The Impact of Food and Water Insecurity on Sleep Quality in PLHIV: Insights from Kisumu County, Kenya

Richard K.S. Wu[1,2], Patrick Mbullo Owuor[3], Ellis A. Adams[4,5], Godfred O. Boateng[1,2]

[1] School of Global Health, Faculty of Health, York University, Toronto, ON, Canada
[2] Dahdaleh Institute for Global Health Research, York University, Toronto, ON, Canada
[3] College of Liberal Arts and Sciences, Wayne State University, Detroit, MI, United States
[4] Eck Institute for Global Health, University of Notre Dame, Notre Dame, IN, United States
[5] Keough School of Global Affairs, University of Notre Dame, Notre Dame, IN, United States

Questions or comments?

References

Introduction

- Sleep plays a vital role in the normal functioning of higher life forms; sleep deprivation has been associated with poor regulation of weight, sugar, and blood pressure in humans
- As a result of increased anxiety and stress, changes to sleep architecture, or pharmaceutical side effects, among the many sequelae people living with HIV/AIDS (PLHIV) experience is progressively declining sleep quality
- Previous studies have linked both food and water insecurity to poor sleep quality, however, few studies have examined these relationships in sub-Saharan Africa
- This aims of this study are the following:
  1. Examine the effect of food and water insecurity on sleep quality
  2. To elucidate the potential drivers that mediate this relationship among PLHIV in Kisumu County, Kenya

Hypotheses

- **Hypothesis 1:** Both food and water insecurity are associated with worsened sleep quality among PLHIV
- **Hypothesis 2:** Factors such as overall level of education, socioeconomic status, and average income are associated with lowered risk of poor-quality sleep among PLHIV

Methods

Study Setting

- Cross-sectional survey with 1,132 participants living with HIV/AIDS in Kisumu County, Kenya

Outcome

- Having symptoms of insomnia. Respondents were considered symptomatic if, in the last month, they experienced any of:
  - Trouble falling or staying asleep
  - Took anything to help with sleep
  - Used alcohol to help with sleep
  - Had a medical condition that disrupted sleep

Exposures

- Those living with HIV **experiencing food insecurity**
  - As measured using the Household Food Insecurity Access Scale (HFIAS), a 9-item scale
  - Items include frequency of hunger, limiting variety, size, or number of meals, or worry due to inadequacy of resources to obtain food, among others
- Those living with HIV **experiencing water insecurity**
  - As measured using the Household Water Insecurity Experiences Scale (HWISE), a 12-item scale
  - Items include frequency of thirst, worry, inability to perform household chores (e.g. washing clothes), inability to cook, or inability to bathe due to inadequate water, among others

Covariates

- Social Factors: Age, Gender, Self-reported Socioeconomic Status, Average Monthly Income
- Psychiatric Measures: Depression (WHO-5), Anxiety (GAD-7), Satisfaction with Life (SWL Composite)
- Primary Water Sources: Public/Community Tap, Neighbour's Tap, Access to Well

Data Analysis

- Logistic regression with robust standard errors was conducted to examine the association between food and water insecurity and risk of experiencing insomnia symptoms
- Both bivariate and multivariate models were produced
- Multivariate models included adjustment for covariates

Results

Sample Characteristics

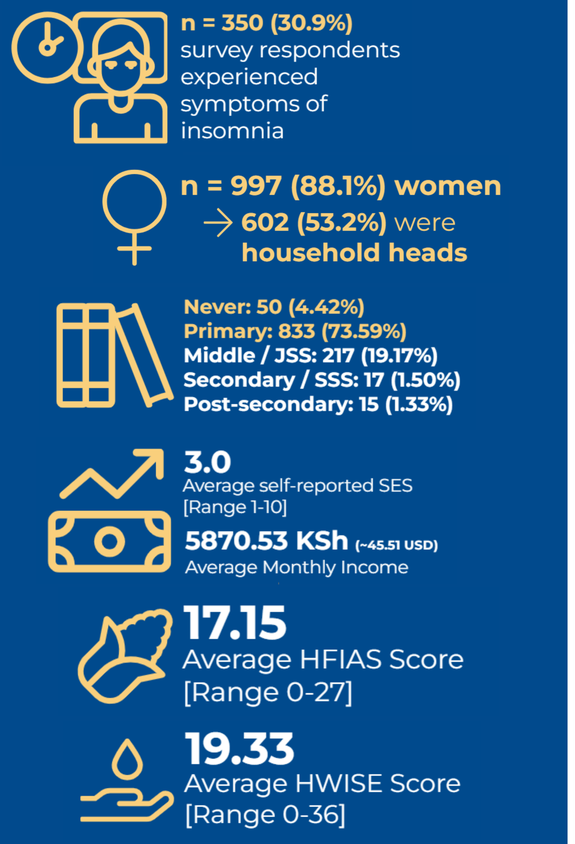

Figure 1 Descriptive statistics of key variables. In this cross-sectional survey, about 1 in 3 respondents reported experiencing symptoms of insomnia.

Hypothesis 1

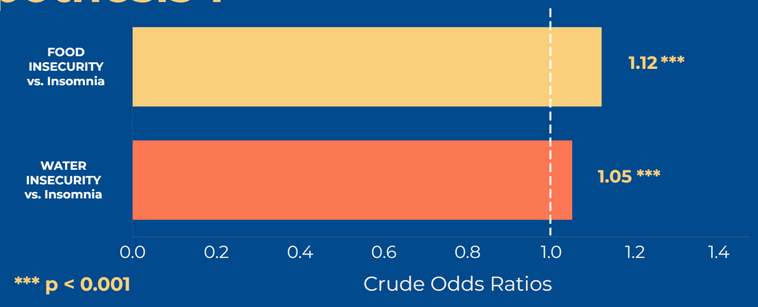

Figure 2 Bivariate analysis of resource insecurity and risk of insomnia. Both food and water insecurity are associated with experiencing symptoms of insomnia.

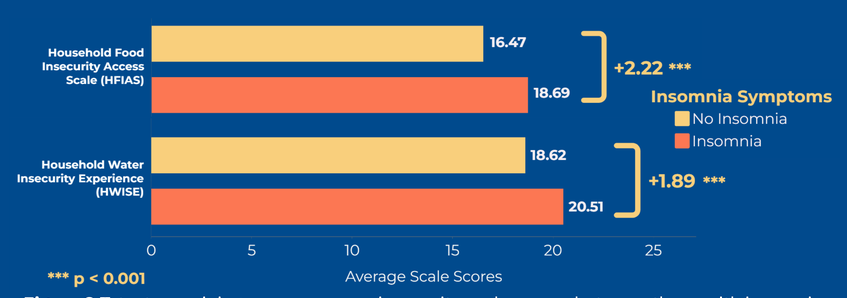

Figure 3 T-test examining mean resource insecurity scale scores between those with insomnia and those without. On average, mean resource insecurity scale scores were higher among those experiencing symptoms of insomnia.

Hypothesis 2

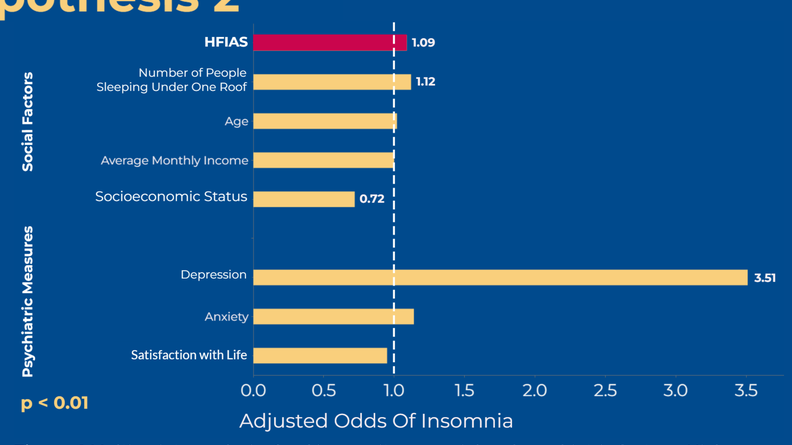

Figure 4 Multivariate analysis: food insecurity vs. social and psychiatric factors. Higher self-reported socioeconomic status was associated with 0.72 times the odds of experiencing insomnia. Conversely, anxiety and, critically, the presence of depressive symptoms significantly increased the odds of insomnia.

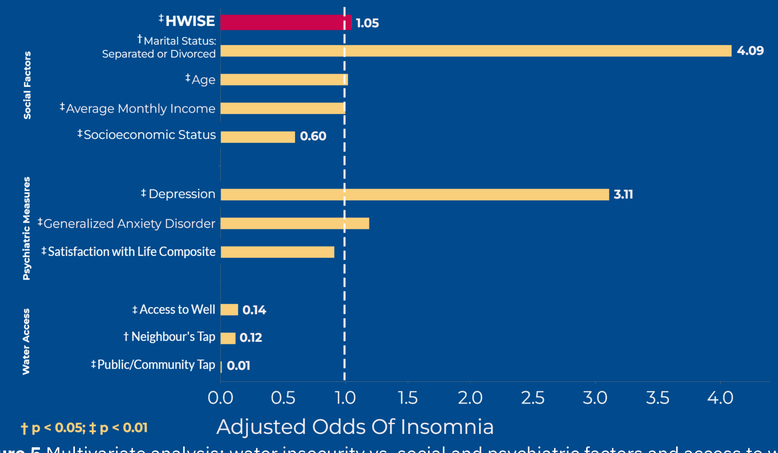

Figure 5 Multivariate analysis: water insecurity vs. social and psychiatric factors and access to water. Here, higher self-reported socioeconomic status, and depression/anxiety were all similarly associated with decreased and increased odds of insomnia in the context of water insecurity, respectively. Divorced/separated respondents experienced 4.09x the odds of insomnia in the context of water insecurity. Access to water significantly attenuated the odds of insomnia.

Discussion

- In this cross-sectional study, food and water insecurity were both positively associated with an increased odds in experiencing sleep disturbances in PLHIV, failing to reject our first hypothesis
- While self-reported SES was associated with a decreased odds of insomnia in the context of both food and water insecurity, the effect of other social factors such as average monthly income, though statistically significant, did not seem to affect the odds of sleep disturbance, partially confirming our second hypothesis
- Divorce or separation, the number of people sleeping under one roof and, critically, the presence of other psychiatric co-morbidities was significantly and negatively associated with sleep disturbances
- These data additionally highlight the alleviation of water insecurity as a potential mechanism to improve sleep and overall quality of life for PLHIV
- Although the cross-sectional nature of this study precludes inferring causality, the consistency of our results with prior studies assures the validity of our findings

Conclusions

- The negative association between depressive symptomatology and poor sleep quality has been demonstrated previously, with our study highlighting the additional deleterious effect of food and water insecurity on sleep quality among PLHIV
- Our findings not only provide additional evidence of the link between resource insecurity and poor sleep quality, but also strengthen existing calls in the literature to intensify efforts to enhance mental health resources and reduce food and water insecurity in low-to-middle-income countries