia using National Food Consumption Survey data.

Methodology

Nationally and regionally representative data from the 2011 Ethiopian National Food Consumption Survey, weighted for relative population sizes ($n=4100$ children 6-23 months-of-age) were used in the analysis. A DD score (DDS) was calculated for each child by categorizing individual foods consumed in quantities > 5 g in the past 24-hours into the United Nations Children's Fund seven food groups for DD. Chi-square test was used to determine in which regions children were consu

ming minimum DD, defined as having a DDS ≥ 4 food groups. The association between stunting and DDS was determined using logistic regression model, including all potential socioeconomic, demographic and physiological confounders.

Results

Nationally, 8.6% of children consumed adequate diet (DDS ≥ 4 food groups). There was a statistically significance difference in DDS among regions ($p < 0.001$). Lower DDS were observed in Benshangul Gumuz region (3.4%), and the highest score was observed in Addis Ababa (22.4%). (Table 1)

Table 1. Diet Diversity Score among children 6-23 months of age across regions, Ethiopia, 2011

Region	n (weighed)	% DDS ≥ 4 food groups	P-value
Tigray	539141	8.7	<0.001
Afar	93537	5.7	
Amhara	1992816	6.5	
Oromiya	3507282	13.2	
Somali	85188	5.8	
Benshangul Gumuz	80973	3.4	
SNNPR	1692963	7.2	
Gambella	28337	10.3	
Harari	21817	15.4	
Addis Ababa	290682	22.4	
Dire Dawa	44042	10.2	
Total	8376778	8.6	

Among the variables considered, place of residence, region, mother's education, child sex, child breast feeding status, DDS and child age were significantly associated with stunting ($p < 0.001$). In contrast, socio-economic status and number of children less than 5 years in the household were not significantly associated with stunting.

Compared to DireDawa, there was a significant difference in the prevalence of stunting in Tigray, Somali and Gambella regions; OR=1.75, 95% CI: 1.19, 2.56, OR=0.62, 95% CI: 0.41, 0.93 and OR= 0.54, 95% CI: 0.34, 0.85 respectively. Unlike Tigray region, the prevalence of stunting in Somali and Gambella regions was lower; OR=0.62, 95% CI: 0.41, 0.93 and OR=0.54, 95% CI: 0.34, 0.85, respectively.

In multivariate analyses, compared with high DDS, children with low DDS had a higher chance of being stunted (OR=1.4, 95% CI: 1.05, 1.84).

Children who were not breastfed and living in urban areas were less likely to be stunted compared to those who were breastfed (OR=0.78, 95% CI: 0.63, 0.96) and those living in rural areas (OR=0.73, 95% CI: 0.55, 0.97), respectively. (Table 2)

Conclusion and recommendation

Our findings demonstrated that limited diversity in complementary foods is a predictor of stunting among children 6-23 months of age in Ethiopia. This reinforces the notion that improved food variety may indeed reflect a greater likelihood of meeting daily energy and nutrient requirements, which would result in improved nutritional status among young children.

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Results (Continued)

Variables	Odds ratio	95% CL
Place of residence	Urban	0.73 (0.55, 0.97)
	Rural (Reference)	1
Region	Tigray	1.75 (1.19, 2.56)
	Afar	0.92 (0.61, 1.38)
	Amhara	1.35 (0.93, 1.95)
	Oromiya	1.01 (0.70, 1.46)
	Somali	0.62 (0.41, 0.93)
	Benshangul	0.99 (0.66, 1.49)
	SNNPR	1.06 (0.73, 1.53)
	Gambella	0.54 (0.34, 0.85)
	Harari	1.01 (0.66, 1.55)
	Addis Ababa	0.88 (0.57, 1.35)
Mother's Education	Illiterate	1.64 (1.22, 2.20)
	Primary	1.27 (0.95, 1.70)
	Secondary and above (Reference)	1
Child Sex	Male	1.45 (1.30, 1.67)
	Female (Reference)	1
Child Breastfeeding	No	0.78 (0.63, 0.96)
	Yes (Reference)	1
Diet Diversity	Inadequate (<4 food groups)	1.39 (1.05, 1.84)
	Adequate (≥ 4 food groups) (Reference)	1
Child Age	1.13	(1.11, 1.15)

Non-significant variables: Socio-economic status and number of children's <5 in the household

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