



The Rate of Food Insecurity among Households with Children with Sickle Cell Disease is Above National Average

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INTRODUCTION

- Sickle cell disease (SCD):
 - Is a genetic blood disorder characterized by hemolytic anemia and vascular occlusion
 - Affects ~ 100,000 people in the U.S., primarily African Americans
- The majority of children with SCD is poor and receives health coverage from public programs
- Food insecurity in children is associated with:
 - Adverse mental and physical health, development outcomes and academic performance
 - Greater odds of having their health reported as fair or poor and having higher rates of hospitalization than food-secure children
- None of these studies included households with children with SCD

HYPOTHESIS

The prevalence of food insecurity among households with children with SCD is higher compared to the national average of 12%.

We conducted a cross-sectional study at a tertiary care medical center, in Nashville, Tennessee, to complete the following aims:

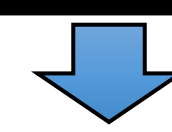
- To estimate the prevalence of food-insecure households of our pediatric population with SCD
- To examine the association between child-level food insecurity, anthropometric measures and disease-severity

METHODS

Vanderbilt University Medical Center and Meharry Sickle Cell Center



Informed consent and assent obtained from caregivers and youth 12-17 yo



- 75 caregivers completed the U.S. 18-item Household Food Security Survey
- 24 children completed the 9-item Food Security Module for Youth Ages 12-17
- We referred all families to nutritionist for education and to food pantry



We performed a chart review on 75 children, collected data on:

- Anthropometric data: weight, height
- Clinical data: pain and acute chest syndrome episodes in the past 12 months
- Laboratory data: most recent hemoglobin and MCV



Food security: defined as having access to enough food always for an active and healthy life. Ranges of food security and insecurity as follow:

- Food security:** (1) *high*: no indications of food-access problems or limitations; (2) *marginal*: 1-2 reported indications – typically anxiety over food insufficiency or shortage of food in the house. Little to no indication of changes in diet/food intake
- Food insecurity:** (1) *low*: reduced quality, variety or desirability of diet. Little to no indication of reduced intake; (2) *very low*: multiple indications of disrupted eating patterns and reduced food intake

Figure 1. General Overview of Study Design

RESULTS

Figure 2. Household and Child Food Insecurity Level Classification

Food Security	Score	Child-Level	Household-Level
Food Secure	High	0	0
	Marginal	1	1-2
Food Insecure	Low	2-5	3-7
	Very Low	6-9	8-18

Table 1. Characteristics of 75 children with SCD categorized by household food security level

Characteristics	All N=75	Food secure N=59	Food insecure N=16	P#
<i>Demographic</i>				
Age, median (IQR) (years)	10.4 (5.5-15.3)	10.4 (5.0-15.3)	9.8 (5.7-15.1)	0.836§
Male, %	46.7	50.8	31.3	0.163
Food security score, median (IQR)	0 (0-2)	0 (0-0)	5 (3-7)	<0.001§
Child-level food insecurity (n=73), %	19.2	5.2	73.3	<0.001†
Child-rated food insecurity (n=24), %	45.8	47.4	40.4	0.585†
<i>Clinical information</i>				
HbSS and HbSβ ⁰ , %	69.3	66.1	81.3	0.362†
<i>Disease-modifying therapy</i>				
None, %	30.7	32.2	25.0	0.568†
Hydroxyurea, %	56.0	52.5	68.8	
Regular blood transfusion, %	13.3	15.3	6.3	
<i>Anthropometric measures</i>				
BMI, median (IQR)	17.8 (15.4-21.6)	17.5 (15.5-20.7)	18.7 (14.4-23.2)	0.938§
BMI Z-score, median (IQR) (n=73)	0.22 (-0.45 – 1.24)	0.32 (-0.38 – 1.10)	0.19 (-0.80 – 2.04)	0.897§
Height-for-age z score, median (IQR) (n=73)	0.13 (-0.70 – 0.84)	0.13 (-0.74 – 0.92)	0.13 (-0.55 – 0.65)	0.951§
Weight-for-age z score, median (IQR) (n=37) *	0.22 (-0.59 – 0.72)	0.25 (-0.27 – 0.76)	-0.57 (-1.11 – 0.10)	0.062§
<i>Laboratory values</i>				
Hemoglobin (g/dl), mean (SD) (n=73)	9.8 (1.3)	9.7 (1.3)	9.9 (1.3)	0.636
MCV (fl), median (IQR) (n=73)	88.0 (75.0-97.8)	87.0 (74.5-96.0)	94.5 (81.2-98.0)	0.357§
<i>Morbidity</i>				
Pain episodes per 100 person-years, mean (SD)	56.0 (115.4)	59.3 (124.7)	43.8 (72.7)	0.545‡
ACS episodes per 100 person-years, mean (SD)	9.3 (33.6)	8.5 (28.1)	12.5 (50.0)	0.492‡

*Limited to children under age 10

Chi-square test for categorical variables and independent sample t-test for continuous variables, unless otherwise noted.

§Mann-Whitney U test, † Fisher's exact test, ‡ Negative binomial regression

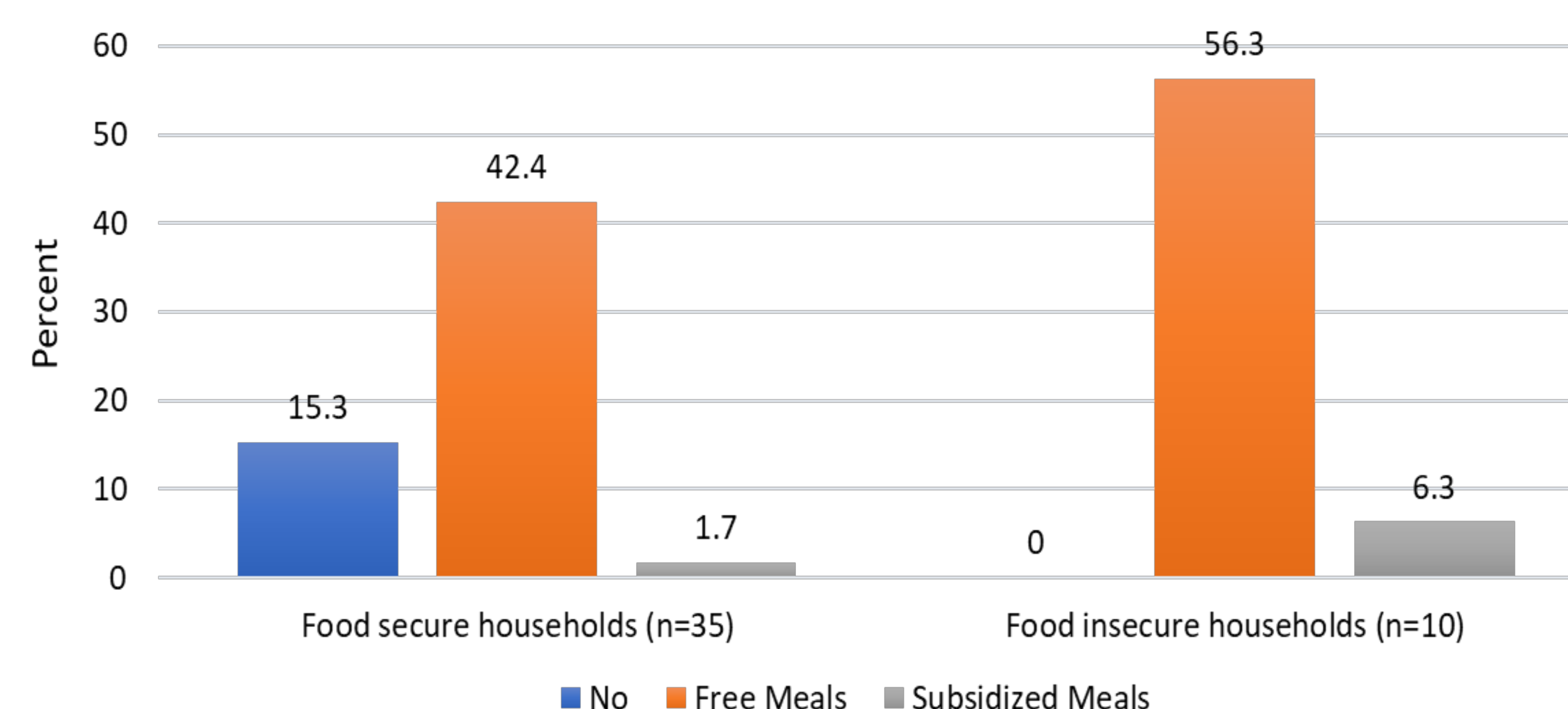


Figure 2. Does your child or children get free or subsidized meals at school?

RESULTS (continued)

18-Item U.S. Food Security Survey Module*	Affirming** %
Household items	
Worried food would run out	29.7
Food bought just didn't last	24.3
Couldn't afford to eat balanced meals	25.3
Adult-specific items	
Adults cut size of meals or skipped meals	15.5
Adult cut size of meals or skipped meals ≥3 months	14.1
Adult ate less than felt s/he should	10.0
Adult hungry but didn't eat	7.1
Adult lost weight	4.4
Adults did not eat for whole day	4.5
Adults did not eat whole day, 3 or more months	4.0
Child-specific items (0-17 years)	
Relied on few kinds of low-cost foods for children	24.7
Couldn't feed children balanced meal	19.4
Children were not eating enough	12.3
Cut size of child's meal	8.8
Child hungry but couldn't afford more food	4.4
Child skipped meal	1.5
Child skipped meals, 3 or more months	1.5
Child did not eat for whole day	1.5

Table 3. Self-Administered 18-Item U.S. Household Food Security Survey (n=75)

CONCLUSIONS

- For the first time, in a tertiary care medical center in TN, we demonstrate:
 - One in five households with children with SCD is food-insecure
 - A significant discordance between caregiver and child assessment of food insecurity: self-reported child-level food insecurity was 46%
 - 81.8% (9/11) of the children who were self-reported food-insecure had caregivers who indicated no food insecurity
- Clinical outcomes and anthropometric measurements were not affected in food-insecure children with SCD
 - The majority were receiving subsidized or free meals in school and were on hydroxyurea therapy
- Our findings highlight the need for family education and advocacy for available resources and assessment by healthcare providers regarding food insecurity
- Future larger prospective studies are needed to examine the association between food insecurity and disease-severity.

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