

Validity of the Food Insecurity Experience Scale and Prevalence of Food Insecurity in the Bahamas

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Abstract

Background: Despite United Nations' recommendations to monitor food insecurity using the Food Insecurity Experience Scale (FIES), to date there are no published reports of its validity for the Bahamas, nor have prevalence rates of moderate or severe food insecurity been reported for the nation. At the same time, food security is a deep concern, with increasing incidence of natural disasters and health concerns related to diet-related disease and dietary quality plaguing the nation.

Objectives: This paper aims to examine 1) the validity of the FIES for use in the Bahamas, 2) moderate and severe food insecurity prevalence, and 3) the socio-demographic factors which contribute to increased food insecurity.

Methods: The FIES was administered via randomized and weighted landline telephone survey in Nassau, Bahamas to 1,000 participants in June and July of 2017. The Rasch modelling procedure was applied to examine tool validity, and outcomes used to report prevalence. A regression analysis informed the relationship between household variables and food security.

Results: The FIES met acceptable ranges for fit statistics for all eight items and the overall Rasch reliability is 0.7. The prevalence of moderate and severe food insecurity is 21%, and the prevalence of severe food insecurity is 10%. Statistically significant variables that contribute to food insecurity include education, age, gender, and presence of diabetes, high blood pressure, or heart disease.

Conclusions: This study, which is among the first to comprehensively measure food security in The Bahamas, provides a baseline for further research and evaluation of practices aimed at mitigating food insecurity in SIDS. Further, this study provides a baseline for future research which may seek to understand the impacts of Hurricane Dorian. Post-disaster food security data is needed to further understand the extent to which food security is impacted by natural disasters and identify which sectors and stakeholders are most vital in restructuring the agricultural sector and improving food availability following such catastrophic events.

Background

The Food Insecurity Experience Scale (FIES) is one of four scales developed by the Food and Agriculture Organization (FAO) of the United Nations as part of the Voices of the Hungry project, which aims to measure food insecurity through individuals' lived experiences. The FIES was recommended by the United Nations in 2017 as a mechanism globally to monitor progress on the eradication of hunger and is recommended for global use under the Sustainable Development Goals framework (SDG 2.1.2). The tool today is widely in use globally, although to date there are no published reports of its validity for the Bahamas [1], nor have prevalence rates of moderate or severe food insecurity been reported for the nation. Moderate food security refers to the lack of consistent access to food, and is an indicator of diminished dietary quality, quantity and disrupted eating patterns. Severe food insecurity is a measure worse, whereby persons have run out of food for a day or days. Both conditions are associated with hunger, compromised health and well-being [1].

The Bahamas is a nation of more than 388,000 residents, an archipelago of more than 700 islands, of which 30 are inhabited [2]. Over 70% of the population of the nation resides in New Providence, where the capital, Nassau, is located. The most recent poverty data available is from 2013 when 12.5% was determined to live on \$1.25 per day or less [2].

Research on Bahamian food prices conducted in 2017–2018 further raises questions about the cost of a healthy diet [3]. Local food, while generally less expensive, is difficult to find in stores as 90% of the nation's food is imported [4]. Imported foods tend to be costly; as much as \$12 for a gallon of milk, for example, and these imports are generally heavily processed and laden with sugar, salt and fat [3]. These costly imports disproportionately affect poorer households, limiting access to diverse and healthier foods [5]. In response, substantial efforts have been made to help improve access to local food, including a more than \$100 million investment started in 2014 in a 124-acre effort to develop the Bahamas Agriculture and Marine Science Institute (BAMSI) on Andros Island [6].

At the same time, health concerns related to diet-related disease and dietary quality are increasing. Over five years, the percentage of overweight people in the Bahamas increased from 70.5% in 2005 to 79.2% in 2012 [4]. Such increases raise significant public health concerns, as overweight and obesity increase one's risk for developing further chronic non-communicable diseases (CNCDs) such as heart disease, stroke, and diabetes, which represent 4 of the top 5 of the major causes of death for the nation [2].

In 2016 a comprehensive, collaboratively developed, working document, the National Development Plan "Vision2040" was issued in order to provide guidance to future policy efforts, and create a framework for goals and objectives across 4 main policy pillars: the economy, governance, social policy and the environment. The plan emphasizes the critical nature of food security most directly in its *Strategy 7.1: Achieve Food Security and End Hunger*, and calls for improved data collection as part of its monitoring and data collection

framework [7]. This paper, which examines the reliability of the FIES for the Bahamas, reports moderate and severe food insecurity prevalence in the nation, and examines the socio-demographic factors which contribute to greater risk of food insecurity, in part responds to this call. Our research questions include: Is the FIES a reliable tool for measuring food insecurity in The Bahamas?; What is the prevalence of food insecurity in The Bahamas prior to hurricane Dorian?; and To what extent do socio demographic factors contribute to food insecurity among Bahamians?

Methods

Sampling

A landline telephone survey was conducted in New Providence (Nassau) the most populous Bahamian island, between June and July of 2017. A local survey research firm, Public Domain Research & Strategy, in conjunction with established non-profit Hands for Hunger, was responsible for conducting interviewer-assisted surveys by telephone. Given that there is no public record of phone numbers in the Bahamas, a combination of three-digit constituency codes and seven-digit random numbers were used to generate plausible phone numbers. The three-digit constituency codes were selected based on the 2010 census for the purpose of limiting participants to the New Providence region. Calls were made repeatedly until the quantity of survey participants reached the sample size goal. Calls made to invalid phone numbers were disregarded. The process yielded is an approximately random sample of 1,000 Bahamians from the New Providence region. Sampling weights based on the 2010 census data were applied. In sum, the sampling and weighting procedures were designed to approximate a representative sample with the demographic characteristics of the population of interest.

Measurement

The survey included a total of 24 questions with some aimed at understanding the sociodemographic characteristics of the sample and others aimed at assessing participants' individual level of food insecurity.

Sociodemographic variables. Sixteen items in the survey captured demographic characteristics known to impact food insecurity. Individual level variables included age, gender, education, and employment status. Household level variables included ownership status, household size (i.e., number of members), household type, total income, and health risks.

Food Insecurity Experience Scale (FIES). The FIES was developed by the United Nations (UN) Food and Agriculture Organization (FAO) [8]. The FIES is an eight-item questionnaire about experiences with food insecurity that can be implemented at the individual level or household level. It has also been implemented with various reference periods (e.g., 30 days or 12 months). For this study, participants were asked to reflect on their individual experiences within the past 12 months. Table 1 shows the items as they were phrased to participants, the order in which they were asked, and names customarily used to refer to the items. Each FIES item is related to a unique aspect of food insecurity as determined by a meta-analysis of food insecurity scales and ethnographic studies from around the world [9–11]. A minor modification was made to the HEALTHY item to clarify that the question is focused on the quality rather than the quantity of available food. The survey was conducted in English.

Table 1
Food Insecurity Experiences Scale for Bahamas

Order	Item Phrasing*	Item Name
1	You were worried you would not have enough food to eat because of a lack of money or other resources?	WORRIED
2	You were unable to eat healthy and nutritious food (for example, vegetables and fruits)** because of a lack of money or other resources?	HEALTHY
3	You ate only a few kinds of foods because of a lack of money or other resources?	FEWFOODS
4	You had to skip a meal because there was not enough money or other resources to get food?	SKIPPED
5	You ate less than you thought you should because of a lack of money or other resources?	ATELESS
6	Your household ran out of food because of a lack of money or other resources?	RANOUT
7	You were hungry but did not eat because there was not enough money or other resources for food?	HUNGRY
8	You went without eating for a whole day because of a lack of money or other resources?	WHLDAY
* Each question was prefaced with "During the last 12 MONTHS, was there a time when..."		
** The parenthetical phrasing does not appear in the basic FIES question.		

Statistical analyses

The analyses were conducted in R using the RM.weights package [8, 12, 13].

Descriptive statistics. Frequencies were calculated to describe the characteristics of sample and sociodemographic subgroups. Weighted frequencies were calculated to adjust for the parameters of the population. Percentage of missing data was calculated for each variable.

Rasch modeling. Following the FAO guidelines [14], Rasch modeling procedures were used to generate item parameters and respondent parameters. Item parameters provide information about whether the FIES is a valid and reliable measurement tool for the sample. In addition, item parameters allow for an assessment of whether individual items are redundant or uninformative for the given sample and/or whether the relative severity of items differs as compared to applications among other samples. Respondent parameters provide information about participant's degree of food insecurity. Participants with a missing response to any of the eight FIES items were excluded from the Rasch analysis. Also, to avoid biased estimates, participants with extreme scores of 0 or 8 (responding no to all items or yes to all items, respectively) were excluded.

Equating. Following the FAO guidelines [8, 14], equating procedures were used to calibrate the results to the global FIES reference scale and compute internationally comparable prevalence rates of moderate and severe food insecurity and severe food insecurity.

Regression analyses. General linear modeling procedures were used to explore the degree to which sociodemographic variables and household-level health risks explain variances in food insecurity as measured by the FIES.

Results

Sample characteristics

The sample included 1,000 Bahamians aged 18 or older (see Table 2). Just over half of the same sample were women (52.2%). The majority were under the age of 55 (82%). Although many participants graduated from high school (41.5%) and college (25.4%), the sample also included some participants with less than a 12th grade education and others with graduate degrees. A large proportion of participants did not respond to questions about employment, housing, household income, household size, and household composition; therefore, those variables were not included in further analysis. As shown in Table 3, most participants reported they were not (or were not aware of) living in a household with someone who suffered from diabetes, high blood pressure, obesity, heart disease, or cancer.

Table 2

Sociodemographic Characteristics of Respondents ($n = 1000$)

Characteristic	Frequency	Weighted %
Gender		
Male	312	47.8
Female	688	52.2
Age		
18–34	285	40.7
35–54	429	41.3
55+	283	17.9
Missing	3	0.1
Education		
Some elementary/secondary education	53	4.0
High school graduate	393	41.5
Technical school or undergraduate education	365	37.8
Graduate education	176	15.9
Missing	13	0.7
Employment		
Employed full-time	259	27.7
Not employed full-time	233	21.4
Missing	508	51.0
Housing		
Homeowner	369	35.5
Renter	105	11.8
Missing	526	52.7
Household Income		
Less than \$30K	342	36.5
Between \$30K and \$60K	200	20.8
More than \$60K	115	11.9
Missing	343	30.8
Household size		
3 or fewer members	253	24.6
4 or more members	232	24.4
Missing	515	51.0
Household composition		
Couple without children	25	2.4
Couple with children	218	21.8

Characteristic	Frequency	Weighted %
Single without children	78	8.7
Single with children	112	11.4
Missing	567	55.7

Table 3
Household-level Health Risks ($\backslash \text{varvec}n = 1000$)

Health Risk	Frequency	Weighted %
Diabetes		
No	792	82.1
Yes	203	17.3
Missing	5	0.6
High Blood Pressure		
No	618	65.6
Yes	376	33.8
Missing	6	0.6
Obesity		
No	860	86.5
Yes	129	12.4
Missing	11	1.1
Heart Disease		
No	958	95.9
Yes	34	3.1
Missing	8	0.9
Cancer		
No	951	95.7
Yes	45	3.8
Missing	4	0.5
Note: A <i>yes</i> response indicates that at least one member of the household suffers from the health condition. The missing frequency is the count of participants who responded <i>I don't know</i> and participants who made no response.		

Item parameters and FIES reliability

Preparation for the Rasch analysis included the removal of 38 cases with incomplete responses to the FIES survey, 572 cases with an extremely low FIES scores, and 59 cases with an extremely high FIES scores. The remaining 331 cases was a sufficiently large sample size to generate reliable item parameters [8, 14, 15]. The item parameters (see Table 4) are an estimate of the severity of the items on a logit scale with a mean of 0 and standard deviation of 1. The numeric value of an item parameter cannot be interpreted per se. However, participants are less likely to respond affirmatively to items with a higher severity. Also, participants who respond affirmatively to items with higher parameters are more likely to be food insecure and experience food insecurity in multiple ways.

Table 4
Item Parameters and Fit Statistics of FIES Scale in Bahamas

Item Order	Item Name	Item parameter	Standard error	Infit	Outfit	Frequency (Proportion) of affirmative responses*
3	FEWFOOD	-1.140	0.133	0.955	0.926	211 (63.7)
2	HEALTHY	-0.645	0.132	1.256	1.424	186 (56.2)
1	WORRIED	-0.621	0.132	1.103	1.104	180 (54.4)
5	ATELESS	-0.127	0.135	0.835	0.806	138 (41.7)
4	SKIPPED	0.007	0.136	0.884	0.893	127 (38.4)
6	RANOUT	0.361	0.141	0.984	1.002	104 (31.4)
7	HUNGRY	0.725	0.147	0.784	0.744	84 (25.4)
8	WHLDAY	1.440	0.164	1.117	1.339	51 (15.4)

Note: Item order refers to the order in which the corresponding survey question was posed to participants. The table is sorted by item parameter to arrange the items in order of severity.

The infit statistics are close to 1 (i.e., in the acceptable range between 0.7 and 1.3) for each item, suggesting all items performed well within the sample. The outfit statistics, none of which surpassed the acceptable maximum of 2, indicate that no items were sensitive to outliers with unusual responses. The residual correlations were low ($< |0.4| < / > cript >$) enough to infer that each item captures a unique aspect of food insecurity. The overall Rasch reliability (0.698) provides evidence that the scale effectively discriminates between respondents who have more or less food insecurity. In summary, the results suggest the FIES is a valid measurement tool for use in the Bahamas.

Equating and prevalence rates

The equating process was used to recalibrate the 2014–2016 FAO global standard to a common scale for comparison. The process allows for comparison of food insecurity prevalence rates using the ATELESS and WHLDAY items as benchmarks for moderate and severe food insecurity, respectively. Figure 1 illustrates the item parameters for the Bahamas in order from the least to greatest severity in comparison to the standardized global item parameters. A comparison of the order and spacing of the severities illustrate what is unique about the food experiences in the Bahamas. Notably, mild food security in the Bahamas is experienced in a different order than it is in other parts of the world. Responses indicate it is likely that, by the time a Bahamian worries they will not have enough food to eat, they have already restricted their meals to a few kinds of foods and begun to limit their intake of vegetables and fruits. The spacing of the item parameters suggests that Bahamians who experience moderate food insecurity are more likely to go from restricting the quantity of their food to skipping meals than their global counterparts.

Table 5 shows the estimated probability of being moderately or severely food insecure and the probability of being severely food insecure in relationship to the total FIES score. The probabilities are calculated using a normal probability distribution that accounts for the person parameter and measurement error generated by the Rasch analysis. The prevalence rates are calculated as the sum of the products of the weighted percentage of the population and the probability. The prevalence rate of moderate and severe food insecurity (i.e., the estimated proportion of the population that is not food secure or mildly food insecure) is 21%. The prevalence rate of severe food insecurity is 10%.

Table 5
Probability of Food Insecurity Based on FIES Score

FIES Score	Person parameters	Weighted Percentage of Participants	Probability of Moderate and Severe Food Insecurity	Probability of Severe Food Insecurity
0	-2.945	59%	0.000	0.000
1	-2.158	8%	0.041	0.000
2	-1.245	7%	0.120	0.001
3	-0.593	6%	0.326	0.004
4	-0.028	3%	0.612	0.024
5	0.574	4%	0.852	0.128
6	1.242	4%	0.957	0.401
7	2.177	4%	0.985	0.740
8	2.979	6%	0.985	0.847

Regression analyses.

Multiple regression analysis was conducted to determine whether sociodemographic variables explain the severity of food insecurity. Using 932 complete cases, the total FIES score was modeled using sociodemographic variables and household-level health risks with low rates of missingness. A stepwise selection procedure was used to add variables to the model in the order of their contribution to the variation explained and remove variables rendered insignificant by the addition of other significant variables to the model. The results, which matched a forward selection procedure, indicate that the variables in the final model account for unique sources of variation. The model ($R^2 = .10$, $R^2_{adj} = .09$, $F(9,22) = 10.92$, $p < .01$) is shown in Table 6 in the order of proportion of variance accounted for. Only two variables, household-level obesity and household-level cancer, were not included in the model. There is no difference in FIES scores among Bahamians with a high school diploma and those with less than a high school education; however, those with post-high school education have significantly lower FIES scores. There is no difference in food insecurity among young adults (18–34) and middle-aged adults (35–54); however, Bahamians who are 55 years old or older are more food secure. Females experience more food insecurity than males. Finally, Bahamians who live in a household with someone who suffers from diabetes, high blood pressure, or heart disease experience more food insecurity.

Table 6
Stepwise Regression Model of Food Insecurity Experience Scores

	Estimate	Std. Error	t-value	Pr(> t)	95% CI		
					LL	UL	
(Intercept)	4.60	0.55	8.38	< .01	***	3.52	5.68
Education							
Some elementary/secondary education	Referent						
High school graduate	-0.39	0.37	-1.06	0.29		-1.11	0.33
Technical school or undergraduate education	-0.97	0.37	-2.63	0.01	**	-1.70	-0.25
Graduate education	-1.68	0.39	-4.29	< .01	***	-2.45	-0.91
Household Member with Diabetes							
Yes	Referent						
No	-0.65	0.21	-3.07	< .01	**	-1.06	-0.23
Age							
18–34	Referent						
35–54	-0.20	0.19	-1.07	0.29		-0.58	0.17
55+	-0.94	0.22	-4.33	< .01	***	-1.37	-0.52
Household Member with High Blood Pressure							
Yes	Referent						
No	-0.54	0.17	-3.11	< .01	**	-0.88	-0.20
Gender							
Female	Referent						
Male	-0.41	0.17	-2.36	0.02	*	-0.75	-0.07
Household Member with Heart Disease							
Yes	Referent						
No	-0.88	0.45	-1.97	0.05	*	-1.75	0.00

Discussion

The present study is part of a global call to address the growing challenges of food insecurity, known to impact both hunger and obesity [1]. Climate change has exacerbated food security challenges, and island nations, including the small island developing states (SIDS) are at high risk for continued impacts. Island nations struggle as sea levels rise and the number and severity of natural disasters increases, to ensure the viability of local production and to minimize reliance on imports, which are largely processed foods [1, 3, 4].

Our findings indicate that the FIES is a reliable tool for use in the Bahamas and found that 21% of the population of Nassau was food insecure in 2017. More specifically, 11% was moderately food insecure and 10% was severely food insecure. For Saint Lucia, another Caribbean country, approximately the same percentage of the population (22.2%) experienced moderate or severe food insecurity in 2017, although fewer people (4.5%) experienced severe food insecurity. Information on the prevalence of food insecurity in other Caribbean countries is limited. However, people in The Bahamas experienced similar rates of moderate or severe food insecurity as the rest of the Americas (22.9%) in 2017, again with fewer people (6.2%) experiencing severe food insecurity [17]. Bahamian rates of severe food insecurity are generally lower in comparison with severe food insecurity rates in sub-Saharan Africa, as found in a recent study. However, Senegal, Mauritius, Mauritania all have similar rates of severe food insecurity (around 10%) [18]. In September 2019, Hurricane

Dorian, one of the most intense tropical cyclones on record, made landfall on the Bahamas. While the data presented here pre-dates the storm, it is valuable as a pre-storm baseline upon which we can compare future rates.

There is substantial precedent for natural disasters to profoundly impact food security. In one study, the FAO found that across 140 disasters affecting at least 250,000 people, food supply losses after each disaster were equivalent to, on average, a 7 percent decrease of national per capita dietary energy supply [19]. Disasters cause unemployment, resulting in reductions of a households' purchasing capacity while at the same time, food commodity availability becomes scarce leading to food inflation, and fewer resources, collectively increasing food insecurity, risk for malnutrition and hunger [19]. The World Food Program (WFP) stresses that four out of five people suffering from hunger live in areas that are particularly susceptible to disasters [20]. In developing countries, the agriculture sector on average absorbs a disproportionate 22 percent of total damage and loss from natural disasters [19].

Our analysis also included examining FIES item difficulty, which in this context is conceptualized as how difficult it is for a respondent to answer "yes" to each food insecurity question included in the standard tool. By learning which questions are more difficult, and by how much, these analyses also inform the manner in which a community or nation experiences food security, and enables comparisons across nations, and the globe. The Bahamian findings were unique in that early questions characterizing mild food security had a different order of difficulty than have been reported globally [21] (see Fig. 1). Globally, individuals more often report being WORRIED first, then eating FEWFOODS and then lack of HEALTHY foods. In contrast, individuals in the Bahamas do not report being WORRIED until after first reporting FEWFOODS and also reporting a lack of HEALTHY foods. It is not entirely clear the reason for this distinction in the Bahamas. However, it is possible that the strong religiosity of the nation and history of enduring difficult times, including experiences with storms, have led citizens to characterize worry differently, or later in the process, long after food becomes scarce. The presence of delayed worry suggests more qualitative research is needed to better understand the progressive experience of hunger across the globe, and the cultural meanings embedded in these experiences. Further, examination of how experiential responses differ before and after a disaster, may also inform our understanding of coping mechanisms.

The examination of the relationship between individual and household-level variables on food security revealed a protective effect for age (over 55 years) and for having completed some post-high school education or better. While it is not particularly surprising that having more education is associated with less food insecurity, the finding that older persons are less likely to experience food insecurity may run counter to that of other nations. For example, in Latin America and in the US, older individuals are often at higher risk [16, 22]. However, based on the knowledge of our Bahamian co-author, Bahamians have long held traditions to first feed the elders in the home, which may explain the effect. Data analysis also showed that households with higher rates of diet-related disease including diabetes, high blood pressure and heart disease are more likely to experience food insecurity. This finding is consistent with prior research from developed nations which has recognized the association between food insecurity diabetes and its risk factors as well as the compounded challenge in managing a chronic disease while experiencing food insecurity [23]. At the same time, interestingly, our analysis did not reveal an effect for obesity nor for cancer. It is possible that the effect which would have been captured by the obesity variable was overshadowed by that of the other diet related diseases, given their likelihood to co-exist.

Our research, from the data collection, to analysis and writing were completed as a collaborative led not by the nation's government, but rather a partnership between a non-governmental institution, a for-profit market research firm and two academic institutions, one in the Bahamas, and one in the United States. Our collaborative approach represents a novel, interdisciplinary, and relatively low-cost mechanism to achieve answers in an environment where government staff and officials are often under-resourced and may also contribute to achievement of SDG 17 [24]. In areas that recognize the need for data about the problem of food insecurity, but where governmental resources are strained, such approaches may work to close important gaps in capacity, or related resources.

While offering novel insight into food insecurity in the Bahamas, this research is not without limitations. First, the Bahamas is an archipelago that lacks an easy mechanism to conduct data collection on all inhabited islands. Each island in the nation has unique characteristics and, likely, its own challenges including likely differences in food security, and perhaps the ways that food security is experienced. Without contacting residents from each island, we miss critical data. Our data were only collected in New Providence, home to 70% of the populous of the Bahamas, though in itself a unique island and is not necessarily characteristic of other islands. As such, our findings should not be attributed to other islands without great caution. Further, our results examining the relationship between household characteristics and food security outcomes, was limited by missing data, in particular high rates of missingness on questions about employment, housing, household income, household size, and household composition influence food insecurity. While it is unclear why so many individuals declined these questions, and not other, also relatively personal questions, it suggests that future research should review question wording and seek feedback prior to a second administration.

Conclusions

Prior to hurricane Dorian 10% of Bahamians living in Nassau suffered from severe food insecurity, while another 11% experienced moderate food insecurity. Ongoing monitoring and reporting of food insecurity prevalence is critical, particularly among SIDS nations where natural disasters can quickly change the social milieu, and availability of food. Additional data from other islands, including family islands will help provide a more comprehensive understanding of the problem across the nation.

Abbreviations

SIDS: Small Islands Developing States

SDGs: Sustainable Development Goals

FIES: Food Insecurity Experience Scale

FAO: Food and Agricultural Organization

Declarations

Ethics approval and consent to participate

All methods for this study were reviewed and approved by the IRB of the University of Delaware. The IRB of the University of Delaware approved the analysis of de-identified secondary data. Local IRB approval was not applicable as initial data collection occurred through a partnership with a for profit and non-profit organization, and later UD analyzed the existing data. Written consent for participation was obtained from all participants.

Consent for publication

All authors have expressed verbal consent for the publication of this article.

Availability of data and material

The data that support the findings of this study are accessible through Public Domain Research & Strategy, but restrictions apply to data access. For the current study, the data were accessed under contract through the non-profit group, Hands for Hunger.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

This research article developed as a cooperative effort between AK, EP, ZK, AS, GH, NK, HW, and DR. AK led the development of the manuscript with significant contributions from NK, HW and DR. GH performed multiple stepwise regression analyses and contributed to the methods section of the manuscript. AS performed initial stepwise regressions. ZK and EH assisted with data collection and study development. All authors approved the final manuscript.

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Figures

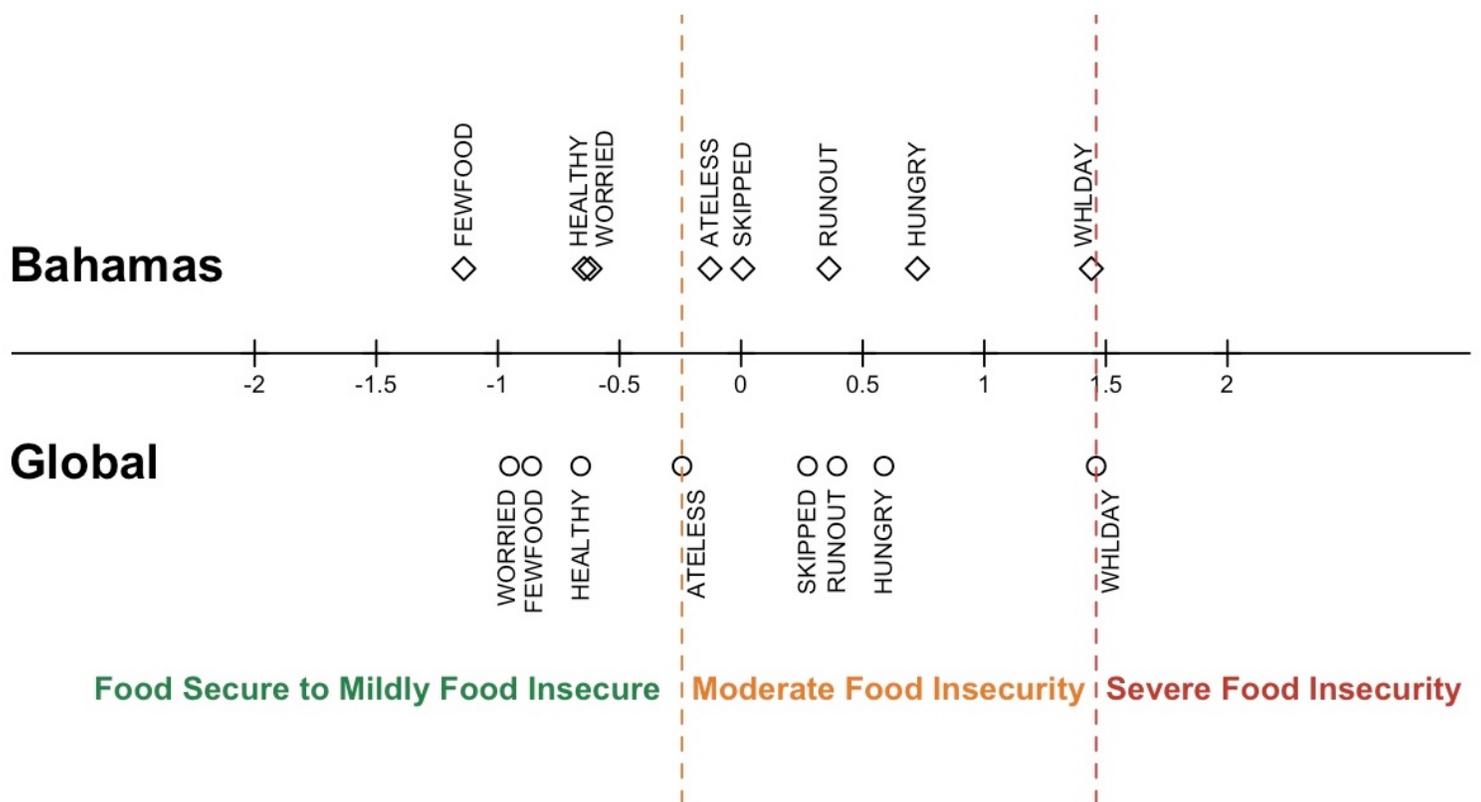


Figure 1

Food insecurity in the Bahamas compared to FAO global standard

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- [supplement1.png](#)