

Relevance of Political Actions Aimed at Guaranteeing a Healthy and Sufficient Diet During and After the COVID-19 Pandemic in the context of Latin America

Relevancia de las acciones políticas dirigidas a garantizar una alimentación saludable y suficiente durante y después de la pandemia de COVID-19 en el contexto de América Latina

Received: 09 February 2021 | Accepted: 23 March 2021

LUIS FERNANDO GÓMEZ

Professor, Department of Preventive and Social Medicine, School of Medicine,
Pontificia Universidad Javeriana, Bogotá, Colombia
ORCID: <https://orcid.org/0000-0003-1834-3012>

MARÍA FERNANDA PARRA^a

School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia
ORCID: <https://orcid.org/0000-0002-9453-653X>

DIEGO IVÁN LUCUMÍ

Albero Lleras Camargo School of Government, Universidad de los Andes, Bogotá
headquarters, Colombia
ORCID: <https://orcid.org/0000-0003-1834-7937>

LAURA CAMILA BERMÚDEZ

School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia
ORCID: <https://orcid.org/0000-0002-3615-2239>

ANTONIO JOSÉ CALDERÓN

School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia
ORCID: <https://orcid.org/0000-0002-0184-2416>

JULIANA MANTILLA

School of Medicine, Pontificia Universidad Javeriana, Bogotá, Colombia
ORCID: <https://orcid.org/0000-0003-2209-9614>

MERCEDES MORA-PLAZAS

Department of Human Nutrition, School of Medicine, Universidad Nacional de
Colombia, Bogotá. School of Medicine, Pontificia Universidad Javeriana, Bogotá,
Colombia

ORCID: <https://orcid.org/0000-0001-5396-8726>

^a Corresponding author: mparram@javeriana.edu.co

How to cite: Gómez LF, Parra MF, Lucumí DI, Bermúdez LC, Calderón AJ, Mantilla J, Mora-Plazas M. Relevance of political actions aimed at guaranteeing a healthy and sufficient diet during and after the COVID-19 pandemic in the context of Latin America. *Univ. Med.* 2021;62(2). <https://doi.org/10.11144/Javeriana.umed62-3.rapd>

ABSTRACT

Unhealthy eating patterns are the main behavioral risk factor related to mortality in Latin America and the Caribbean. Because of the COVID-19 pandemic, the implementation of political actions to promote a healthy diet and reduce the consumption of ultra-processed foods is a priority, not only to prevent non-communicable diseases (NCDs), but also to reduce the clinical impairment of the persons who suffer them. The political actions that ensure the supply of unprocessed foods of high nutritional value to the markets in a periodic and timely manner and that allow the farmers to continue with their cultivation and harvest activities are a fundamental pillar to mitigate the effects of indirect health negatives derived from the pandemic. To face the growing challenge of obesity and NCDs associated with unhealthy eating patterns a comprehensive approach is required that includes the following actions: taxes on sugary beverages, restrictions on marketing and advertising of ultra-processed foods and beverages, front-of-package warning label, as well as policies to modify agricultural and food systems.

Keywords

food legislation; nutrition and food programs and policies; noncommunicable diseases; pandemics.

RESUMEN

Los patrones de alimentación no saludables son el principal factor de riesgo comportamental relacionado con la mortalidad en América Latina y el Caribe. En el contexto de la pandemia por COVID-19, no solo es prioritario implementar acciones políticas para promocionar una alimentación saludable y reducir el consumo de comestibles ultraprocesados para prevenir enfermedades crónicas no transmisibles (ENT), sino además para reducir el deterioro clínico de las personas que las padecen. De ahí que las acciones políticas sean un pilar fundamental que aseguren la disponibilidad de alimentos no procesados de alto valor nutricional para la población general y que les permitan a los agricultores continuar con sus actividades de cultivo y cosecha para mitigar los efectos negativos en la salud derivados de la pandemia. Se requiere un abordaje integral para enfrentar el creciente desafío de la obesidad y de las ENT asociadas con patrones de alimentación no saludables, que incluya las siguientes acciones: impuestos a las bebidas azucaradas, restricciones al máquetin de bebidas y comestibles ultraprocesados, etiquetado frontal de advertencia y el desarrollo de políticas públicas para modificar los sistemas agrícolas y alimentarios actuales.

Palabras clave

legislación alimentaria; programas y políticas de nutrición y alimentación; enfermedades no transmisibles; pandemias.

Introduction

Both the health emergency caused by the COVID-19 pandemic and the situations generated by previous viral pandemics have shown that there is a close interaction between infectious diseases and non-communicable diseases (NCDs) (1, 2, 3).

Unhealthy eating patterns represent the first behavioral risk factor linked to mortality and disease burden in Latin America and the Caribbean (4). These patterns are mainly characterized by the habitual and excessive consumption of ultra-processed foods and beverages, defined as industrialized products made from components extracted from food, with the presence of additives and high contents of critical components such as free sugars, saturated fats, and sodium (5).

Mathematical and epidemiological models have estimated that the COVID-19 pandemic

could last until the end of 2021 (6) or even longer (7). This article documents the interactions between viral pandemics, such as that generated by SARS-CoV-2, and NCDs. It also raises the need to implement political actions to promote healthy eating and reduce the consumption of ultra-processed foods, not only to prevent various forms of malnutrition but also to avoid further deterioration of the clinical conditions of people suffering from them.

What is meant by healthy eating?

This article assumes that healthy eating should be complete, balanced, sufficient, and adequate. These criteria are relevant in light of current public health situation. In general, healthy eating should be complete, based on the daily consumption of natural or minimally processed healthy foods that promote a varied diet in homemade and traditional preparations. The diet should have a balanced proportion of nutrients to allow for maximum utilization. In addition, to promote an optimal quality diet, the amount consumed should be sufficient to provide the energy requirements and nutrient needs of each person. In addition, food should be appropriate for the age, tastes, and habits of people, safe and in long-term harmony with the environment. This is summarized by José Buschini (8), in his book *La alimentación como problema científico y objeto de políticas públicas en la Argentina* (Food as a scientific problem and object of public policies in Argentina).

The growing challenge of viral pandemics

Processes linked to global climate change, which affect animal reservoirs and migration patterns of various birds, could increase the spread of new influenza virus strains (9). The threat of viruses with pandemic potential in humans and animals has increased in recent decades, due not only to the growth of human, poultry, and swine populations but also to the effects on the ecology, which increase the interaction between humans and wild species (10, 11).

The expansion of the agricultural frontier and deforested areas in several regions of the world inevitably generates an increase in the frequency of virus exchange between natural reservoirs and humans (10,12). In this context, the challenge for human societies is to halt the processes of agricultural expansion and deforestation, while identifying promptly not only the virus strains that are transmitted and generate disease in humans, but also those that spread efficiently among humans (10,13,14).

Evidence on the links between non-communicable diseases and the severity of viral pandemics

There is a documented link between NCDs and the severity of viral pandemics in Latin America. A study conducted in Mexico in 2009 during the H1N1 influenza pandemic found that 40% of patients had metabolic syndrome, 21% had cardiovascular disease, 20% had diabetes, 20% had high blood pressure, and 38% of women and 26% of men were obese (15). Another study in the same country reported that 36% of critically ill patients requiring intensive care unit management were obese (16).

Similar results were found in other Latin American countries. In Brazil, 38% of patients diagnosed with severe influenza A (H1N1) pneumonia were obese, and 36% had one additional risk condition linked to the severity of the disease, with diabetes being the most frequent (21%) (17). A study conducted in Chile found that 33.3% of the patients who died were obese, compared to 6.1% of those who survived (18). Another Chilean study reported that 47.1% of patients with H1N1 were obese. When comparing obese and non-obese individuals, the first subgroup had a higher chance of having two or more comorbidities (OR: 8.2; 95% CI: 3.8-17.9; $p < 0.0001$); this group also required more mechanical ventilation and vasoactive drugs and had more complications, with statistically significant differences. Furthermore, mortality was higher in obese patients than in non-obese patients

(36% vs. 19.4%) (19). Finally, according to an Argentine study, 67% of patients had one or more pre-existing medical conditions. Of the patients who died, 86.4% had comorbidities compared to 57.1% of the patients who survived. The most frequent diseases in the group of patients who died were obesity (40%), diabetes (19%), cardiovascular disease (15%), and arterial hypertension (38%) (20).

Regarding the COVID-19 pandemic, evidence indicates that patients diagnosed with this disease and whose clinical picture progresses to severe pneumonia, acute respiratory distress syndrome or death have higher proportions of chronic conditions such as hypertension, diabetes mellitus, and cardiovascular conditions (21). These findings suggest that NCDs are risk factors linked to clinical severity in patients diagnosed with COVID-19 (22).

These results are consistent in different countries. Thus, a systematic review carried out from information obtained in China up to March 2020 found that patients with severe clinical pictures caused by COVID-19 were 2.3 times more likely to have been previously diagnosed with hypertension than those with mild or moderate clinical manifestations (OR: 2.3; 95% CI: 1.4-3.8). For chronic respiratory disease and cardiovascular disease, the odds were 2.4 and 3.4, respectively (OR: 2.4; 95% CI: 1.7-3.4 and OR: 3.4; 95% CI: 1.8-6.2) (23).

The high frequency of chronic comorbidities has not only been documented in older adults. A study conducted in 14 U.S. states found that 59% of patients hospitalized in March 2020 for COVID-19, aged 18-49 years, had obesity, 19.6% had diabetes, 17.5% had high blood pressure, and 36.4% had chronic respiratory diseases such as asthma and chronic obstructive pulmonary disease (24). Similar results have been reported in the New York metropolitan area (25). These percentages are higher with respect to prevalence reported in the general U.S. population of similar ages (26, 27, 28).

Regarding links with obesity, in France, the proportion of COVID-19 patients requiring invasive mechanical ventilation increased as a function of body mass index (BMI) categories.

Patients with a BMI greater than 35 kg/m² were 7.4 times more likely to require invasive mechanical ventilation than those with a BMI less than 25 kg/m² (29). Additionally, in New York, it was found that patients hospitalized for COVID-19 under 60 years of age who were obese were 2 times more likely to be admitted to an intensive care unit in contrast to those who were not obese (30). These findings are similar to those of a study in Italy and could indicate that COVID-19 mortality is significantly higher than in China, due to the lower prevalence of obesity in the latter country (31).

Latin America: a highly vulnerable region in the context of viral pandemics

According to the Global Burden of Disease Study (32), the percentage of deaths attributable to NCDs in Latin America and the Caribbean increased from 57.4% in 1990 to 75.6% in 2017. Regarding the estimated burden of disease in disability-adjusted life years (DALYs) attributable to NCDs, the proportions were 47.5% and 68.6% in the same period (33).

Countries classified by the World Bank in the upper-middle-income category, like most countries in the region, have a significantly higher burden of hypertensive heart disease relative to high-income countries (34). This pattern persists even in people who do not belong to the older adult group. According to the Global Burden of Disease Study, the rates of DALYs per 100,000 population attributable to hypertensive heart disease in persons aged 50 to 69 years in 2017 was 453 in Latin America and the Caribbean, and 129 in Western Europe (34). In the case of diabetes mellitus, the rates were 3,570 and 1,318, respectively (35).

The growing problem of NCDs is mainly explained by unhealthy eating patterns, physical inactivity, and tobacco use (4). Both caloric intake of unhealthy foods and physical inactivity are closely related to obesity, which considerably affects all countries in the region, with prevalence exceeding 30% in the adult populations of Mexico and Chile (36, 37).

In low-income countries, the association between socioeconomic status and obesity is positive in most cases; that is, the higher the socioeconomic status, the higher the prevalence of obesity. However, in middle-income countries, such as most Latin American countries, the relationship is negative in the female population, which means that poorer women are more likely to suffer from obesity (38). In Argentina, Bolivia, Colombia, Brazil, and Paraguay, adult women with educational levels higher than high school were less likely to be obese, in contrast to those with lower levels of education (39). It is predictable that, in the context of globalization, obesity, diabetes, and arterial hypertension will be increasingly concentrated in the most socially vulnerable population in Latin America.

People living in vulnerable conditions have social, economic, and political constraints, which prevent them from making appropriate decisions regarding their dietary patterns. Several studies have found that belonging to a low socioeconomic stratum is positively associated with unhealthy eating patterns (40, 41, 42).

Relevance of ensuring a healthy and sufficient diet in pandemic contexts

Documented experiences in epidemic outbreaks of Ebola and Middle East respiratory syndrome show that these types of emergencies affect food production and supply chains (43, 44). During these epidemics, food insecurity increased, affecting mainly children, women, and the elderly in the most socially vulnerable sectors. In the Ebola epidemic that occurred in several West African countries in 2014-2016, prices of staple foods such as rice and cassava increased by 30% and 150%, respectively (45).

The humanitarian crisis being caused by the COVID-19 pandemic has large-scale negative economic consequences and affects the supply and consumption of unprocessed foods with high nutritional value. Regardless of the future scenario regarding the behavior of the pandemic, the poorest population and the most socially vulnerable human groups will be the most

affected, because they have fewer resources to cope with the loss of jobs or income and the likely increase in food prices (46). This is a particularly critical situation in the Venezuelan migrant population living in conditions of poverty (47). Vulnerable populations face challenges in protecting themselves from disease, have no income, belong to the informal economy, and lack flexible work schemes (48).

In the absence of a socially adequate response through the State, the prevalence of forms of malnutrition such as acute malnutrition, chronic malnutrition, and micronutrient deficiencies may increase, due to the decrease in supply and low consumption of foods with high nutritional value. For example, ill-conceived government food assistance programs and food bank initiatives would lead to increased consumption of ultra-processed foods and increase the burden of disease attributable to chronic non-communicable conditions. Evidence from food banks suggests that most of these programs provide foods of low nutritional quality (49).

From this evidence and from studies that have evaluated the short-term cardiometabolic effects of unhealthy eating patterns (50, 51, 52), it is plausible to think that unwise political decisions in food assistance programs aimed at the most socially vulnerable population would aggravate the clinical conditions of patients with NCDs and increase the likelihood of death if they acquire COVID-19.

Recommendations for public policies associated with healthy eating in Latin America during and after the pandemic

Political actions that ensure the supply of unprocessed foods of high nutritional value to markets on a regular and timely basis and that allow farmers to continue to cultivate and harvest are a key pillar in mitigating the indirect negative health effects of the pandemic (43). For this purpose, it is necessary to implement the following recommendations:

Ensure the adequate nutritional quality of financial or in-kind contributions. To this end,

Unicef recommendations (54) emphasize that neither breast milk substitutes nor donations of foods with excessive content of free sugars, sodium, or saturated fats should be accepted. This recommendation should be extended to all ultra-processed foods (55). Also, avoid in-kind donations or financial contributions from industry sectors that produce unhealthy foods. This type of contribution by the industry seeks to promote joint communications with the public sector to promote a positive corporate image before society (54).

Moreover, national farmers should be designated as essential frontline workers (56) to prevent the spread of the virus in the rural areas where they reside (57). It is therefore necessary to grant them preferential tax benefits to improve productivity and reduce transaction costs in imports and exports (56).

Encourage local production of foods of high nutritional value, such as legumes, vegetables, and fruits, and thus improve the quality of the diet (58, 46).

Preserve the functioning of agri-food systems linked to the consumption of unprocessed or minimally processed foods.

Allow farmers to cultivate, and those responsible for distributing and marketing food to continue working as long as conditions of social distancing and constant hygienic practices are met throughout the chain (53, 57, 58).

Maintain the service provision of local food markets and implement biosecurity measures for this group of workers (58).

Find innovative ways to promote and increase the demand for nutrient-rich foods, especially by national leaders and the media, which should promote the consumption of unprocessed or minimally processed foods (58).

Preserve food trade and support regional coordination of food networks, especially within the region. Transparency on food stocks and open trade regimes could ensure food security and offset the risks of price speculation (53).

For their part, governments should implement social protection mechanisms for the poorest and most vulnerable people during the COVID-19 crisis, incorporating provisions on the right to

food (57). It is also necessary to stimulate innovative and safe food delivery systems, especially those that generate employment (58).

Collect and share data and support research on the impact of the COVID-19 pandemic on agri-food systems (46).

Medium- and long-term recommendations

It will not be possible to mitigate the potentially devastating effect of future viral pandemics if strong action is not taken to prevent the risk factors for NCDs. After the pandemic, it is not possible to return to what was assumed to be “normality”, characterized, among other aspects, by a negative environmental impact associated with production, distribution, and commercialization processes, as well as by a high and growing consumption of ultra-processed foods (59).

In this context, a comprehensive approach is required to address the growing challenge of obesity and NCDs associated with unhealthy eating patterns, including the following actions: taxes on sugar-sweetened beverages, restrictions on marketing and advertising of and ultra-processed beverages and foods, consumer-friendly front-of-pack labeling, as well as policies to modify agricultural and food systems (60). A public policy that integrates these actions will gradually prevent new cases of obesity and potentially decrease the percentage of obese people in the long term, leading to a reduction in the accumulation of risk that can mitigate other large-scale infectious events. These political actions have the potential to prevent different forms of malnutrition, which include not only overweight and obesity, but also malnutrition, micronutrient deficiencies, and unhealthy eating patterns (61).

To achieve these goals, it is necessary to transform agricultural and food systems, based on the following criteria:

Focus social protection programs not only on promoting the production and consumption of

unprocessed or minimally processed foods but also on preventing food insecurity (62).

Make water and sanitation issues a priority in development plans, policies, and strategies, including a proactive policy plan that reduces the risks of emergencies, such as water-related disasters, floods, and droughts, including the spread of waterborne diseases. As well as monitoring and assessing water resources, ensuring water access and quality (63).

Facilitate the establishment of integrated policy and planning frameworks that include social protection schemes and prevention and risk reduction plans during pandemics (64).

Support the creation of a food systems preparedness plan and develop adaptation measures that also include other actors, such as civil society organizations, small farmers, and family farmers, involving the private sector throughout the food chain (64).

Promote short supply chains and strengthen urban-rural linkages to adequately support food systems (64).

Create food hubs. This would be a permanent solution that would have a positive effect on reducing congestion and carbon emissions while becoming an important component of the emergency preparedness plan (64).

Strengthen e-commerce as an innovative strategy to facilitate access to unprocessed or minimally processed foods (64).

Conclusions

The emergency generated by the COVID-19 pandemic highlights the need to strengthen public health institutions, not only to address infectious diseases but also to implement political actions aimed at preventing NCDs. The interaction between the clinical severity of viral pandemics such as COVID-19 and H1N1 and NCDs highlights the urgency of a comprehensive approach that includes short- and long-term actions.

Political actions aimed at promoting healthy eating and discouraging the consumption of ultra-processed beverages and foods are a key

component in promoting appropriate dietary patterns and addressing this challenge.

In Latin America, the agents responsible for input supply, logistics, and food processing and retailing are expected to be the most affected by the disruption of domestic trade (53). The availability of healthy, locally produced foods is essential to promote their consumption and reduce the purchase of ultra-processed food products. For this reason, it is necessary to ensure production, distribution, and access to healthy foods during and after the pandemic.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Acknowledgments

This article was prepared as part of an agreement between Pontificia Universidad Javeriana and the University of North Carolina, which is funded by Bloomberg Philanthropies (Contract 5103721). We gratefully acknowledge the support of Professors Barry Popkin, Lindsey Smith Taillie, and Shu Wen NG, University of North Carolina.

References

1. Badawi A, Ryoo SG. Prevalence of diabetes in the 2009 influenza A (H1N1) and the middle east respiratory syndrome coronavirus: a systematic review and meta-analysis. *J Public Health Res.* 2016 Dec 21;5(3):130-8.
2. Maddaloni E, Buzzetti R. Covid-19 and diabetes mellitus: unveiling the interaction of two pandemics. *Diabetes Metab Res Rev.* 2020 Mar 31;e33213321.
3. National Academies of Sciences, Engineering and Medicine. *The convergence of infectious diseases and noncommunicable diseases.* Washington: National Academies Press; 2019. <https://doi.org/10.17226/25535>
4. Institute for Health Metrics and Evaluation (IHME), University of Washington. GBD Compare [Internet]. 2019. Available from: <http://ihmeuw.org/53n3>
5. Ministerio de Salud de Brasil. *Guía alimentaria para la población brasileña* [Internet]. Brasília; 2015. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/guia_alimentaria_poblacion_brasilena.pdf
6. Institute for Health Metrics and Evaluation (IHME), University of Washington. COVID-19 projections [Internet]. 2021 [cited 2021 Mar 10]. Available from: <https://covid19.healthdata.org/global?view=total-deaths&tab=trend>
7. Pitzer V. COVID-19 is here: now how long will it last? [Internet]. Yale School of Medicine; 2020 [cited 2020 Apr 27]. Available from: <https://medicine.yale.edu/news-article/23446/>
8. Buschini J. La alimentación como problema científico y objeto de políticas públicas en la Argentina: Pedro Escudero y el Instituto Nacional de la Nutrición, 1928-1946. *Apunt Rev Ciencias Soc* [Internet]. 2016 Oct 31;43(79):129-56. Available from: <http://revistas.up.edu.pe/index.php/apuntes/article/view/764>
9. Short KR, Kedzierska K, van de Sandt CE. Back to the future: lessons learned from the 1918 influenza pandemic. *Front Cell Infect Microbiol.* 2018;8:343.
10. Donatelli I, Castrucci MR, De Marco MA, Delogu M, Webster RG. Human-animal interface: the case for influenza interspecies transmission. *Adv Exp Med Biol.* 2017;972:17-33. https://doi.org/10.1007/5584_2016_136

11. Johnson CK, Hitchens PL, Pandit PS, Rushmore J, Evans TS, Young CCW, et al. Global shifts in mammalian population trends reveal key predictors of virus spillover risk. *Proc R Soc B Biol Sci.* 2020 Apr 8;287(1924):20192736. <https://doi.org/10.1098/rspb.2019.2736>
12. Gilbert M, Slingenbergh J, Xiao X. Climate change and avian influenza. *OIE Rev Sci Tech.* 2008 Aug;27(2):459-66.
13. Madhav N, Oppenheim B, Gallivan M, Mulembakani P, Rubin E, Wolfe N. Pandemics: risks, impacts, and mitigation. En: *Disease control priorities.* 3.^a ed. (vol. 9): Improving health and reducing poverty. Washington: The World Bank; 2017. p. 315-45.
14. Neumann G, Kawaoka Y. Predicting the next influenza pandemics. *J Infect Dis.* 2019 Apr 8;219:S14-20.
15. Fajardo-Dolci G, Gutiérrez-Vega R, Arboleya-Casanova H, Villalobos A, Wilson KS, García SG, et al. Clinical characteristics of fatalities due to influenza A (H1N1) virus in Mexico. *Thorax.* 2010;65(6):505-9. <https://doi.org/10.1136/thx.2009.126953>
16. Domínguez-Cherit G, Lapinsky SE, Macías AE, Pinto R, Espinosa-Pérez L, De La Torre A, et al. Critically ill patients with 2009 influenza A(H1N1) in Mexico. *J Am Med Assoc.* 2009;302(17):1880-7.
17. Yokota RTC, Skalinski LM, Igansi CN, de Souza LRO, Iser BPM, Reis PO, et al. Risk factors for death from pandemic (H1N1) 2009, southern Brazil. *Emerg Infect Dis.* 2011;17(8):1467-71. <https://doi.org/10.3201/eid1708.101233>
18. Riquelme R, Riquelme M, Rioseco ML, Inzunza C, Gomez Y, Contreras C, et al. Characteristics of hospitalised patients with 2009 H1N1 influenza in Chile. *Eur Respir J.* 2010 Oct 1;36(4):864-9. <https://doi.org/10.1183/09031936.00180409>
19. Arancibia F, Ugarte S, Soto R, Hernández A, Alonzo R, Pérez G, et al. Impacto de la obesidad en pacientes con neumonía grave por virus influenza A/H1N1: estudio multicéntrico chileno TT. *Rev Chil Med Intensiv [Internet].* 2011;26(1):7-16. Available from: <https://pesquisa.bvsalud.org/port al/resource/es/lil-669028>
20. Kuszniery G, Uboldi A, Sosa G, Torales S, Colombo J, Moyano C, et al. Clinical features of the hospitalized patients with 2009 pandemic influenza A (H1N1) in Santa Fe, Argentina. *Influenza Other Respi Viruses.* 2013;7(3):410-7. <https://doi.org/10.1111/j.1750-2659.2012.00405.x>
21. Bermúdez-Rojas LM, Calderón-García AJ. Desenlaces de la infección por SARS-CoV-2 en pacientes con enfermedades crónicas no transmisibles: una revisión exploratoria. Bogotá: Pontificia Universidad Javeriana; 2020.
22. Chow N, Fleming-Dutra K, Gierke R, Hall A, Hughes M, Pilishvili T, et al. Preliminary estimates of the prevalence of selected underlying health conditions among patients with coronavirus disease 2019 — United States, February 12-March 28, 2020. *Morb Mortal Wkly Rep [Internet].* 2020 Apr 3 [cited 2020 Apr 27];69(13):382-6. Available from: http://www.cdc.gov/mmwr/volumes/69/wr/mm6913e2.htm?s_cid=m6913e2_w
23. Yang J, Zheng Y, Gou X, Pu K, Chen Z, Guo Q, et al. Prevalence of comorbidities in the novel Wuhan coronavirus (COVID-19) infection: a

systematic review and meta-analysis. *Int J Infect Dis.* 2020 Mar.

24. Garg S, Kim L, Whitaker M, O'Halloran A, Cummings C, Holstein R, et al. Hospitalization rates and characteristics of patients hospitalized with laboratory-confirmed coronavirus disease 2019-COVID-NET, 14 States, March 1-30, 2020. *Morb Mortal Wkly Rep.* 2020;69(15):458-64. <http://dx.doi.org/10.15585/mmwr.mm6915e3>

25. Richardson S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, Davidson KW, et al. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized With COVID-19 in the New York City Area. *JAMA.* 2020;323(20):2052-59. <https://doi.org/10.1001/jama.2020.6775>

26. Centers for Disease Control and Prevention (CDC). National diabetes statistics report 2020: estimates of diabetes and its burden in the United States [Internet]. 2020. Available from: https://www.cdc.gov/diabetes/pdfs/data/statistics/NDSR_2020_Spanish-508.pdf

27. Fryar CD, Ostchega Y, Hales CM, Zhang G, Kruszon-Moran D. Hypertension prevalence and control among adults: United States, 2015-2016. *NCHS Data Brief.* 2017 Oct 1;(289):1-8.

28. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity and severe obesity among adults: United States, 2017-2018. *NCHS Data Brief.* 2020 Feb;(360):1-8.

29. Simonnet A, Chetboun M, Poissy J, Raverdy V, Noulette J, Duhamel A, et al. High prevalence of obesity in severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) requiring invasive mechanical ventilation. *Obesity.*

2020;28(7):1195-9. <https://doi.org/10.1002/oby.22831>

30. Lighter J, Phillips M, Hochman S, Sterling S, Johnson D, Francois F, et al. Obesity in patients younger than 60 years is a risk factor for Covid-19 hospital admission. *Clin Infect Dis.* 2020;71(15):896-7. <https://doi.org/10.1093/cid/ciaa415>

31. Dietz W, Santos-Burgoa C. Obesity and its implications for COVID-19 mortality. *Obesity.* 2020;28(6):1005. <https://doi.org/10.1002/oby.22818>

32. Institute for Health Metrics and Evaluation (IHME), University of Washington. GBD Compare [Internet]. 2015 [cited 2020 Apr 17]. Available from: <http://ihmeuw.org/53mu>

33. Institute for Health Metrics and Evaluation (IHME), University of Washington. GBD Compare [Internet]. 2015 [cited 2020 Apr 8]. Available from: <http://ihmeuw.org/53mv>

34. Institute for Health Metrics and Evaluation (IHME), University of Washington. GBD Compare [Internet]. 2019 [cited 2021 mar 10]. Available from: <http://ihmeuw.org/5ejx>

35. Institute for Health Metrics and Evaluation (IHME), University of Washington. GBD Compare [Internet]. 2019 [cited 2021 mar]. Available from: <http://ihmeuw.org/53ag>

36. Ministerio de Salud Gobierno de Chile. Encuesta Nacional de Salud 2016-2017 Primeros resultados [Internet]. 2017. Available from: https://www.minsal.cl/wp-content/uploads/2017/11/ENS-2016-17_PRIMEROS-RESULTADOS.pdf

37. Shamah-Levy T, Campos-Nonato I, Cuevas-Nasu L, Hernández-Barrera L, Morales-Ruán M del C, Rivera-

- Dommarco J, et al. Sobrepeso y obesidad en población mexicana en condición de vulnerabilidad. Resultados de la Ensanut 100k. *Salud Publica Mex.* 2019 Dec 5;61(6):852. <http://www.saludpublica.mx/index.php/spm/article/view/10585>
38. Dinsa GD, Goryakin Y, Fumagalli E, Suhrcke M. Obesity and socioeconomic status in developing countries: A systematic review. *Obes Rev.* 2012 Nov;13(11):1067-79.
39. Jiwani SS, Carrillo-Larco RM, Hernández-Vásquez A, Barrientos-Gutiérrez T, Basto-Abreu A, Gutierrez L, et al. The shift of obesity burden by socioeconomic status between 1998 and 2017 in Latin America and the Caribbean: a cross-sectional series study. *Lancet Glob Heal.* 2019 Dec 1;7(12):e1644-54.
40. Fernández-Alvira JM, Bammann K, Pala V, Krogh V, Barba G, Eiben G, et al. Country-specific dietary patterns and associations with socioeconomic status in European children: The IDEFICS study. *Eur J Clin Nutr.* 2014;68(7):811-21.
41. Mayén AL, Marques-Vidal P, Paccaud F, Bovet P, Stringhini S. Socioeconomic determinants of dietary patterns in low- and middle-income countries: a systematic review. *Am J Clin Nutr.* 2014 Dec 1;100(6):1520-31.
42. Merhout F, Doyle J. Socioeconomic status and diet quality in college students. *J Nutr Educ Behav.* 2019 Oct 1;51(9):1107-12.
43. Tiensin T, Kalibata A, Cole M. Ensuring food security in the era of COVID-19 [Internet]. 1 de abril de 2020. Available from: <https://www.project-syndicate.org/commentary/covid19-threatens-to-unleash-global-food-insecurity-by-thana-wat-tiensin-et-al-2020-03?barrier=accesspaylog>
44. United Nations Development Group-Western and Central Africa. Socio-economic impact of ebola virus disease in West African countries [Internet]. 2015. Available from: <https://www.undp.org/content/dam/rba/docs/Reports/ebola-west-africa.pdf>
45. Fan S. Preventing global food security crisis under COVID-19 emergency [Internet]. International Food Policy Research Institute; 2020 [cited 2020 Apr 27]. Available from: <https://www.ifpri.org/blog/preventing-global-food-security-crisis-under-covid-19-emergency>
46. High-Level Panel of Experts on Food Security and nutrition HLPE. Impact of COVID-19 on Food Security and Nutrition (FSN). 2020 [cited 2020 Apr 25]. <http://www.fao.org/cfs/cfs-hlpe>
47. Correa A. Displaced Venezuelans face poverty and pandemic in Colombia | Americas | North and South American news impacting on Europe. Deutsche Welle; 9 de abril de 2020 [cited 2020 Apr 27]. Available from: <https://p.dw.com/p/3aipS>
48. Naciones Unidas. América Latina y el Caribe ante la pandemia del COVID-19: efectos económicos y sociales. Informe Especial [Internet]. 2020;(1). Available from: https://repositorio.cepal.org/bitstream/handle/11362/45337/4/S2000264_es.pdf
49. Simmet A, Depa J, Tinnemann P, Stroebele-Benschop N. The dietary quality of food pantry users: a systematic review of existing literature. *J Acad Nutr Diet.* 2017 Apr 1;117(4):563-76.
50. Liu S, Manson JE, Buring JE, Stampfer MJ, Willett WC, Ridker PM. Relation between a diet with a high glycemic load and plasma

- concentrations of high-sensitivity C-reactive protein in middle-aged women. *Am J Clin Nutr.* 2002 Mar [cited 2020 Apr 27];75(3):492-8. <https://doi.org/10.1093/ajcn/75.3.492>
51. Malik VS, Hu FB. Sugar-sweetened beverages and cardiometabolic health: an update of the evidence. *Nutrients.* 2019; 11(8):1840. <https://doi.org/10.3390/nu11081840>
52. Stanhope KL, Medici V, Bremer AA, Lee V, Lam HD, Nunez MV, et al. A dose-response study of consuming high-fructose corn syrup-sweetened beverages on lipid/lipoprotein risk factors for cardiovascular disease in young adults. *Am J Clin Nutr.* 2015 Jun 1;101(6):1144-54.
53. Ruben R, McDermott J, Brouwer I. Reshaping food systems after COVID-19 [Internet]. *Agriculture for Nutrition and Health*; 2020 [cited 2020 Apr 25]. Available from: <http://a4nh.cgiar.org/2020/04/20/reshaping-food-systems-after-covid-19/>
54. UNICEF. Technical note on donations and financial or in-kind contributions from the food and beverage companies: response to COVID-19 [Internet]. 30 de marzo de 2020. Available from: <https://www.unicef.org/laos/media/4096/file/Technical%20note%20on%20donations.pdf>
55. Ministerio de Desarrollo Social de Uruguay. Anexo: Protocolo para la evaluación de donaciones de alimentos, INDA-MIDES [Internet]. 2020. Available from: <https://www.gub.uy/ministerio-desarrollo-social/sites/ministerio-desarrollo-social/files/2020-04/Protocolo%20donaciones%20ALIMENTOS.pdf>
56. Global Alliance for Improved Nutrition. The COVID-19 crisis and food systems: probable impacts and potential mitigation and adaptation responses [Internet]. 2020. Available from: <https://www.gainhealth.org/sites/default/files/news/documents/covid-19-crisis-and-food-systems-probable-impacts-and-potential-mitigation-and-adaptation-responses.pdf>
57. Food and Agriculture Organization of the United Nations. Social protection and COVID-19 response in rural areas [Internet]. 2020 Apr [cited 2020 Apr 25]. Available from: <http://www.fao.org/3/ca8561en/CA8561EN.pdf>
58. Headey D, Ruel M. The COVID-19 nutrition crisis: what to expect and how to protect. *International Food Policy Research Institute*; 2020 [cited 2020 Apr 25]. Available from: <https://www.ifpri.org/blog/covid-19-nutrition-crisis-what-to-expect-and-how-to-protect>
59. Hawkes C. Healthy diets for human resilience in the age of COVID-19. *Nutrition Connect* [Internet]. 2020 [cited 2020 Apr 27]. Available from: <https://nutritionconnect.org/news-events/healthy-diets-human-resilience-age-covid-19>
60. Swinburn B, Kraak V, Rutter H, Vandevijvere S, Lobstein T, Sacks G, et al. Strengthening of accountability systems to create healthy food environments and reduce global obesity. *Lancet.* 2015;385(9986):2534-45. [https://doi.org/10.1016/S0140-6736\(14\)61747-5](https://doi.org/10.1016/S0140-6736(14)61747-5)
61. Hawkes C, Ruel MT, Salm L, Sinclair B, Branca F. Double-duty actions: seizing programme and policy opportunities to address malnutrition in all its forms. *Lancet.* 2020;395(10218):142-55. [https://doi.org/10.1016/S0140-6736\(19\)32506-1](https://doi.org/10.1016/S0140-6736(19)32506-1)
62. Haddad L, Fanzo J, Godfrey S, Hawkes C, Morris S, Neufeld L. The COVID-19 crisis and food systems: addressing threats, creating

opportunities [Internet]. Global Alliance for Improved Nutrition; 2020 [cited 2020 Apr 25]. Available from: <https://www.gainhealth.org/index.php/media/news/covid-19-crisis-and-food-systems-addressing-threats-creating-opportunities>

63. Food and Agriculture Organization of the United Nations. Integrated agriculture water management and health The COVID-19 pandemic recalls the vital importance of achieving Sustainable Development Goal (SDG) 6: Ensure availability and sustainable management of water and sanitation for all [Internet]. 2020 [cited 2020 Apr 25]. <https://doi.org/10.4060/ca8712en>

64. Food and Agriculture Organization of the United Nations. Urban food systems and COVID-19: the role of cities and local governments in responding to the emergency [Internet]. 2020 [cited 2020 Apr 25]. Available from: <http://www.foodpolicy-milano.org/en/food-aid-system/>