



## Food insecurity, depression and the modifying role of social support among people living with HIV/AIDS in rural Uganda

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### ABSTRACT

Depression is common among people living with HIV/AIDS and contributes to a wide range of worsened HIV-related outcomes, including AIDS-related mortality. Targeting modifiable causes of depression, either through primary or secondary prevention, may reduce suffering as well as improve HIV-related outcomes. Food insecurity is a pervasive source of uncertainty for those living in resource-limited settings, and cross-sectional studies have increasingly recognized it as a critical determinant of poor mental health. Using cohort data from 456 men and women living with HIV/AIDS initiating HIV anti-retroviral therapy in rural Uganda, we sought to (a) estimate the association between food insecurity and depression symptom severity, (b) assess the extent to which social support may serve as a buffer against the adverse effects of food insecurity, and (c) determine whether the buffering effects are specific to certain types of social support. Quarterly data were collected by structured interviews and blood draws. The primary outcome was depression symptom severity, measured by a modified Hopkins Symptom Checklist for Depression. The primary explanatory variables were food insecurity, measured with the Household Food Insecurity Access Scale, and social support, measured with a modified version of the Functional Social Support Questionnaire. We found that food insecurity was associated with depression symptom severity among women but not men, and that social support buffered the impacts of food insecurity on depression. We also found that instrumental support had a greater buffering influence than emotional social support. Interventions aimed at improving food security and strengthening instrumental social support may have synergistic beneficial effects on both mental health and HIV outcomes among PLWHA in resource-limited settings.

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### Introduction

Depression is common among people living with HIV/AIDS (PLWHA) in the U.S. (Bing et al., 2001). This is important clinically because untreated or sub-optimally treated depression may result in worsened HIV-related outcomes (Anastos et al., 2005; Burack et al., 1993; Carrico et al., 2011; Cook et al., 2004). Conversely,

alleviation of depressed mood may improve HIV-related outcomes (Tsai et al., 2010). Policies and programming for PLWHA in sub-Saharan Africa focus primarily on improving access to HIV anti-retroviral therapy. Yet although the prevalence of depression may be as high among PLWHA in sub-Saharan Africa as among PLWHA in the U.S., little research has emphasized the treatment or prevention of depression among PLWHA in sub-Saharan Africa to optimize HIV outcomes (Kaharuza et al., 2006; Martinez et al., 2008).

Food insecurity, defined as having uncertain or limited availability of nutritionally adequate food or as being unable to procure food in socially acceptable ways (Anderson, 1990), may be a risk

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factor for depression that can be modified to improve HIV outcomes. Although there are no population-based estimates of the prevalence of food insecurity among PLWHA, small-sample evidence from Canada, the U.S., and Uganda suggest that the prevalence is high (Bukusuba, Kikafunda, & Whitehead, 2007; Weiser, Fernandes, et al., 2009; Weiser, Frongillo, et al., 2009). Several analyses based on data from both resource-limited and resource-rich settings suggest an association between food insecurity and poor mental health (Carter, Kruse, Blakely, & Collings, 2011; Cole & Tembo, 2011; Gupta et al., 2010; Maes, Hadley, Tesfaye, & Shifferaw, 2010; Okechukwu, Ayadi, Tamers, Sabbath, & Berkman, 2012).

Several cross-sectional studies have also described an association between food insecurity and depression among PLWHA (Anema et al., 2011; Vogenthaler et al., 2011; Wu et al., 2008). Because of the clinical importance of both food insecurity and depression to HIV outcomes, and because of the elevated prevalence of both factors among PLWHA in sub-Saharan Africa, there is a need for heightened attention to issues of reverse causality and potential confounding. More robust statistical designs would help to strengthen the case for integrated food security interventions to improve the health of PLWHA in these settings. We therefore undertook this longitudinal study of PLWHA initiating HIV anti-retroviral therapy (ART) in rural Uganda to estimate the association between food insecurity and depression symptom severity.

Our conceptual framework draws heavily from the literature on social structure and its influence on depression. The stress process model, first elaborated by Pearlin and colleagues (Pearlin, 1989, 1999; Pearlin, Lieberman, Menaghan, & Mullan, 1981), directs attention to eventful experiences and life strains in the production of stress and psychological distress. Role-related strains have been found to be more strongly associated with depressed mood than discrete life events (Kessler, Price, & Wortman, 1985). Given the centrality of food production as a primary role for persons engaged in subsistence livelihoods to support their households, especially women (Quisumbing, Brown, Feldstein, Haddad, & Pena, 1995), food insecurity may be even more strongly associated with depressed mood than other psychosocial stressors. In many sub-Saharan African settings, food insecurity is the predominant form of uncertainty experienced in daily living (Pike & Patil, 2006).

We further hypothesize that food insecurity is related to depression symptom severity only, or primarily, for persons without social supports. This “buffering” hypothesis has been elaborated in the more general context of social support exerting a moderating influence on the potentially depressogenic effects of life strains (Cassel, 1976; Cobb, 1976). Further, the buffering effect will be most effective when the type of support provided “matches” the stress experience (Cohen & McKay, 1984; Cohen & Wills, 1985). Food shortfalls will be most effectively met with support in the form of tangible assistance. For example, Kawachi hypothesized that “Even apparently trivial differences in the willingness of neighbors to help each other (e.g., through cash loans or labor in kind) might conceivably affect the health of individuals living in deprived communities” (p. 121) (Kawachi, 1999). Thus, instrumental social support – as distinguished from emotional, informational, or diffuse social support (Cohen & Wills, 1985) – may be the most relevant form of social support to consider when assessing potential moderating influences on the food insecurity–depression relationship.

Studies based on longitudinal data are needed to disentangle the complicated relationship between food insecurity and depression, as two potential concerns could undermine interpretations of associational estimates based on cross-sectional data, namely: reverse causality and inability to adjust for unobserved confounding. First, given that the course of depressive illness is often characterized by functional decline (Judd et al., 1998), the observed relationship between food insecurity and depression could be

explained by depression undermining one’s ability to effectively procure food or cope with the uncertain availability of food. Second, qualitative studies conducted in diverse cultural contexts identify feelings of helplessness, shame, suffering, and humiliation as central to the experience of food insecurity (Coates, Frongillo, et al., 2006; Hamelin, Beaudry, & Habicht, 2002; Nanama & Frongillo, 2012; Nordanger, 2007). Thus, there may be simple overlap between the scales used to measure both constructs. A related concern is that personality type may affect the reporting of both food insecurity and depression symptom severity (Epstein, 1992): for example, if certain types of personalities are prone to over-report difficulties obtaining food *and* over-report symptoms of depression, then this could lead to detection of a spurious association. As described below, our design and analytic methods address both of these concerns.

## Methods

### *Study population, design, and data collection*

Mbarara District is located in a rural area of Uganda southwest of Kampala, reachable by a 5-h automobile drive. Mbarara town (population 82,000) is the primary commercial hub, but the majority of district residents live in outlying rural areas. Data for this study were drawn from the Uganda AIDS Rural Treatment Outcomes (UARTO) study, a cohort of adult ART-naïve patients initiating no-cost ART who have been recruited from the Mbarara Immune Suppression Syndrome Clinic on an ongoing basis since 2005. Ethical approval for all UARTO study procedures was obtained by the Committee on Human Research, University of California at San Francisco; the Partners Human Research Committee at Massachusetts General Hospital; the Institutional Ethical Review Committee, Mbarara University; and the Uganda National Council of Science and Technology. After providing written informed consent and enrolling in the study, participants are seen every three months for blood draws and structured interviews to assess depression symptom severity, food insecurity, health status, substance use, and HIV-related stigma. The UARTO survey instrument was translated into Runyankole, back-translated into English, and pilot-tested in a group of 97 ART-naïve HIV+ Ugandans initiating ART.

### *Time-dependent variables*

To measure depression symptom severity, we used the 15-item Hopkins Symptom Checklist for Depression (HSCL-D) (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974a). Following prior studies of depression in Uganda, we modified the HSCL-D for the local context by adding a 16th item, “feeling like I don’t care about my health” (Bolton & Ndogoni, 2001; Martinez et al., 2008). Previous research has demonstrated that inclusion of somatic items may inflate depression scores among PLWHA, due to overlap between symptoms of depression and symptoms of HIV infection (Kalichman, Rompa, & Cage, 2000; Kalichman, Sikkema, & Somlai, 1995). Therefore, we removed the four somatic items (“feeling low in energy, slowed down,” “feeling fidgety,” “poor appetite,” and “having difficulty falling or staying asleep”) and calculated the total score by averaging across the remaining 12 cognitive-affective items. Participants with a score of 1.75 or greater are classified as symptomatic, and this is typically used as the threshold for a positive screen of probable depression (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974b). The Cronbach’s alpha for the modified HSCL-D was 0.84, indicating excellent internal consistency.

Food insecurity was measured using the nine-item Household Food Insecurity Access Scale (HFIAS or simply food insecurity) (Coates, Swindale, & Bilinsky, 2006). This experience-based

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