

COVID-19 and the social distribution of hunger in three Caribbean Small Island Developing States

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ABSTRACT

Objectives. To determine changes to income and livelihood, food consumption, and hunger due to coronavirus disease 2019 (COVID-19) in three Small Island Developing States (SIDS) in the Caribbean: Jamaica, St Kitts and Nevis, and St Vincent and the Grenadines.

Methods. This was a cross-sectional study conducted in July 2020. Participants were selected using telephone directories and lists of mobile numbers. Data were collected through face-to-face and telephone interviews. Participants rated the impact of COVID-19 on their livelihoods and the Adult Food Security Module was used to assess hunger. To examine how these outcomes varied by sociodemographic group, multivariable logistic regression analysis was used, with odds ratios (OR) and 95% confidence intervals (CI) reported.

Results. The analysis included 880 participants. Of these, 40% (344/871) reported some form of hunger, with 18% (153/871) classed as moderate-to-severe hunger. Almost three quarters of households reported some impact on their livelihood (640/880), with 28% (243/880) classifying this impact as moderate to severe. Women were 60% more likely to report that their livelihoods were moderately to severely affected by COVID-19 (OR 1.59; 95% CI 1.09, 2.31) and 70% more likely to experience moderate-to-severe hunger (OR 1.70; 95% CI 1.37, 2.09). The effects of COVID-19 on livelihood and hunger were greater in those with secondary-school and primary-school education compared with tertiary education.

Conclusion. The COVID-19 pandemic is disproportionately affecting the most vulnerable segments of the population. Social protection programmes are a key component of efforts to alleviate the pandemic's consequences; however, equitable access must be ensured.

Keywords

Hunger; food security; COVID-19; Caribbean Region.

In March 2020, the World Health Organization declared the coronavirus disease 2019 (COVID-19) outbreak a global pandemic. Since then, its impact has been unprecedented: as of 30 August 2021, deaths have surpassed 4.5 million, with more than 217 million cases reported globally (1). In response to this global health crisis, most countries implemented restrictions to mitigate the spread of the disease, and these measures have caused tremendous disruption to the economy (2). Although we will not be able to measure the precise effects of the global

economic fallout from COVID-19 for some years, close to 150 million more people worldwide may have fallen into extreme poverty in 2020 (3) – an increase of 20% from pre-pandemic levels. This has major implications for food security, nutrition, and welfare across the world, particularly in areas without resilient food systems (4).

The Small Island Developing States (SIDS) are a group of developing countries that, due to their small size, are particularly vulnerable to economic shocks (5). In 2015, the Food and

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Agriculture Organization described the food and nutrition security of the Caribbean SIDS as “precarious” due to their heavy dependence on food imports and their high risk of natural disasters, such as storms, droughts, and earthquakes (6). The additional impact of COVID-19 may well push many households into more vulnerable food and nutrition situations, with recovery posing major challenges.

Within societies, it has become clear that social inequalities in health are profoundly and unevenly affecting COVID-19 morbidity and mortality (7). Many social determinants of health, such as poverty, gender, and race or ethnicity, can have a considerable effect on COVID-19 outcomes (8). Socially disadvantaged groups experience the greatest burden of COVID-19, although the relationship may not be linear: data from the United States (US) show a U-shaped relationship between poverty and COVID-19 infections and deaths (9). At the same time, socially disadvantaged groups are also the most vulnerable to food insecurity, a so-called syndemic of COVID-19 and food insecurity (10). If vulnerable groups are not identified and then considered in the response to COVID-19, it is likely that existing social inequalities will be exacerbated (11).

In the Caribbean, the impact of COVID-19 on livelihoods, diet, and food security has been documented (12). Most households reported moderate or greater effects on their ability to earn a living, and a substantial proportion (40%) experienced some form of hunger. The study demonstrated that the pandemic has brought about changes in the types of food consumed, with reduced consumption of healthy foods such as fish, fruit, and vegetables. This present analysis sought to build on these findings by describing how the impact COVID-19 is distributed in society, and to determine whether some populations are disproportionately affected. To our knowledge, this is the first such analysis in the region. We determined whether changes to income and livelihood, access to social protection programmes, food consumption, and experiences of hunger differed by social group, as defined by gender, education, income, and household dependency ratio.

METHODS

This study was a multicountry cross-sectional study conducted in July 2020 in eight countries in the English-speaking Caribbean. We limited this analysis to three countries (Jamaica, St Kitts and Nevis, and St Vincent and the Grenadines) in order to provide information to support the “Improving Household Nutrition Security and Public Health in the CARICOM” project (13), which is underway in these islands. This study seeks to determine how previous and proposed research can best be scaled up and incorporated into more nutrition-sensitive, gender-responsive food systems in the Caribbean region.

Details of the study methods have been reported elsewhere (12). Sample size estimation was based on guidance from the World Food Programme on conducting emergency assessments of food security (14). The World Food Programme estimated sample sizes based on empirical experience of household food security surveys and recommends between 50 and 150 households per reporting domain. Furthermore, a response rate of 20% was applied to account for non-responses. Telephone directories and specially compiled lists of mobile numbers that were obtained from governmental organizations, agencies, and other public listings were used as sampling frames in this research.

The list was stratified into urban and rural areas and these strata were divided into subgroups according to parishes. The page interval was determined by dividing the total number of pages and contacts in the master list by the predetermined sample size. To determine the call interval, the total number of contacts that was obtained for each parish was divided by the desired number of respondents which was predetermined for each parish by proportional sampling. Due to COVID-19 restrictions, data collection in Jamaica took place by telephone interview; in St Kitts and Nevis, interviews were face-to-face (with physical distancing); and in St Vincent and the Grenadines a combined approach was used.

A questionnaire was developed based on standardized tools such as the US Department of Agriculture rapid food security assessment tool (15) and the World Food Programme’s emergency food security assessment tool (14), which were adapted for this study context. The questionnaires were piloted in all study sites before data collection, but were not formally validated for these populations. The Adult Food Security Module was used to assess hunger (15). This module measures conditions and behaviors that are characteristic of food insecurity, such as quantity of food consumed, meal skipping, and lack of financial resources to obtain food. The number of affirmative responses was summed to obtain a raw hunger score. Participants were categorized into one of four categories: no hunger (score of 1), mild hunger (score of 2), moderate hunger (score of 3), and severe hunger (score of 4). For analysis, hunger status was dichotomized into no/mild hunger (score of 1–2) and moderate-to-severe hunger (score of 3–4). Household dependency ratio was calculated as the number of household members divided by the number of income earners within the household.

Categorical variables are presented using numbers and percentages and continuous variables are presented as means and standard deviations. Multivariable logistic regression models were used to examine how outcomes (impact of COVID-19 on livelihood and hunger) varied by sociodemographic group. A forward stepwise approach was used to build these models, i.e. variables were added one by one and were retained if the *p*-value was < 0.2. The models included: sex, age, education level, household size, number of income earners in the household, and household dependency ratio. The country where the data were collected was included in the model, so the results are independent of data collection site. Statistical significance was set at a *p*-value of 0.05. Stata version 16 (Stata Corp, Texas, USA) was used to conduct the analyses.

This study was approved by the University of Technology Ethics Committee. After the purpose of the study was explained, verbal consent was obtained from the participants before the interviews. The names of interviewees were not required for participation in the study. The data collected were grouped and cannot be identified or linked to any individual or household.

RESULTS

The characteristics of the sample are shown in Table 1. A total of 880 participants were included in this analysis, with 46% from Jamaica, 31% from St Kitts and Nevis, and 24% from St Vincent and the Grenadines. The sample had slightly more males (460/880; 52%) than females, and a large proportion had a tertiary level education (455/880; 52%). As regards hunger, 40% (344/871) reported some form of hunger, with 18% (153/871)

TABLE 1. Sociodemographic and hunger characteristics of the study sample, Jamaica, St Kitts and Nevis, and St Vincent and the Grenadines, 2020

Variable	n (n = 880)	%
Country		
Jamaica	401	45.6
St Kitts and Nevis	269	30.6
St Vincent and the Grenadines	210	23.9
Sex		
Male	460	52.3
Female	420	47.7
Age in years, mean and standard deviation	46.9	14.1
Education		
Primary	80	9.1
Secondary	345	39.2
Tertiary	455	51.7
Household size, no. of members		
1–2	301	34.2
3–4	374	42.5
≥ 5	205	23.3
Number of income earners in household (n = 865)		
1	358	41.4
2	368	42.5
≥ 3	139	16.1
Household dependency ratio (n = 689)		
1	250	36.3
2–3	334	48.5
≥ 4	105	15.2
Hunger level (n = 871)		
No hunger	527	60.5
Mild	191	21.9
Moderate	79	9.1
Severe	74	8.5
Impact on livelihood		
Little or none	240	27.3
Some to moderate	397	45.1
Moderate to severe	243	27.6

Source: Prepared by the authors based on study results.

reporting moderate or severe hunger. Almost three quarters of participants (640/880) reported more than a little impact on the livelihood within their household, with 28% (243/880) classifying this impact as moderate to severe.

Changes in household income due to the pandemic are shown in Table 2. The largest changes occurred in the highest income category (a decrease of 19 percentage points) and the lowest income category (an increase of 12 percentage points), indicating an overall decrease in weekly household income. These results were similar in both sexes (within ± 2.5 percentage points in each category; data not shown). Please see the Annex (Table 1) for results stratified by country; patterns were similar to the overall sample.

To mitigate this economic shock, some households sought financial assistance from social protection programmes. The value in US dollars of the assistance received on average per household is shown in Table 3. Compared with households headed by persons with a primary-school education,

TABLE 2. Percentage of households in income categories before and during COVID-19, Jamaica, St Kitts and Nevis, and St Vincent and the Grenadines, 2020

Household income (US\$/week)	% of households		Change (%)
	Before COVID-19	During COVID-19	
> 125	74.2	55.3	-18.9
86–125	14.6	16.9	2.3
45–85	7.8	12.6	4.8
< 45	3.4	15.1	11.7

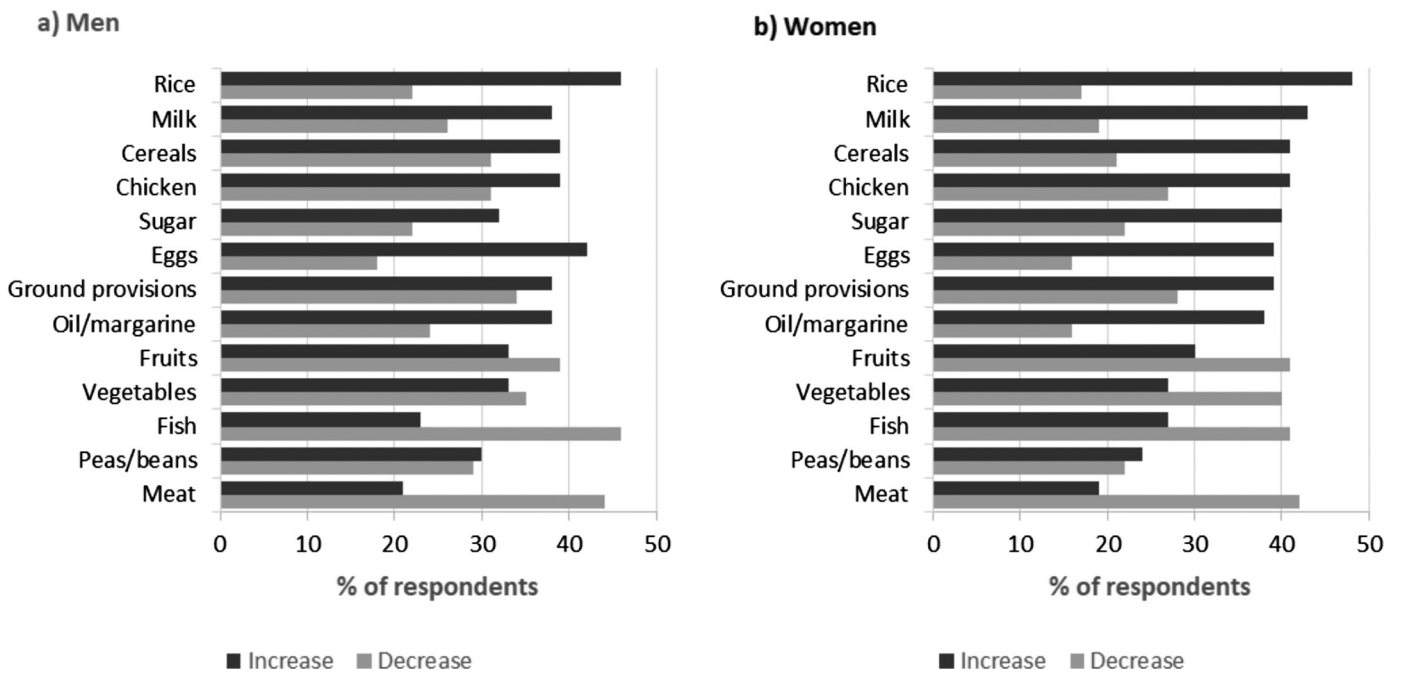
COVID-19, coronavirus disease 2019; US\$, United States dollars.
Source: Prepared by the authors based on study results.

households headed by those with a secondary-school education received 1.5 times more financial assistance (average of US\$ 136.9 versus US\$ 90.4) and those with a tertiary education received almost 3 times more (US\$ 248.7 versus US\$ 90.4). In addition, the value of the assistance was higher for self-reported male-headed households (about US\$ 40 more) and those with higher income (about US\$ 60 more in the highest versus lowest categories), but these differences were not statistically significant. Please see Annex (Table 2) for results stratified by country; patterns were similar to the overall sample.

Figure 1 shows the reported changes in types of food consumed by those severely affected by COVID-19. For both men and women, the COVID-19 pandemic brought about changes in dietary patterns, with reduced consumption of more expensive food items, such as meats, fish, vegetables, and fruit. In contrast, the consumption of cheaper food items increased, such as rice, cereals, sugar, and eggs. The magnitude of the reduction in fruit and vegetable consumption was greater in women than men (11% and 13% net decrease in fruit and vegetable consumption, respectively, for women versus 6% and 2% for men).

The results of the multivariable logistic regression analysis to explore the sociodemographic determinants of the impact of COVID-19 on livelihood and hunger are shown in Table 4. After adjusting for confounders and for country where the data were collected, women were 60% more likely to report that their livelihoods were moderately to severely affected by COVID-19 (OR 1.59; 95% CI 1.09, 2.31) and 70% more likely to experience moderate-to-severe hunger (OR 1.70; 95% CI 1.37, 2.09). The impact of COVID-19 on livelihood was greater in those with secondary-school and primary-school education compared with tertiary education: OR 2.09 (95% CI 1.42, 3.08) and OR 2.81 (95% CI 1.54, 5.16), respectively. Similarly, those with less education were more likely to experience hunger than tertiary-educated participants: OR 3.91 (95% CI 2.95, 5.18) in those with secondary-school education and OR 11.61 (95% CI 10.25, 13.15) in primary-school educated groups. Households with fewer income earners experienced a greater impact on their livelihood: OR 5.09 (95% CI 1.82, 14.21) and OR 6.79 (95% CI 2.25, 20.50) for households with two and one income earners, respectively, compared with three or more income earners. These households also experienced more hunger: OR 7.37 (95% CI 1.85, 29.38) and OR 6.19 (95% CI 2.07, 18.55) for two and one income earners, respectively, compared with three or more income earners. Higher dependency ratio was associated with greater odds of hunger: OR 2.95 (95% CI 1.57, 5.56) and OR 5.66 (95% CI 2.04, 15.70) for a dependency ratio of 2–3 and

FIGURE 1. Change in types of food consumed by those severely affected by coronavirus disease 2019, Jamaica, St Kitts and Nevis, and St Vincent and the Grenadines, 2020



Note: Ground provisions are traditional root vegetable staples, such as sweet potatoes, dasheen, yams, and cassava.
Source: Prepared by the authors based on study results.

TABLE 3. Financial assistance sought during COVID-19 by sociodemographic characteristic, Jamaica, St Kitts and Nevis, and St Vincent and the Grenadines, 2020

Variable	n	Financial assistance in US\$ (mean (SD))	p-value ^a
Sex			
Male	81	195.2 (303.0)	0.34
Female	104	156.9 (221.9)	
Education			
Primary	22	90.4 (68.9)	0.007
Secondary	93	136.9 (187.4)	
Tertiary	70	248.7 (350.6)	
Household income, US\$/week			
< 65	52	135.7 (160.1)	0.33
65–125	60	134.9 (182.7)	
≥ 126	73	191.5 (293.8)	
Household dependency ratio			
1:1	33	172.3 (270.0)	0.43
2–3:1	77	198.0 (198.0)	
> 4:1	34	131.4 (131.4)	

COVID-19, coronavirus disease 2019; US\$, United States dollars, SD, standard deviation.
^a t-test.

Source: Prepared by the authors based on study results.

≥ 4, respectively. The odds of experiencing moderate-to-severe hunger decreased with age (OR 0.99 (95 CI 0.98, 0.99)).

DISCUSSION

This study documents the impact of COVID-19 in three Caribbean SIDS, with an emphasis on highlighting vulnerable

groups. The results demonstrate extensive disruption to livelihoods, with a net decrease in household income and a substantial proportion (28%) of respondents reporting a moderate-to-severe impact on their ability to earn a living. In addition, the prevalence of moderate-to-severe hunger was 17.6%. We found that socially disadvantaged groups such as women and those with less education were particularly vulnerable to these adverse outcomes during the pandemic. Furthermore, the most vulnerable groups of society benefited the least from social protection programmes, with male-headed households and those in the highest education and income categories receiving the most financial support.

Before COVID-19, 74% of households earned in excess of US\$ 125 a week. During COVID-19, the proportion of households at this income level fell by almost 20 percentage points. On the other hand, the proportion of households earning less than US\$ 45 a week increased from 3% to 15%. This decline in income was reflected in the proportion of households reporting that the impact of COVID-19 on their livelihood was moderate to severe (28%). This loss of income is occurring all over the world, with estimates suggesting that around 150 million people could fall (or have already fallen) into extreme poverty as a result of the recession triggered by the COVID-19 pandemic (3).

In the Caribbean, governments have invested in social protection programmes that target those affected by income disruptions (16). However, as this study showed, households that needed the assistance most got the least support. Thus, while many Caribbean countries allocated (and continue to allocate) relatively large amounts of their limited resources to expand social assistance during the pandemic, there is a clear need to ensure the equitable distribution of these resources.

TABLE 4. Relationship between sociodemographic factors and perceived impact of COVID-19 on livelihood and hunger, Jamaica, St Kitts and Nevis, and St Vincent and the Grenadines, 2020

Variable	Impact of COVID-19 on livelihood ^a		Hunger ^b	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Sex				
Male	Reference		Reference	
Female	1.59 (1.09, 2.31)	0.016	1.70 (1.37, 2.09)	< 0.001
Age, in years ^c	0.98 (0.97, 1.00)	0.068	0.99 (0.98, 0.99)	0.027
Education				
Tertiary	Reference		Reference	
Secondary	2.09 (1.42, 3.08)	< 0.001	3.91 (2.95, 5.18)	< 0.001
Primary	2.81 (1.54, 5.16)	0.001	11.61 (10.25, 13.15)	< 0.001
Household size, no. of members				
1–2	Reference		Reference	
3–4	1.73 (0.92, 3.26)	0.082	1.82 (0.82, 4.03)	0.141
≥ 5	2.18 (0.97, 4.90)	0.064	2.63 (1.01, 6.85)	0.048
Income earners, no.				
≥ 3	Reference		Reference	
2	5.09 (1.82, 14.21)	0.002	7.37 (1.85, 29.38)	0.005
1	6.79 (2.25, 20.50)	0.001	6.19 (2.07, 18.55)	0.001
Household dependency ratio				
1	Reference		Reference	
2–3	1.35 (0.72, 2.54)	0.344	2.95 (1.57, 5.56)	0.001
≥ 4	1.45 (0.57, 3.70)	0.430	5.66 (2.04, 15.70)	0.001

COVID-19, coronavirus disease 2019; OR, odds ratio; CI, confidence intervals.

^a ORs represent odds of livelihood being moderately to severely affected by COVID-19.

^b ORs represent odds of moderate-to-severe hunger during COVID-19.

^c Age was entered into the model as a continuous variable, so ORs represent the change in odds of the outcome as a result of a 1-year increase in age.

Source: Prepared by the authors based on study results.

SIDS rely heavily on imported food; most Caribbean countries are net food importers, making them particularly susceptible to price fluctuations and vulnerable to the effects of the pandemic (17, 18). Changes in patterns of food consumption have been observed in other settings, with poor households shifting their spending away from fresh fruits and vegetables (19) and towards consumption of more processed foods (20). Similar changes have been observed in Caribbean settings, with reports of increased consumption of rice, ground provisions, chicken, cereals, milk, sugar, oils/margarine, peas or beans, and eggs and reduced consumption of vegetables, fruits, meats, and fish (12). Our analysis shows that these changes are particularly pronounced in women and female-headed households, further underscoring the disproportionate impact of the pandemic on women.

The COVID-19 pandemic has magnified existing social inequities around the world, with disadvantaged segments of society suffering from the worst effects of the crisis (21). These groups are already disproportionately affected by food insecurity and hunger and they are also at higher risk of contracting COVID-19 (22). In our analysis of three Caribbean SIDS, female-headed households and those with less education reported a greater impact on their livelihood and higher levels of hunger. It is recognized that women, in their caregiving role for elderly and sick family members, are at greater risk of exposure to the COVID-19 virus and also face additional burdens during COVID-19 as frontline health workers and food service workers (23, 24). Furthermore, women are at risk of increased domestic violence due to the recession and confinement at home during lockdowns (25).

The role of education as a determinant of health is well documented: it is strongly associated with life expectancy, morbidity, and health behaviors. Education plays an important role in health by shaping opportunities, employment, and income (26). Lower educational attainment is associated with low-skilled and irregular employment. It is therefore unsurprising that households with less educated members were especially vulnerable to the shocks brought on by the pandemic. Our findings emphasize the disproportionate impact of the pandemic on vulnerable populations and indicate that, unless their needs are considered as a priority, a likely outcome will be the widening of social inequality in these countries.

The results of our study should be interpreted in the context of their possible limitations. The sampling frame was constructed from landline and mobile telephone listings and therefore excludes households without these amenities. Over half the sample had a tertiary-level education, indicating that our sample may not be nationally representative. These findings describe the situation in July 2020, fairly close to the start of the pandemic. The situation has evolved considerably since then, with the introduction of vaccines and the reopening of the economy in the study sites. There is a clear need therefore to repeat the survey to monitor the later impact of COVID-19 on livelihoods, food consumption patterns, and hunger and the resulting implications for health inequities.

In conclusion, we have shown in three Caribbean SIDS that the COVID-19 pandemic disproportionately affected the most vulnerable segments of the population. Social protection programmes are a key component of efforts to alleviate the

pandemic's consequences; however, equitable access must be ensured to prevent the further widening of inequalities.

Author contributions. FH conceived the original idea and collected the data. KR and CH analyzed the data and interpreted the results. CH wrote the paper. All authors reviewed and approved the final version.

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Conflicts of interests. The authors declare no conflicts of interest.

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La COVID-19 y la distribución social del hambre en tres pequeños Estados insulares en desarrollo del Caribe

RESUMEN

Objetivos. Determinar qué cambios ha ocasionado la enfermedad por el coronavirus del 2019 (COVID-19) en los ingresos y los medios de subsistencia, el consumo de alimentos y el hambre en tres pequeños Estados insulares en desarrollo del Caribe: Jamaica, Saint Kitts y Nevis, y San Vicente y las Granadinas.

Métodos. En este estudio transversal realizado en julio del 2020, para seleccionar a los participantes se utilizaron guías telefónicas y listas de números de teléfono celular. Los datos se recopilaron mediante entrevistas en persona y por teléfono. Los participantes calificaron cuál había sido la repercusión de la COVID-19 en sus medios de subsistencia; el hambre se evaluó mediante la escala de la encuesta sobre seguridad alimentaria en los hogares "Adult Food Security Module". Para estudiar cómo variaban los resultados según el grupo sociodemográfico, se realizó un análisis de regresión logística multivariable, con razones de probabilidades (*odds ratios* u OR) e intervalos de confianza de 95% (IC).

Resultados. El análisis incluyó a 880 participantes. De estos, 40% (344/871) declararon haber pasado algún grado de hambre y 18% (153/871) lo calificaron de moderado a grave. Casi tres cuartos de los hogares informaron que sus medios de subsistencia habían tenido algún tipo de repercusión (640/880) y 28% (243/880) la calificaron de moderada a grave. Las mujeres tenían un 60% más de probabilidades de valorar la repercusión de la COVID-19 en sus medios de subsistencia de moderada a grave (OR 1,59; IC de 95% 1,09, 2,31) y un 70% más de probabilidades de haber tenido un nivel de hambre de moderado a grave (OR 1,70; IC de 95% 1,37, 2,09). Los efectos de la COVID-19 sobre los medios de subsistencia y el hambre fueron mayores en aquellos participantes con educación primaria y secundaria en comparación con aquellos con educación terciaria.

Conclusión. La pandemia de COVID-19 está afectando desproporcionadamente a los segmentos más vulnerables de la población. Los programas de protección social son un componente clave de las iniciativas dirigidas a paliar las consecuencias de la pandemia; sin embargo, debe garantizarse que el acceso a estos programas es equitativo.

Palabras clave Hambre; abastecimiento de alimentos; COVID-19; Región del Caribe.

COVID-19 e a distribuição social da fome em três pequenos Estados insulares em desenvolvimento do Caribe

RESUMO

Objetivos. Determinar mudanças na renda e na subsistência, no consumo de alimentos e na fome devido à doença causada pelo coronavírus 2019 (COVID-19) em três pequenos Estados insulares em desenvolvimento (SIDS, na sigla em inglês) no Caribe: Jamaica, São Cristóvão e Névis, e São Vicente e Granadinas.

Métodos. Este foi um estudo transversal realizado em julho de 2020. Os participantes foram selecionados por meio da utilização de listas telefônicas e números de celular. Os dados foram coletados por meio de entrevistas presenciais e telefônicas. Os participantes avaliaram o impacto da COVID-19 em seus meios de subsistência, e o módulo de segurança alimentar para adultos foi utilizado para avaliar a fome. Para examinar como esses resultados variavam por grupo sociodemográfico, foi utilizada a análise de regressão logística multivariável, com razões de chances (RC) e intervalos de confiança (IC) relatados de 95%.

Resultados. A análise incluiu 880 participantes. Entre eles, 40% (344/871) relataram alguma forma de fome, com 18% (153/871) classificados como fome moderada a grave. Quase três quartos das famílias relataram algum impacto em sua subsistência (640/880), com 28% (243/880) classificando esse impacto como moderado a grave. As mulheres tiveram 60% mais probabilidade de relatar que seus meios de subsistência foram afetados moderada a gravemente pela COVID-19 (RC 1,59; IC 95% 1,09, 2,31) e 70% mais probabilidade de passar fome de moderada a grave (RC 1,70; IC 95% 1,37, 2,09). Os efeitos da COVID-19 sobre a subsistência e a fome foram maiores nas pessoas com ensino fundamental e médio, em comparação com o ensino superior.

Conclusão. A pandemia de COVID-19 está afetando de forma desproporcional os segmentos mais vulneráveis da população. Programas de proteção social são um componente essencial dos esforços para aliviar as consequências da pandemia; entretanto, o acesso equitativo deve ser garantido.

Palavras-chave Fome; abastecimento de alimentos; COVID-19; Região do Caribe.
