

# The impact of living in an Ebola-affected household on food insecurity and quality of life in Kono District, Sierra Leone: a cross-sectional study two years post-outbreak

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## Introduction

The World Food Program estimated that the 2013-2016 Ebola epidemic pushed approximately 750,000 additional people into a state of food insecurity in Sierra Leone.<sup>1</sup>

The devastation of households whose family members had Ebola virus disease (EVD) was substantial and has the potential for long-lasting, socioeconomic sequelae.

EVD survivors received some form of social and food support for at least three months.<sup>2</sup>

Households in which Ebola-infected individuals died received no support, and the decontamination process resulted in destruction of assets (e.g., beds were burned).

The impact of living in an Ebola-affected household on food insecurity and quality of life has yet to be studied.

We hypothesized that households with an EVD death only are more likely to be food insecure and have a lower quality of life than households with EVD survivors.

## Methods

We conducted a community-based, cross-sectional study in Kono District, Sierra Leone, from June to July 2017. Participants who lived in eight selected communities were eligible for enrollment.

We enrolled all participants who lived in an EVD-affected or quarantined households during the Ebola outbreak. We also enrolled a random sample of households who did not have an EVD case or were not quarantined.

Our outcomes were 9-item Household Food Insecurity Access Scale (HFIAS) and 20-item World Health Organization Quality of Life Scale (WHOQOL-BREF).<sup>3,4</sup>

HFIAS: Participants self-reported food security over a recall period of the past four weeks. Each occurrence question was followed by a frequency question.

WHOQOL-BREF: Participants self-reported their physical health-related and mental health-related quality of life over a recall period of the past two weeks. Questions used a Likert scale.

Our explanatory variables were type of household during the Ebola outbreak. Participants reported whether the household had an EVD case, how many EVD cases, and the vital status of each EVD case (dead or alive). We collected data on the age, gender, educational level, occupation, study site, and household group.

HFIAS was dichotomized as severely vs. not severely food insecure. WHOQOL-HIVBREF was a continuous variable (scale, 20-100).

We fit multivariable regression models, using robust generalizing estimating equations, which adjusted for clustering and potential confounders.



## Results

There were 461 participants enrolled and completed HFIAS. Of these, 231 participants completed the WHOQOL-BREF.

Participants had an age of 27.3 on average. The majority were male (58.6%) and about one-third (34.2%) completed primary school. Most were unemployed (62.2%). Nearly half (44.3%) reported being severely food insecure.

Two years after the Ebola outbreak, EVD-affected households of survivors have 3.1 and 3.8 times the odds of severe food insecurity than mixed EVD-affected households of survivors and dead (95% CI, 1.21-8.01) and EVD-affected households of dead only (95% CI, 1.29-11.37), adjusting for age, sex, educational level, work and clustering.

There were no associations between quality of life and households.

Table 1. Characteristics of participants (N = 461).			
		Total (n)	% (n/N)
Age	Mean, Standard deviation (SD)	27.3 (mean)	17.0 (SD)
Gender	Female	197	41.4
Educational level	No formal education	163	34.2
	Completed primary school	144	30.3
	Completed secondary school or higher education	169	35.5
Occupation	Any job	180	37.8
Type of household	EVD-affected households with survivor only	72	15.6
	EVD-affected households with at least one survivor and death	54	11.7
	EVD-affected households with death only	82	17.8
Food status	Severely food insecure	211	44.3
Quality of life	Mean, Standard deviation (SD)	62.0	6.2

Table 2. Risk factors for severe food insecurity based on living in type of an Ebola virus disease (EVD)-affected household (N=461). Note: Models were adjusted for age, gender, educational level, and occupation. Bold type indicates p-value<0.05.			
		Adjusted Odds Ratio	95% Confidence Interval
Household comparison 1	EVD-affected households with death only	Ref	Ref
	EVD-affected households with survivor only	<b>3.12</b>	<b>1.21-8.01</b>
Household comparison 2	EVD-affected households with at least one survivor and death	Ref	Ref
	EVD-affected households with survivor only	<b>3.83</b>	<b>1.29-11.37</b>
Household comparison 3	Unaffected households	Ref	Ref
	EVD-affected households with survivor only	2.07	0.93-4.64

Table 3. Risk factors for poor quality of life based on living in type of an Ebola virus disease (EVD)-affected household (N=231). Note: Models were adjusted for age, gender, educational level, and occupation. Bold type indicates p-value<0.05.			
		Adjusted Odds Ratio	95% Confidence Interval
Household comparison 1	EVD-affected households with death only	Ref	Ref
	EVD-affected households with survivor only	2.20	0.06-80.69
Household comparison 2	EVD-affected households with at least one survivor and death	Ref	Ref
	EVD-affected households with survivor only	0.18	0.004-8.24
Household comparison 3	Unaffected households	Ref	Ref
	EVD-affected households with survivor only	0.56	0.03-9.35

## Conclusions

Two years after the Ebola outbreak, EVD-affected households with survivors only were at a significantly higher risk of food insecurity than EVD-affected households with dead only or EVD-affected households mixed with survivors and dead.

Households of EVD survivors, not only EVD survivors, might benefit from targeted, post-EVD support services, particularly food aid.

Qualitative research about EVD-affected households with survivors only is needed to give insight into these results and explain why certain households experience food insecurity.



## Future Goals

We plan to conduct 30 open-ended interviews among EVD-affected households across the range of EVD outbreaks (dead, alive, and those with a proportion of both).

We will use these quantitative and future qualitative data to prepare a mixed-methods paper for publication.

## Literature Cited

- World Food Programme. How can we estimate the impact of Ebola on food security in Guinea, Liberia and Sierra Leone? Special Focus. November 2014. Available at: <http://documents.wfp.org/stellent/groups/public/documents/ena/wfp268882.pdf>.
- Davis N, Alva S, Son Y. Comprehensive program for Ebola survivors: baseline assessment. 2017. Arlington, VA: Advancing Partners & Communities.
- Coates, J., Swindale, A., Bilinsky, P., 2007. Household Food Insecurity Access Scale (HFIAS) for Measurement of Food Access: Indicator Guide, v. 3. Washington, D.C.
- World Health Organization, 2002. WHOQOL-HIVBREF. Geneva.

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