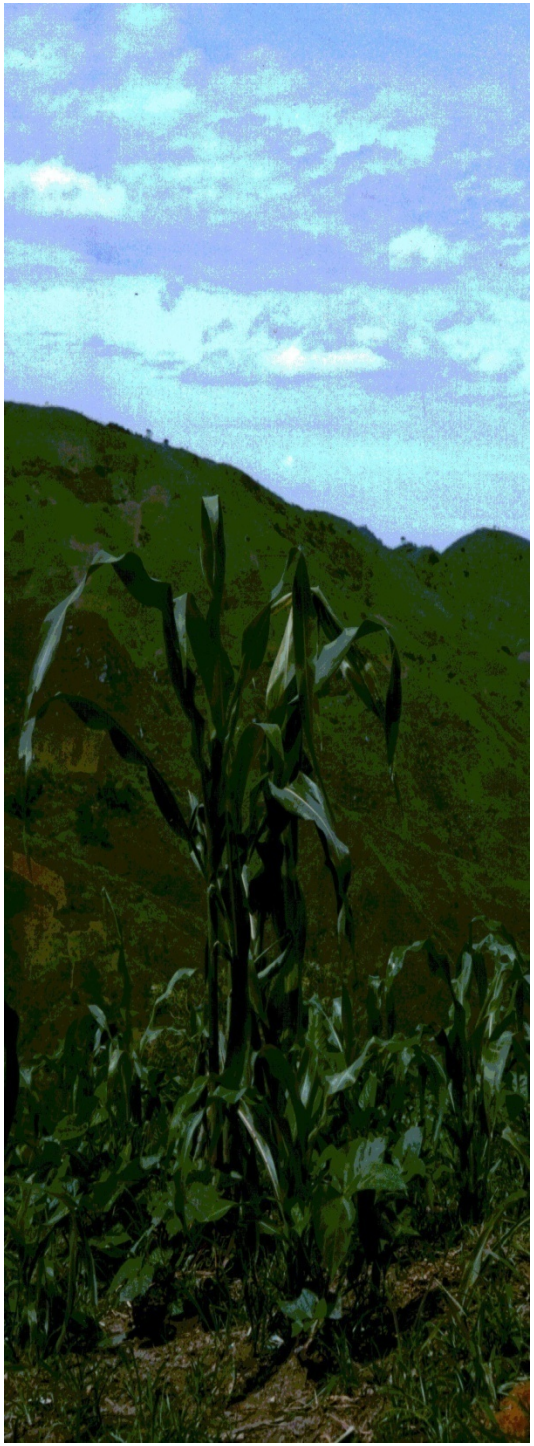

Household Food Security and the Nutritional Status of Rural Tanzanian Adolescents (10-19 years)

Cordeiro LS, Wilde P, Pinderhughes E, Lamstein S, and Levinson FJ. 2007
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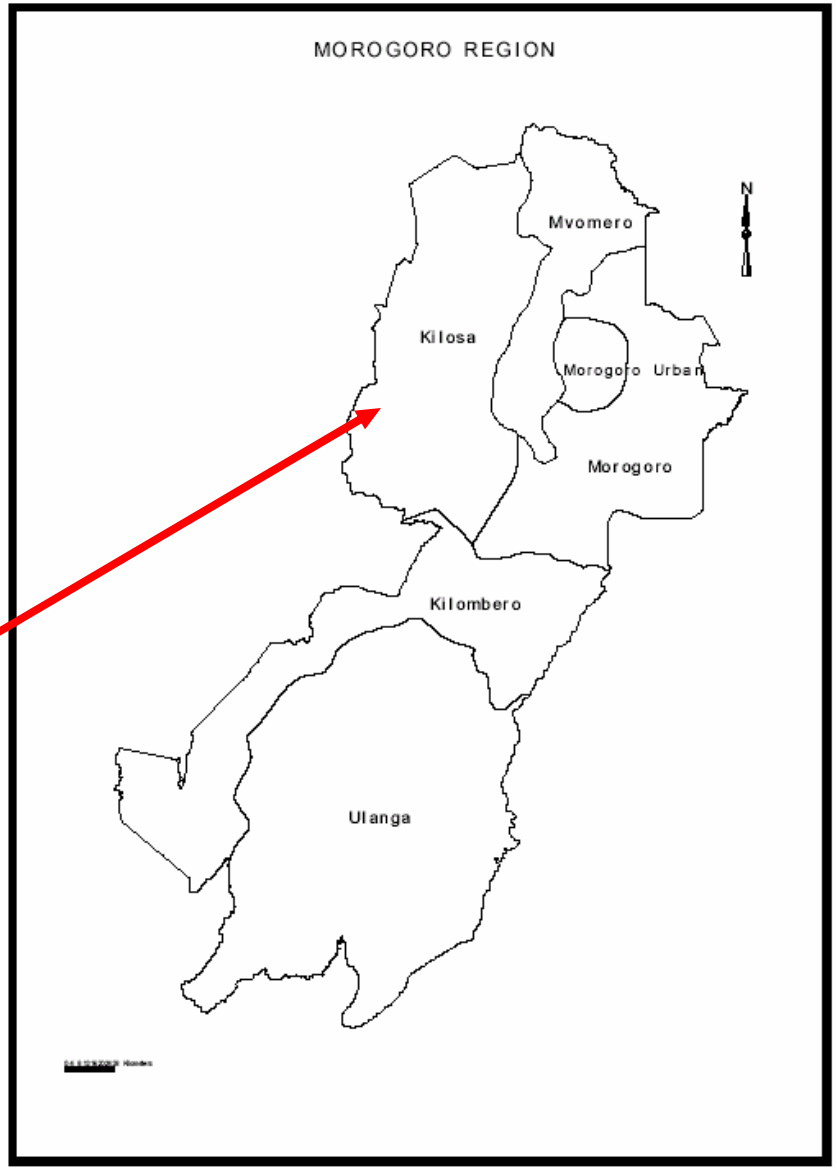
Abstract

Household food insecurity contributes to poor nutritional health, with negative consequences on growth and development across childhood. While the nutritional status of children under five years is a priority due to vulnerability and child survival concerns, once beyond that critical age, adolescence is the next important nutritional phase – a time when adult bodies, minds, and social behaviors are formed. This study investigates the association between household food insecurity and undernutrition (BMI for Age <5th percentile of the NCHS/WHO reference) among a sample of never-married adolescents ages 10-19 years (n=670) from 28 villages in Kilosa District, Tanzania. This study is unique in examining these issues in the context of a developing country, Tanzania, which is deeply affected by HIV/AIDS and where chronic undernutrition is highly prevalent. The prevalence of undernutrition among adolescents in this sample was 21%. Multivariate analyses tested for associations between undernutrition and three distinct measures of household food insecurity (i.e. household caloric adequacy, household dietary diversity score, and coping strategies index), after adjusting for morbidity, socioeconomic status, and potential confounders. Household Dietary Diversity Score emerged the most important indicator of food insecurity: every one additional food group added to the household diet increased the odds of being well-nourished by 18% (OR 0.82). Similarly, the odds of being well-nourished increased by 9% (OR 0.91) with every unit increase (1 unit = 10 percentage points) in household caloric adequacy. These findings support a growing body of research on adolescent health, suggesting detrimental effects of household food insecurity on nutritional status. We conclude that household dietary diversity is a practical indicator of food security and a strong determinant of adolescent nutritional health, and recommend its use in studies on adolescents in developing countries.



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Adolescents

- Adolescents are defined as persons aged 10-19 years (WHO 1986)
- Over 20% of the world's population (UNICEF 2000).
- 85% live in developing countries (Rosen 2004; UN 1997).
- 25% of Tanzania's population (NBS 2002).
- Adolescence is a time of experiential learning and vulnerability to environmental factors make adolescents particularly prone to engaging in sexual and other risk behaviors (Reininger 2003).
  - Globally, the highest prevalence of sexually transmitted infections (STIs), including HIV, is observed among individuals aged 15 and 24 years (WHO 2005)
- Adolescence is an optimal time to establish healthy behaviors.

Sub Saharan Africa

- Youth are projected to comprise 33% of the total population in 2025
- Undernutrition affects between 15-29% of adolescents
- Young people (15-24 yrs) comprise more than 50% of new HIV infections (UNAIDS 2004)
- Food security remains one of the continent's most persistent challenges to economic growth

Adverse Consequences of Household Food Insecurity on Adolescent Nutritional Status

- Limited research on relationship between food insecurity and adolescent nutritional status
  - U.S. studies
    - links between FIS and obesity (Casey et al. 2001)
    - FIS negatively associated with the children's BMIs and household food supplies but not with the children's food intakes (Matheson et al. 2002)

- Household food insecurity or insufficiency has been associated with poor child health in the U.S., with increased health risks particularly for stomach aches, headaches, depression, and suicide.

Defining Terms

- Household Food Security

Food Security "exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (World Food Summit 1996)

Measures of Household Food Security

- Household Caloric Adequacy per Adult Equivalent (CalAdq)
- Household Met 80% of its Calorie Requirements per Adult Equivalent (Met80%)
- Household Diet Diversity Score (HDDS)
- Coping Strategies Index (CSI)

- Undernutrition

Body Mass Index (BMI=weight (kg)/height $(m)^2$) for age and sex less than the 5^{th} percentile of the NCHS/WHO reference population (WHO 1995b; Must et al. 1991).

Research Question
What factors are associated with adolescent nutritional status in Tanzania?

Primary Hypothesis:

Household food insecurity is independently associated with undernutrition among adolescents after controlling for age, gender, orphan status, puberty, hygiene practices, morbidity, physical activity, socioeconomic status (i.e. assets and expenditure), and number of household members.

Research Design and Data Collection

- Cross-sectional Survey
  - January to March 2004

- Sample:
  - 30 villages (cluster sampling)
  - 791 adolescents interviewed (simple random sample)
    - Response rate 94%

- Unit of analysis: Adolescent (10-19 years)
  - Never-married Individuals (N=670)

Data Analysis

- Prevalence estimates and contigency tables
- Correlation analysis
  - undernutrition, food security indicators, and measures of socioeconomic status.
- Logistic regression models
  - tested the associations between undernutrition and each of the four measures of household food insecurity, after adjusting for age, gender, orphan status, puberty, hygiene practices, physical activity, morbidity, socioeconomic status, and number of household members.
  - Assessed whether or not food insecurity affected nutritional status through diminished health.

Results

Table 1. Household Food Security Status Using Three Measures (N=637)

		n	Percentage (%)
Household Calorie Adequacy: Households Meeting 80% of Caloric Req. per Adult Equivalent (N=555)	Met <80% of HH Caloric Req.	260	46.8
	Met 80% of HH Caloric Req.	295	53.2
Mean Household Calorie Intake per Adult Equivalent: 86.58% of requirement (SD 37.45; Range 1.62-241.16%)			
Household Dietary Diversity: No. of Food Groups Consumed by the HH (N=635)	1-3 food groups	234	36.9
	4-5 food groups	281	44.3
	6-9 food groups	120	18.9
Mean Household Dietary Diversity Score: 4.23 (SD 1.39; Range 1-9 food groups)			
Coping Strategies: Number of Coping Strategies used Occasionally or More Often within the past 30 days (N=596)	None	72	12.1
	1-3 Strategies	238	39.9
	4-6 Strategies	180	30.2
	7 or more Strategies	106	17.8
Mean No. of HH Coping Strategies Used Occas. or More Often (30 days): 3.73 (SD 2.7; Range 0-13 strategies)			
Mean Household Coping Strategies Index (N=593): 43.95 (SD 34.08; Range 0-143)			

SD: Standard Deviation

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Results

Table 2. Adolescent Health and Nutritional Status in Kilosa District (N=670)

		n	Percentage (%)
Morbidity	Healthy (No symptoms of morbidity)	182	29.6
	Morbid (at least one symptom of morbidity)	432	70.4
	Total	614	100
Nutritional Status (BMI for Age using the NCHS/WHO Reference)	Underweight (BMI for Age <5th percentile)	137	21.0
	Normal weight (5th -85th percentile BMI for Age)	513	78.6
	Overweight (BMI>85th percentile) [1]	3	0.5
	Total	653	100

[1] One male and two females were overweight.

Results: Bivariate Analyses

- A significantly higher proportion of male than female adolescents were undernourished (25.4% vs. 15.7%, $p<0.01$).
- No Association was observed between morbidity and nutritional status in this sample.
- The proportion of undernourished adolescents living in food insecure households was significantly higher than in food secure households (24.5% vs. 17.4%, $p<0.05$)

Results: Multivariate Analyses

Table 3. Undernutrition among Adolescents (10-19 yrs): A Comparison of Coefficients for Four Distinct Measures of Household Food Security

	Coef. (SE)	P Value
Household Caloric Req. per Adult Equivalent (CalAdq)	-0.094 (0.036)	0.009**
Household Met 80% of its Calorie Req. per Adult Equivalent (Met80%)	- 0.594 (0.251)	0.018*
Household Dietary Diversity Score (HDDS)	-0.198 (0.094)	0.036*
Coping Strategies Index (CSI)	0.004 (0.380)	0.991

* P<0.05; ** P<0.01; ***P<0.001

Results: Multivariate Analyses

- Undernutrition was significantly and negatively associated with household food insecurity after adjusting for potential confounding variables.
  - For every unit increase (1 unit=10 percentage points) in household caloric adequacy, the odds of being well-nourished increased by 9% (Odds Ratio (OR) 0.91) for adolescents in this sample.
  - Household Dietary Diversity Score: Consumption of every one additional food group at the household level increased the odds of an adolescent being well-nourished by 18% (OR 0.82), after controlling for all other covariates in the model.

Conclusions

- Food insecurity is significantly and negatively associated with adolescent nutritional status.

- Household dietary diversity is an acceptable and useful indicator of food security and a strong determinant of adolescent nutritional health.

- Household dietary diversity might be the most practical indicator of food security in adolescent studies conducted in developing countries.

Conclusions

The results of this study are promising as they suggest that simple strategies focused on increasing household caloric intake and improving dietary diversity among the most vulnerable households could improve the nutritional health of young people – even when they are not the intended beneficiaries of food aid and nutrition education strategies.

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Research and programs carried out with a perspective that views children and adolescents as assets, incorporates youth as agents of change, and acknowledges the responsibility of adults in ensuring safe and healthy environments for child development hold the most promise in altering poor health among children and adolescents in Africa.