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Around the Table: Food Insecurity, Socioeconomic Status, and Instrumental Social Support among Women Living in a Rural Kenyan Island Community

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The objective of this study was to investigate the relationship among socioeconomic status, social support, and food insecurity in a rural Kenyan island community. A cross-sectional random sample of 111 female heads of households representing 583 household members were surveyed in Mfangano Island, Kenya from August to October 2010 using adaptations of the Household Food Insecurity Access Scale and the Medical Outcomes Study Social Support Survey. In multiple linear regression models, less instrumental social support, defined as concrete direct ways people help others ($B = -0.81$; 95% confidence interval [CI] -1.45 to -0.17), and decreased ownership scale based on owning material assets ($B = -2.93$; 95% CI -4.99 to -0.86) were significantly associated with increased food insecurity, controlling for age, education, marital status, and household size. Social support interventions geared at group capacity and resilience may be crucial adjuncts to improve and maintain the long term food security and health of persons living in low-resource regions.

KEYWORDS *global health, food security, Kenya, social network, social support, socioeconomic status*

Food insecurity, defined as insufficient quality or quantity of nutritionally adequate foods, reductions of food intake, or feelings of uncertainty, anxiety, or shame over food (Coates, Swindale, and Bilinsky 2007), is a leading cause of global mortality and morbidity (FAO 2000; Lartey 2008). Food insecurity affects 239 million (26%) of the 910 million people in sub-Saharan Africa and disproportionately affects the estimated 22.5 million people living with HIV/AIDS in sub-Saharan Africa (Ivers et al. 2009; UNAIDS 2010). Food insecurity is associated with higher rates of depression, poor HIV outcomes chronic disease, increased hospitalizations, and higher mortality (Tsai et al. 2011; Tsai et al. 2012; Weiser et al. 2011). Understanding the drivers of food insecurity in sub-Saharan Africa is important for devising interventions to prevent these negative health consequences of food insecurity, both among people living with HIV/AIDS and in the general population.

Markers of low socioeconomic status such as lower education, limited income, fewer assets, and unemployment have been associated with food

insecurity in both resource-rich and resource-limited settings (Foley et al. 2010; Knueppel, Demment, and Kaiser 2010; Laraia et al. 2006; Leyna et al. 2010; Vosoris and Tarasuk 2003). However, this association is complex as not all persons with low socioeconomic status experience food insecurity, and some people with higher socioeconomic status may experience food insecurity (Foley et al. 2010).

Regardless of socioeconomic status, social support may strengthen food security through altruistic and transactional exchanges such as the sharing of meals, lending of money, or direct food assistance (De Weerd and Dercon 2006; Kaschula 2011). Functional components of social support include emotional support involving care, empathy, and love; informational support providing guidance or feedback which may provide a solution to a problem; companionship which involves spending time with others in recreational or leisure activities; and instrumental support (Sherbourne and Stewart 1991). Instrumental social support, referring to practical help that serves a particular function such as cash loans or labor in-kind, is thought to most effectively foster improved food security in comparison to emotional, informational, or companionship social support (Cohen and Wills 1985; Tsai et al. 2011). Relatively few previous studies in sub-Saharan Africa have examined the relationship between food insecurity and social support (Hadley, Mulder, and Fitzherbert 2007; Frongillo, Valois, and Wolfe 2003; Lemke et al. 2003; Nyikahadzoi et al. 2013). A mixed-methods study in South Africa found that female-headed households had better nutrition security than male-headed households, which was attributed to women's reliance on and fostering of social ties and networks (Lemke et al. 2003). A cross-sectional study in Zimbabwe found that elderly-headed households had greater food security compared to households headed by younger people, and social capital increased the elderly headed household's likelihood of being food secure (Nyikahadzoi et al. 2013). One study in rural Tanzania demonstrated that measures of wealth and social support were strongly associated with greater food security (Hadley et al. 2007).

Among people with HIV/AIDS in rural Uganda, researchers observed an association between food insecurity and instrumental social support, even when controlling for household wealth and employment status (Tsai et al. 2011). In the same sample, food insecurity was associated with depression symptoms in women, but mainly among women with low social support. Instrumental social support had a greater protective influence than emotional social support in this regard on depression (Tsai et al. 2012).

Though previous literature has examined the relationship between food insecurity and social support, we explore this relationship for the first time in a relatively isolated rural island community in Lake Victoria with limited resources. The objective of this study was to identify the relationship among household food insecurity, socioeconomic status, and social support in a rural Kenyan island community. Discerning these relationships may

help inform the development of sustainable economic and social network interventions and policies aimed at improving nutrition and health of persons living in low-resource regions.

METHODS

Study Population

This study was conducted on Mfangano, an island of 65 km² in Lake Victoria that is home to approximately 26,000 people, mainly of Suba and Luo descent. Mfangano is situated in Homa Bay County where 27.1% of adult residents are living with HIV (Ministry of Health, Republic of Kenya, 2013), most residents practice subsistence farming and fishing (Fiorella et al. 2014; Nagata et al. 2011), and food insecurity is common (Nagata et al. 2014; Nagata et al. 2013; Nagata et al. 2012).

Study Design and Sample

A cross-sectional survey was conducted in three villages on Mfangano Island from August to October 2010. The study included adult (> 18 years old) females identified as the head of household; females were targeted given their critical role in household food security (Nagata et al. 2009). One third of all households were randomly sampled from Community Health Worker catchments (representing 3 to 24 households). Ethical approval was provided by the Committee on Human Research at the University of California, San Francisco (UCSF) and the Kenya Medical Research Institute (KEMRI). Written informed consent was obtained from all participants in the study.

The survey instrument was piloted, translated into Dholuo, and back-translated into English to ensure consistency of meaning. Local research assistants interviewed female heads of households in either English or Dholuo, as per the respondent's preference, and generally lasted one hour. The survey included demographic information including age (continuous), marital status (dichotomous: married or not married), household size (continuous), education (categorical: none, primary school, secondary school, or college) (see table 1). Social support was measured using a modified subset of the Medical Outcomes Study (MOS) Social Support Survey (based on questions 2, 5, 12, and 15) that represented instrumental social support (table 2) (Sherbourne and Stewart 1991). Responses were coded as: 1 no support; 2. a little support; 3. some support; 4. pretty good support; and 5. excellent support. The instrumental social support score was calculated as the numerical sum of all six instrumental social support questions and scored into a continuous variable. Food insecurity was measured using a modified subset of the Household Food Insecurity Access Scale (HFIAS) (questions 5, 6, 8, and 9) (Coates et al. 2007) (see table 3). Household food security score was calculated as the numerical sum of all four food insecurity questions. Food

TABLE 1 Selected Socio-demographic Characteristics of Female Heads of Households in Rural Kenya

	<i>n</i>	Overall		Food secure to mildly or moderately food insecure	Severely food insecure	Test statistic	<i>p</i>
		Mean (<i>SD</i> %)	Range	Mean (<i>SD</i> %)	Mean (<i>SD</i> %)		
Age	110	38.4 (16.5)	19–78	38.4 (16.5)	38.5 (16.6)	0.1 ^a	.95
Education (%)	110					3.8 ^b	.28
None	21	18.9%		19.3%	18.9%		
Primary school	71	63.9%		57.9%	71.7%		
Secondary school	14	12.6%		17.5%	7.5%		
College	4	3.6%		5.3%	1.9%		
Marital status	111					0.5 ^b	.50
Married	74	66.7%		63.8%	69.8%		
Not married	37	33.3%		36.2%	30.2%		
Household size	111	5.3 (2.4)	1–12	5.2 (1.8)	5.3 (2.4)	0.3 ^a	.77
Ownership scale	111	4.3 (1.8)	0–9	4.6 (1.8)	3.9 (2.4)	2.3 ^a	.03
Household food security score	111	3.7 (2.8)	0–12	1.8 (1.7)	5.7 (2.4)	10.0 ^a	<.001
Food insecurity category	111					111 ^b	<.001
Food secure/mildly food insecure	27	24.3%		46.6%	0.0%		
Moderately food insecure	31	27.9%		53.4%	0.0%		
Severely food insecure	53	47.7%		0.0%	100.0%		
Instrumental social support score	111	15.3 (4.96)	6–26	16.4 (5.4)	14.0 (4.7)	2.6 ^a	.01

^aIndependent samples *t*-test.^bPearson's Chi-square test.

TABLE 2 Select Instrumental Social Support Questions Adapted from Medical Outcomes Study (MOS) Social Support Survey

	1. No support (%)	2. A little support (%)	3. Some support (%)	4. Pretty good support (%)	5. Excellent support (%)
On a scale of 1–5 please rank the types of support that you have in your life right now:					
Someone to take you to the doctor if you needed it	13.5	19.8	17.1	42.3	7.2
Someone to look after your children if you were sick	15.9	19.6	22.4	30.8	11.2
Someone to help you on your farm or do household chores if you were too sick to work	35.1	21.6	17.1	21.6	4.5
Someone to help you with school fees if you could not pay them for your children	41.3	27.9	12.5	17.3	1.0
Someone to help you with medical fees if you or someone in your family was sick	32.4	25.2	16.2	25.2	0.9
Someone to share food if you were unable to provide for your family	34.2	26.1	19.8	18.9	0.9

insecurity category was determined according to HFIAS published guidelines (Coates et al. 2007). Asset ownership was estimated using an additive scale based on an asset index that evaluated owning material assets.¹

Quantitative statistical analyses were conducted with SPSS 12.0 for Windows (SPSS Inc., Chicago, IL). Differences in demographic and socio-economic characteristics for severely food insecure versus not severely food insecure respondents were analyzed using independent samples *t*-tests (for continuous variables) and Pearson's Chi-square tests (for categorical variables). Simple and multiple linear regressions were performed with the food insecurity score as the continuous dependent variable, and age (continuous), education (continuous), marital status (binary: married vs not married), household size (continuous), asset ownership score (continuous) and instrumental social support score (continuous) as independent variables. Regression coefficients (B) and 95% confidence interval are reported.

¹ Respondents received one point each for ownership of the following: metal or wood bed, radio, bicycle, sofa set, metal roof, irrigation pump, camera, boat, fishing net, television, and cellular phone. Asset ownership scale was calculated using the sum of the total points and scored into a continuous variable.

TABLE 3 Select Food Insecurity Questions Adapted from Household Food Insecurity Access Scale (HFIAS)

	1. Never (%)	2. Rarely (%)	3. Sometimes (%)	4. Often (%)
In the past four weeks, how often did:				
You or other members of your household have to eat a smaller meal than was needed because there was not enough food?	25.5	18.2	45.5	10.0
You or other members of your household have to eat fewer meals in a day because there was not enough food?	34.2	26.1	33.3	6.3
Anyone in your household go to sleep hungry because there was not enough food?	53.2	28.8	14.4	3.6
Anyone in your household go a whole day and night without eating anything because there was no food?	67.6	21.6	9.0	1.8

P values < .05 were considered statistically significant. Socio-demographic predictor variables were selected based on previous literature (Nagata et al. 2012; Tsai et al. 2012; Tsai et al. 2011).

RESULTS

In total, 111 female heads of households representing 583 individuals were sampled. The average age was 38 and the average household size was 5.3 (table 1). The highest levels of education for the sample were primary school (63.9%), secondary school (12.6%), and college (3.6%). Of the sample, two thirds of the respondents were married. Nearly half of the sample was severely food insecure (47.7%), while 27.9% was moderately food insecure and 24.3% was mildly food insecure to food secure. Severely food insecure respondents had significantly lower asset ownership scales ($p = .03$) and instrumental social support ($p < .001$) when compared to respondents who were not severely food insecure.

Responses to instrumental social support questions are reported in table 2. Overall, 64.8% of respondents reported at least “a little” support from someone to help on the farm or do household chores if they were too sick to work and 65.7% of respondents reported at least “a little” support from someone to share food if they were unable to provide for their family. Responses to household food insecurity questions are reported in table 3. Over half of respondents (55.5%) reported having to eat a smaller meal than was needed sometimes or often because of lack of food whereas 39.6% of

TABLE 4 Results from Simple and Multiple Linear Regression with Food Insecurity as the Dependent Variable, and Socio-demographic Factors and Social Support as Independent Variables

Variable	<i>n</i>	Bivariate analysis		Multivariate analysis	
		B (95% CI)	<i>p</i>	B (95% CI)	<i>p</i>
Age	110	0.15 (-.06-.35)	.15	0.17 (-.08-.41)	.18
Education	111	-0.16 (-2.67-2.34)	.90	2.40 (-.34-5.13)	.09
Marital status	111	-4.39 (-11.42-2.63)	.22	1.28 (-6.82-9.38)	.75
Household size	111	0.37 (-1.02-1.77)	.60	0.92 (-.49-2.33)	.2
Ownership	111	-2.88 (-4.68- -1.08)	<.01	-2.93 (-4.99- -.86)	<.01
Instrumental social support	111	-0.95 (-1.57- -.33)	<.01	-0.81 (-1.45- -.17)	.01

Note. CI = Confidence interval.

respondents reported having to eat fewer meals in a day sometimes or often because there was not enough food.

In both simple and multiple linear regression models, instrumental social support and asset ownership were significantly associated with food security (table 4). In multiple linear regression models, less instrumental social support (B = -0.81; 95% confidence interval [CI] -1.45 to -.17) and decreased asset ownership (B = -2.93; 95% CI -4.99 to -.86) were significantly associated with increased food insecurity, when controlling for age, education, marital status, and household size. In multiple linear regression models, age (B = 0.17; 95% CI -.18 to .41), education (B = 2.40; 95% CI -.34 to 5.13), marital status (B = 1.28; 95% CI -6.82 to 9.38), and household size (B = 0.92; 95% CI -.49 to 2.33) were not significantly associated with food insecurity.

DISCUSSION

Strikingly, in this study in a rural Kenyan island community in Lake Victoria, nearly half of the women sampled experienced severe food insecurity. Among a population experiencing extremely high rates of food insecurity, the associations among increased food insecurity and lower levels of instrumental social support is noteworthy. While previous literature has examined these relationships (Tsai et al. 2011), this study affirms the role of social support independent of assets within a severely food insecure population.

The link between instrumental social support and food insecurity points to the fact that individuals with strong social networks can call upon these resources during times of food stress or anxiety for practical help and assistance (Hadley et al. 2007). Previous studies have demonstrated that social networks may provide material support such as gifts or loans of money or food in areas affected by food insecurity (Kaschula 2011). A majority of respondents in this study reported they could receive at least a little financial support for medical or school fees from their social networks if needed.

However, given the overall limited material resources in this relatively isolated island community, non-financial support such as labor in kind may be an essential resource that may conceivably affect the health of individuals (Kawachi 1999). For instance, respondents reported more support from helping to look over children or taking a sick person to the doctor than from monetary gifts.

People with HIV may face additional challenges with food insecurity as HIV-related stigma may lead to an erosion of their social support networks (Kalichman et al. 2009). People with HIV may experience discrimination in the workplace, be barred from purchasing foods in the marketplace, or have difficulty selling goods to wary non-infected clients (Tsai et al. 2011). Though HIV and food insecurity are inextricably linked, each exacerbating the severity of the other (Weiser et al. 2011), food insecurity also significantly affects the general population in low-resource areas. Our results also confirm the relationship between food security and socioeconomic status in a rural Kenyan island in Lake Victoria (Fiorella et al. 2014).

This study has several limitations. The cross-sectional nature of the study precludes any causal inferences and our results from a rural island may not be broadly generalizable. Though the questionnaire attempted to select the most salient items, adaptations to the HFIAS and the MOS social support scale limited our ability to differentiate among food secure and mildly food insecure categories on the HFIAS and may have affected survey validity. Participants' HIV status was not ascertained and the study is therefore unable to evaluate the effect of HIV on food insecurity or social support.

One final limitation is that the surveys were conducted after the main maize and bean harvest season; therefore, the results may represent an underestimate of food insecurity compared to other seasons. One previous study among HIV-positive populations in Mfangano Island demonstrated nearly 80% of severe food insecurity prior to the harvest season (Nagata et al. 2012). Other studies in sub-Saharan Africa have demonstrated decreased intakes of energy and ten micronutrients, less frequent consumption, and consumption of smaller amounts during the lean season compared to the post harvest season (Becquey et al. 2012). Though many residents of Mfangano Island rely on subsistence agriculture, a shortage of accessible water throughout the year remains a considerable agricultural challenge. Furthermore, households affected by HIV or other illnesses may experience agricultural labor shortages and declining agricultural productivity (Kaschula 2011). Food insecurity may be greater during the lean season if household agricultural production declines and families must begin to purchase foods in the market, particularly when prices rise during the off season (Becquey et al. 2012). Although free macronutrient supplementation rations are available for the most undernourished individuals (Nagata et al. 2014), these are also subject to availability and experience shortages.

Given the pervasiveness of food insecurity in this population and throughout low-resource areas, understanding the etiology of food insecurity

and identifying modes of intervention are essential to improve food insecurity, nutrition, and health. Livelihood interventions, such as those including support for agriculture, fishing, or fisheries via subsidies or microfinance loans may improve food security through socioeconomic advancement (Pandit et al. 2010). In addition, interventions aimed at strengthening both instrumental and other forms of social support among small social networks (Ding et al. 2013; Johnson et al. 2010; Zoughbie 2009) may also improve the health and nutrition of persons experiencing food insecurity. As food procurement, preparation, and consumption are inextricably social processes (Tsai et al. 2012), improving group capacity and resilience among social networks may play an important role in coping with severe food insecurity. Future research should assess the extent to which combined economic and social support interventions may synergistically improve the food security and overall health of persons living in low-resource regions.

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