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COVID-19 seen from a syndemic perspective: Impact of unhealthy habits and future perspectives to combat these negative interactions in Latin America

Audrey Borghi-Silva [a,b,*], Guilherme Dionir Back [a], Adriana S. Garcia de Araújo [a], Murilo Rezende Oliveira [a], Cássia da Luz Goulart [a], Rebeca Nunes Silva [a], Daniela Bassi [b,c], Renata Gonçalves Mendes [a,b], Ross Arena [b,d]

[a] Cardiopulmonary Physiotherapy Laboratory, LACAP, Department of Physical Therapy, Federal University of São Carlos, São Carlos, SP, Brazil
[b] Healthy Living for Pandemic Event Protection (HL – PIVOT) Network, Chicago, IL, USA
[c] Postgraduate Program in Management and Health Services, Ceuma, University, São Luís, MA, Brazil
[d] Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago, Chicago, IL, USA

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ABSTRACT

COVID-19 has to this point led to more than 5 million deaths and has imposed numerous measures restricting populations worldwide, including Latin America (LA). However, analyzing COVID-19 from the perspective of a syndemic, it demonstrates the relationship between the interaction of multiple comorbidities and the increase of contagion in people who are socially vulnerable. The number of deaths by COVID-19 in LA is strongly associated with multi-morbidities (diabetes, obesity, sedentary, smoking, among others) and disproportionately attacks communities located in poorer, low-income regions and ethnic minorities. This review aims to revisit the relationship between COVID-19 and both unhealthy living habits (i.e., sedentary lifestyle, poor nutritional habits, overweight and obesity, smoking) and cardiovascular disease in Latin American countries. In addition, this review aims to introduce strategies and policies that combat social inequalities and enable healthy living behaviors in LA countries. If LA countries do not work on public policies that decrease multi-morbidities and social inequalities, we will be unable to eliminate COVID-19, as well as possible other outbreaks that may arise in the future.

Contents

Abbreviations: COVID-19, Coronavirus 2019; ICU, Intensive Care Unit; GII, Gender Inequality Index; HDI, Human Development Index; LA, Latin America; PA, physical activity; SB, sedentary behavior; SES, socio-economic status; WHO, World Health Organization.

* Corresponding author at: Cardiopulmonary Physiotherapy Laboratory, Federal University of Sao Carlos, Rod Washington Luis, Km 235, Jardim Guanabara, 13565-905 Sao Carlos, Sao Paulo, Brazil.
E-mail address: audrey@ufscar.br (A. Borghi-Silva).

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The pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has become a global health crisis, causing the infection of more than ~275 million people worldwide and more than ~5.5 million deaths by December 2021.[1] Carroll et al.[2] emphasized that viral pandemics, such as the coronavirus disease 2019 (COVID-19), should not be defined as global syndemics, however, a syndemic perspective can conceptualize a variety of vulnerabilities caused by COVID-19.[3]

A syndemic is the convergence of two or more diseases that share social and environmental factors, the interaction of which causes negative effects for the affected population and increases the burden of disease.[4] Furthermore, syndemics can increase political and social factors that drive, perpetuate or aggravate the appearance of a group of diseases that can be recognized.[5]

A syndemic is a process that can document the impact of a disease on human health when there are other aggravating factors, such as individual characteristics or socioeconomic conditions that compromise health. The synergistic interaction between individual and social factors is the focus of the syndemic approach, therefore the presence of disease and factors of the social environment promote and increase the negative effects of the interaction of diseases.[6]

Some important examples to understand the syndemic in the global context are: 1) in the earliest ages of the pandemic, the political failures of the United States as the lack of a universal health systema and a lack of White House leadership over states generated high mortality rates due to COVID-19, thus creating social and biological problems for the American population[7]; 2) the exemplary political leadership in response to the COVID-19 crisis in New Zealand, in which a syndemic did not occur[2]; 3) in Mexico, the confirmation of 231,770 cases of COVID-19, with an incidence of 181.36 per 100,000 inhabitants.[4] Mexico shares a risk of a syndemic between Dengue fever and COVID-19 very similar to that of other Latin American countries.[4] In Brazil, the polarization of national policy has resulted in failures from the federal government to contain the spread of the virus without imposing rigid lockdowns.[8] This is due to potential damage to the socio-economic impact of a country already economically devastated by previous populist governments that left high unemployment rates, resulting in a high number of deaths.[9] These governmental actions lack synchronicity and are often opposed to those of states and municipalities. The disorganized lockdowns imposed have not contributed to reduce the considerable number of deaths or the harm to the economy. The discontent in the population has been seen in countless street demonstrations.[10,11]

The lack of consistent public policies to combat the spread of the virus during the second wave of COVID-19 was most prominently noted in the state of São Paulo, the most populous state of Brazil, which also has the highest percentage of slums in the country and precariousness in the provision of adequate public transport (crowded subways, buses, and trains), where the death rate exceeded the national number of deaths.[1] Therefore, political leadership directly impacts the contexts of the presence or absence of the syndemic and can influence the outcomes of high death rates. Thus, it is extremely important to recognize the political determinants of health to have a better understanding of the COVID-19 syndemic.

Climate and environmental conditions favored the spread of Dengue and the new coronavirus.[4] For example in 2019, the Americas collectively reported over 3 million cases of Dengue, and in 2020 an overlap of Dengue and COVID-19 created a condition of syndemic.[12] Therefore, the non-continuity of surveillance programs for these concomitant diseases and the reallocation of efforts and resources to contain COVID-19 can severely impact the public health system.[13]

Unfortunately, LA is among the regions of the world characterized by greater social inequality. In addition, obesity, smoking, sedentary lifestyle, nutritional habits, low-income, ethnicity, and inadequate access to health services are the main syndemic factors that have the greatest impact on LA.[14]

Relationship between obesity and COVID-19 infection in LA Countries

Upon reaching LA, COVID-19 began to spread in a region where socioeconomic disparities are markedly evident.[15] Case numbers increased slowly in march 2020, but the slope of the curve steepened on the second semester of the year.[16] In May 2020, the World Health Organization (WHO) declared LA as the new epicenter of the disease. In June of 2020, as the number of deaths in the region exceeded four million, LA accounted for 27% of deaths by COVID-19 around the world.[17] Brazil quickly became the country with the second highest absolute number of confirmed cases and deaths.[18] Mexico also had a sharp increase in cases and took third place in terms of the number of deaths in early August.[1] In August 2020, Chile, Peru and Colombia were also among the top 10 countries with the most cases.[15] In this scenario, a reflection emerges about another pandemic, that of obesity, which has grown significantly over the last three decades, reaching more than 650 million people in the world.[19]

It is estimated that the global prevalence of overweight and obesity will exceed 57% in 2030.[20] In a consensus statement in 2016, the *Latin American Federation of Obesity Societies* compiled the most recent data on the prevalence of obesity in LA countries.[21] Bolivia, Mexico and Guatemala were at the upper limit, each with a prevalence above 30%.[21] Ecuador had the lowest prevalence of obesity (14.2%), although recent reports indicate higher levels in this country, similar to those in neighboring countries.[22] Individuals with obesity and COVID-19 are 113% more likely to be admitted to hospitals, 74% more likely to be admitted to intensive care units (ICUs) and 48% more likely to die compared to normal-weight individuals.[19] The high consumption of processed foods and beverages and sedentary lifestyle are remarkably similar in these countries.[20–22]

In addition, policy responses to mitigate COVID-19 are creating major social and economic difficulties.[23] The COVID-19 pandemic brought the need to restrict movements, implement social distancing and prevent economic activities in a wide range of non-essential occupations to all countries.[24] These adjustments have caused problems in the food system, including changes in food consumption, physical activity (PA) patterns, and remote teleworking environments that exacerbate current trends in the prevalence of individuals with obesity and mortality by COVID-19 in LA.[24]

Relationship Between smoking and COVID-19 infection in LA

Smoking is the most preventable cause of premature mortality in the world, accounting for about six million deaths every year.[25] Globally, health expenditures for diseases attributable to smoking exceeds US $ 400 billion. Moreover, 80% of the more than 1.1 billion smokers worldwide live in low and middle income countries, where the burden of disease related to tobacco and death is heavier.[26] In LA, the annual tobacco consumption per person is estimated at 160 to 2000 cigarettes with a prevalence between 6.4% and 35.2% of the population.[25] According to data from by the *Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico 2019* (VIGITEL/2019), the total percentage of smokers aged 18 or over in Brazil is 9.8%, in which 12.3% are among men and 7.7% among women.[27] According to the WHO, among the LA countries, the prevalence of smokers ranged from 7% in Barbados to 40.1% in Chile.[25]

COVID-19 is transmitted mainly through the respiratory tract, and smokers may be at an increased risk of contracting the virus due to reduced lung function, an impaired immune system, cross-infection and hygiene habits susceptible to contamination, causing a reduction in the ability to combat the virus.[28] In addition, smokers collecting and sharing tobacco can promote the spread of viruses.[29] The WHO stated that 1.4–18.5% of hospitalized adult COVID-19 patients were smokers.[30] A review revealed that 22% of current smokers and 46% of ex-smokers had severe pulmonary complications.[31] Additionally, smokers with

COVID-19 presented 2.4 times higher risk of admission to an ICU, need for mechanical ventilation, and death when compared to non-smokers.[32] Despite the COVID-19 pandemic, the results suggested that COVID-19 did not encourage smokers to stop smoking.[33] In addition, there is evidence that isolation at home contributed to increasing smoking behavior and increasing quantities.[33]

Therefore, it is recommended that governments increase smoking cessation messages as part of public health measures to contain the COVID-19 pandemic.[30] Cessation of tobacco use can be an important way to control the spread of COVID-19 in LA and reduce the burden on health care, in addition to contributing to a progressive decline in health costs associated with the pandemic.[25]

Relationship between sedentary behavior (SB) lifestyle and COVID-19 infection in LA

As previously discussed, LA has become an epicenter in the number COVID-19 infections and deaths, with Brazil standing out for its high rates.[17] In addition to the factors mentioned above, such as obesity and smoking, another factor that deserves attention is SB, which is the absence of PA equal to or greater than 30 min of moderate intensity activity daily[34] and refers to activities with a caloric expenditure of less than 1.5 metabolic equivalents of tasks, such as sitting or lying down.[35] To avoid this SB, the WHO recommends adults partake in: 1) at least 150 to 300 min per week of moderate-intensity aerobic; or 2) at least 75–150 min of vigorous intensity aerobic for substantial health benefits.[35] The latest report from the Active Healthy Kids Global Alliance showed that countries with a high Gender Inequality Index (GII), such as some LA countries (Brazil, Chile, Colombia, Mexico and Venezuela), tended to report worse scores in the overall PA when compared globally. The authors also claim that SB was highly prevalent in LA countries and was positively correlated with the Human Development Index (HDI).[36]

However, considering the COVID-19 pandemic and due to social isolation measures applied by governmental actions, such as the restriction and closure of gyms, parks, gymnasiums and leisure spaces, people have increased their SB.[37,38] A systematic review including 66 studies showed that PA decreased and SB increased during the COVID-19 lockdown.[37] In healthy adults and children, PA decreased during lockdown in healthy adults and children despite several government organizations and health or exercise professionals proving guidance on how to stay active during the pandemic.[37] In addition, higher prevalence of inactivity was observed in adolescents and the reductions in PA during the pandemic were more significant in LA.[38] In the Brazilian adolescent cohort, Pinto et al.[39] found that PA and not participating in physical education classes increased loneliness and pandemic related social isolation led to a decrease in PA levels and an increase in SB in Brazilians.[40]

Thus, LA countries suffered in part with restricted measures and consequences of social isolation on PA and SB are not being adequately addressed.[40] Therefore, public health strategies should include the promotion of PA and effective guidance on how to decrease SB during a lockdown.

Relationship between poor nutritional habits and COVID-19 infection in LA

In addition to the topics discussed, an essential aspect to be mentioned is regarding poor nutritional habits. Poor nutritional habits are linked to SB due to the high level of mental demand associated with increased food intake, suggesting that this can lead to a positive energy balance and, consequently, overweight and obesity.[41] The Center for Disease Control and Prevention states that adults who eat a healthy diet live longer and have a lower risk of obesity, heart disease, type 2 diabetes, and certain cancers. Healthy eating can help people with chronic diseases manage these conditions and prevent complications.[42] Moreover, dietary habits were significant predictors of poor hospitalization outcomes.[43]

Thus, nutrients play essential roles in the immune system, therefore an adequate and balanced intake of nutrients is essential for an immune response. Good nutrition creates an environment in which the immune system is able to respond appropriately to inflammatory and infectious processes, such as those caused by COVID-19.[44]

In LA and the Caribbean, malnutrition rates have been increasing in recent years, where the percentage of hungry people has increased from 4.65% in 2013 to 5.5% in 2018.[45] Moreover, considering the COVID-19 pandemic, Ammar et al.[46] suggested that quarantine itself can be considered a risk factor for consuming poor-quality foods, such as ultra-processed foods when compared to the standard living condition. Combined with the potential for lower levels of PA, impaired nutritional habits could lead to a positive energy balance and weight gain. The consumption of ultra-processed food was also high during this period in all countries, but their regular use was more prevalent in LA.[38]

Therefore, this finding reinforces the importance of developing public health policies for this group, focusing on measures to encourage a healthy lifestyle (diet and exercise), especially during and after periods of social isolation.[38,47] Governments need to review policies from a nutritional and health perspective, for example in the international food trade, foods offered in schools or workspaces, and facilitate healthy alternatives at affordable prices.[48] As a result, public policies can reduce hunger, modify food consumption and, consequently, improve health.[48]

Relationship between lower income and COVID-19 infection in LA

As previously mentioned, having a lower income is another important factor in the context of COVID-19, contributing to the rapid spread of the virus. In March 2020, Bong et al.[49] discussed the effects of the pandemic in low- and middle-income countries, emphasizing that the situation would be catastrophic considering the rapid and exponential spread in those regions. This is due to the fact that these countries usually have large populations in substandard living conditions, thus people are unable to follow public health advice such as social distancing, practicing adequate hygiene, proper wearing of masks, and identifying and isolating infected people.[49,50]

Subsequently, lower income populations are at a higher risk to suffer from COVID-19.[51] Patel et al.[52] highlighted several points to support this statement, such as the fact that low-income is associated with living in overcrowded accommodations, being unable to work from home, having unstable work conditions and incomes, poorer access to health care, higher rates of cardiovascular and metabolic diseases, and the tendency of this population to seek healthcare services at more advanced stages of illness. These facts contribute not only to a higher risk of being infected but also to an increased susceptibility to COVID-19 mortality.[49,52]

In this context, Pagel points out the potential of COVID-19 becoming a disease of poverty,[51] and LA gains special attention for its inequality in countries with peripheral and low-income population, highlighting the syndemic nature of COVID-19 in LA.[15,53]

Since the last report of the United Nations (2018), São Paulo, located in the Southeast of Brazil, has been reported as the most populous city in LA and the fourth in the world.[54] Approximately 6% of the Brazilian population lives in subnormal clusters, known as “favelas”. Favelas are more predominant in the Southeast region (49.8% of the total in Brazil in 2010), with greater concentrations in the States of São Paulo (23.2%) and Rio de Janeiro (19.1%).[55] The living conditions in favelas are generally precarious and have high demographic density and socio-economic vulnerability. Not by chance, the Southeast was one of the regions with the most deaths for every 100 thousand inhabitants in Brazil.[56] However, little is said about social inequality as a risk factor for COVID-19.[52]

In addition, the Center for Global Development revealed that poverty in Brazil among Afro-descendant and Indigenous populations is higher

than among Whites,[57] confirming that not only income but also ethnicity matter in the context of COVID-19.

Relationship between ethnicity and COVID-19 in LA countries

Evidence supports that ethnicity has an influence on the risk of suffering from COVID-19.[58,59] Reports conclude certain racial groups such as Indian women, Pakistani and Bangladeshi men and Black women are more likely to die from COVID-19 than their White counterparts.[60] One of the possible reasons is that obesity, cardiovascular, metabolic and psychological diseases are more prevalent in Black and minority ethnic populations, leading to chronic inflammation favorable to the worsening of COVID-19.[61] However, when we add all the aggravating factors, socioeconomic status always appears.[51,52,61]

It is difficult to separate ethnicity from socio-economic status (SES),[62] especially when referring to healthcare access during a pandemic event.[52,53,63] Likewise, it is not new that LA comprises a remarkably diverse ethnic group that influences the phenotypes related to health and disease.[64]

In a cross-sectional study, Li et al.[65] examined the risk of hospitalization and death by race and SES in São Paulo, Brazil. The authors found that Black and *Pardo* (mixed ethnicity, Black with White) patients are more likely to be hospitalized having been infected by COVID-19 when compared with white patients (OR: 0.41, 95% CI to 1.37 to 1.46; OR 1.26%, 95% CI 1.23 to 1.28, respectively) and more likely to die (OR: 1.14, 95% CI 1.07 to 1.21; 1.09, 95% CI 1.05 to 1.13; respectively). Furthermore, inequality surfaces, as patients hospitalized in public hospitals were more likely to die than patients in private hospitals were (OR: 1.40%, 95% CI 1.34% to 1.46%). Additionally, Black (OR: 1.29, 95% CI 1.19 to 1.39) and low-education (OR: 1.36, 95% CI 1.27 to 1.45) patients were more likely to have one or more comorbidities.

In this context, these and many other studies discuss how ethnicity and SES are interconnected contributing to higher numbers of COVID-19 cases and deaths in Black and minority ethnic populations.[52,58,62] In this scenario, Indigenous communities are also at a higher risk of suffering from COVID-19 infection and mortality. Indigenous people are seen as a highly marginalized population and 80% of them are concentrated in Bolivia, Guatemala, Mexico and Peru.[66] They have historically been deprived of access to health services and are discriminated against for their culture, language and SES and they are more vulnerable to the COVID-19 syndemic.[67]

Thus, the impact of ethnicity together with SES and the other risk factors previously mentioned together with the vulnerability of LA countries puts these populations at increased risk and makes the urgent need for the health authorities to work on strategies to minimize drastic effects of this syndemic in LA.

How to combat COVID-19 in LA from the perspective of a syndemic

As mentioned above, COVID-19 brought new practices to people's daily lives: 1) home office practices have been adopted, especially for those services considered non-essential; 2) teaching in schools and universities is now offered remotely and that possibly, even after flexibilization, this form can be adopted in a hybrid way; and 3) social isolation has been used as a measure of health around the world.[68] All these changes have a direct impact on various aspects of the population. In addition to the concern about contamination by COVID-19, there have been restrictions and/or changes in different situations of family daily life, such as restriction to PA,[69] changes in sleep[70] and food[71] habits resulting in higher levels of stress, anxiety and even increased tobacco use.[72] Although mass vaccination is one of the most important collective protective measures to combat COVID-19, the presence of a syndemic must be considered, given the complex current reality, and, in this context, the measures to be adopted must expand the spectrum in the sense of combating sedentary lifestyle habits, harmful habits and nutritional habits considered unhealthy, which have overweight and obesity as a primary consequence, in addition to smoking (Table 1).

The challenges in promoting healthy habits in LA are numerous. Unfortunately, LA is among the regions of the world characterized by greater social inequality, which increases the population's psychosocial stress. In addition, ethnicity, rural residence, lack of basic sanitation, low educational level and inadequate access to health services are the main syndemic factors that have the greatest regional impact.[14]

As previously mentioned, obesity is an enormous challenge to be overcome, as LA today has one of the highest prevalence of childhood obesity in the world. In view of this panorama, in recent years, many LA countries have established numerous regulations aiming to reduce the burden of the population through interventions to prevent various diseases and disorders, especially childhood obesity, given this is where it starts. Thus, in 2014, all LA countries signed the Plan of Action for the Prevention of Obesity in Children and Adolescents. The plan aims to implement the following fiscal policies: increasing taxes on sugary drinks and products with high energy value but poor in nutrients; the regulation of food marketing and labeling; improving school meals; improving physical activity environments; and promoting healthy eating.[73]

Nutritional habits are an important point of reflection that goes hand in hand with obesity. It should be noted that the definition of a healthy diet continually changes to understand the evolution of how different foods play into health and disease.[74] In this context, low dietary diversity is also a concern; not only the limited consumption of diverse food groups, but also the low frequency of consumption of micronutrient-rich food groups.[75] Thus, promoting the consumption of a diversified and high-quality diet aimed at meeting these requirements also needs support from governments, from encouraging small farmers and family farming to education and the promotion of healthy eating habits to the general population.

A sedentary lifestyle is a modifiable risk factor for obesity and cardiovascular risk.[76] Recently, the Society of Behavioral Medicine and the Physical Activity Alliance has recommended action by federal governments to prioritize and fund research involving physical activity and coordinate promotion in various sectors, as its practice reinforces, providing support for coping with stressful life events, such as the present pandemic that the world is currently facing.[77] This year, for the first time in Brazil, the Ministry of Health launched the first PA guide as a public policy aimed at promoting health for the Brazilian population.[78] Another important milestone that occurred in October 2021 was the signing by the President of the Republic of Law 14.231/21, which establishes physical therapists as an integral part of the multidisciplinary health team in the Family Health Program, therefore including this professional as an essential agent for the health promotion of the population.

In addition, the harmful effects of tobacco have been known for a long time, a habit that has put individuals even more at risk of complications caused by COVID-19 through various mechanisms.[77] However, interestingly, the literature has raised the issue of the "smoker's paradox", which can give the false impression that smoking protects against COVID-19. The probable explanation is nicotine, which is an agonist of the cholinergic anti-inflammatory pathway, could offer a protective effect against COVID-19. Moreover, nicotine appears to inhibit the production of pro-inflammatory cytokines,[79] without inhibiting anti-inflammatory cytokines, and thus would protect against cytokine storm syndrome, a phenomenon found in the pathophysiology of COVID-19.

We, however, emphasize the lack of evidence about the protective role of cigarettes and its relationship with lower risk of infection for COVID-19, considering the numerous known and proven adverse health effects of smoking.[80] According to the WHO, smokers face

Table 1
Strategies to combat COVID-19 in Latin America from the syndemic perspective.

Topic	Strategies	Scope / Location
Overweight and Obesity	1. Building and supporting evidence on the relevance of obesity control strategies for mitigating the impact of COVID-19	GO and NGO support of research agencies
	2. Facilitating communication between the scientific academy and the Government to make the translation of research and scientific evidence practice viable.	Research and policy efforts
	3. Encouraging weight loss. Supporting actions at different levels of health care: Prevention and treatment. Actions on healthy lifestyle habits, PA and healthy eating habits, as well as treatment of metabolic manifestations such as diabetes, hypertension and dyslipidemia.	FSMM monitor and prioritize HCP for the obese population, seeking greater surveillance and the opportunity to monitor health conditions using a MA.
	4. Promoting public health education campaigns and training primary care professionals on optimal glycemic and metabolic control, mainly Diabetes type II, to avoid secondary complications.	FSMM monitor and prioritize HCP for the obese population, ensuring greater surveillance and treatment of health conditions using a MA.
	5. Promoting public education campaigns on sedentary lifestyle benefits and strategies locally adapted, including online, mobile apps, print material, radio, and television. Raising awareness about adopting a habit of regular PA associated with healthy eating habits.	Schools prioritize and increase physical activities for children and adolescents. FSMM support and follow public policies to encourage the practice of PA.
Nutrition habits	1. Reducing consumption of processed foods and beverages (junk food). Increasing taxation and banning advertising on sugary drinks and food with high energy value but poor in nutrients, seeking to raise awareness and encouraging the consumption of healthy foods through advertisements	GOV, public policies. Partnerships between state and federal governments, with public and private companies.
	2. Increasing diversity and frequency of consuming vegetables, legumes, fresh fruit and selected whole grains. Policies to encourage agriculture and small producers at the municipal and state level. Support for the dissemination of healthy eating information and its benefits	GOV, public policies
	3.Raising awareness about healthy food choices and the impact of these choices on health	Public and private companies strengthen social communication on smart choice of healthy foods
Sedentary lifestyle	1. Building and supporting evidence on the relevance of physical activities strategies for mitigating the impact of COVID-19	GOV and NGO financial support of research agencies
	2. Facilitating communication between the scientific academy and the Government to make the translation of research and scientific evidence practice viable.	Researchers and policy efforts
	3. Promoting public education campaigns on PA benefits and strategies locally adapted, including online, mobile apps, print material, radio, and television	GOV and PHA; local governments and NGO, community organizations
	4. Reducing population disparities by offering different counseling opportunities for physical activities and developing effective and viable strategies locally adapted to the pandemic period or other times of crisis.	GOV and PHA; local governments and NGO, CO.
	5. Adapting and disseminating safe places (indoor and outdoor), active transportation and urban design (parks, routes, green spaces) to be active during different phases of the pandemic	GOV and PHA; local governments and NGO, CO
	6. Formal training of health professionals on physical activities	GOV and PHA; local governments and NGO, CO
Smoking habit	1.Building and supporting evidence on the relevance of the negative impact of tobacco habits on outcomes in patients with COVID-19	GOV and NGO financial support of RA
	2. Facilitating communication between the scientific academy and the Government to make the translation of research and scientific evidence practice viable.	Researchers and policy efforts
	3. Encouraging and training primary care professionals on smoking cessation strategies and smoking counseling.	GOVt and PHA; local governments and NGO, CO
	4. Promoting public campaigns on tobacco impact and cessation programs locally adapted	GOV and PHA; local governments and NGO, CO
	5. Keeping regulations on exposure to environmental tobacco smoke, and increasing taxation and banning advertising on tobacco products	GOV, public policies
	6. Offering smoking cessation programs opportunities (mobile app, telephone help-lines, printed material, radio and television)	GOV and PHA; local governments and NGO, CO
	7. Implementing effective programs to promote stop using tobacco in different places (educational institutions, health care facilities, workplaces and community programs). Making treatments for smoking cessation easily accessible.	GOV and PHA; local governments, NGO and CO
	8. Establishing programs for diagnosing, counseling, preventing and treating tobacco dependence. Demystifying beliefs on tobacco well-being.	GOV and PHA, local governments and NGO, CO
Lower income and ethnicity	1. Reducing disparities offering opportunities to access healthcare services and making treatments, personal protective equipment and sanitizers easily accessible and readily available to the vulnerable population	GOV, public policies
	2. Offering education and training to healthcare professionals on COVID-19 approaches (primary care, hospital, post discharge)	GOV, PHA, and NGO, CO
	3. Mass vaccination campaign and priority to the vulnerable population	GOV, public policies

Governmental = GOV; Non-governmental financial = NGO; health care policies = HCP; Federal, state and municipal management = FSMM; Public health associations = PHA; community organizations = CO; multidisciplinary approach = MA; Research agences = RA.

40–50% higher risk of developing severe disease and death from COVID-19.[81] In Brazil, there has been a National Tobacco Control Program since 1986, representing a national and international leadership for this health risk, which developed due to the structuring of the National Tobacco Control Policy together with civil society and the media. In this context, challenges remain, such as: 1) diversification of production in areas planted with tobacco; 2) illicit trade; and 3) interference by the tobacco industry in sustaining the policy. Thus, it is clear and evident that complex health policies, and cooperation between different sectors, governmental units and actors must be strengthened.[82]

Conclusions

The COVID-19 pandemic in LA can be considered a syndemic, where factors that affect the health of the population such as comorbidities, economic aspects, housing conditions, nutritional status, lifestyle (sedentary lifestyle, smoking, among others) and low-income all negatively impact health trajectory and increase the spread of COVID-19.[83–86] Furthermore, the lack of consistent public policies and poverty amplifies the dramatic scenario of LA, which may also become a major global problem in the future, therefore world organizations need to become committed collaborators.

Therefore, strategies focused on combating comorbidities, especially modifiable risk factors together with the fight against the pandemic, may be successful in the future. The COVID-19 pandemic in LA countries only reached high rates of morbidity and mortality because many other collective health conditions were neglected over several years. However, there is still time to rethink how to implement effective public policies to fight obesity, sedentary lifestyle, unhealthy eating habits and smoking in LA countries. It is not possible to correct the mistakes of the past, but it is certainly possible to design a better future for generations to come.

Author disclosures

The authors declare they have no conflicts of interest.

Declaration of Competing Interest

None.

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