Research Article

Population Aging Management During the COVID-19 Pandemic in Selected Central American Countries: A Legal-Health Analysis

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**Abstract:** The pandemic caused by the emergence of the 2019 novel coronavirus has wreaked unimaginable havoc on the social and healthcare structures. Worldwide, the public health and social protection systems have reported unprecedented demands, asking for efficient and split-second articulation with all public sectors. In this integrative documentary review, we used a mixed approach to describe the epidemiological behavior of the virus and discuss the legal-health framework developed at the regional and individual levels to protect older adults' wholesomeness in Central American countries, during the 2020-2021 biennium. Our results show that despite the geographic proximity, the pandemic affected each country differently. Notwithstanding the countries having a regional integration system that allowed them to take into account the health crisis from a regional stance, some countries chose to gainsay agreements that sought to reduce the impact of the pandemic in the region. Despite the shortcomings, Central America managed to keep case fatality rates below the average notified by first-world countries. The execution of transitory norms for the elderly strengthened the management of the aged population in all countries, even during the health crisis, mainly through joint-negotiation channels.

**Keywords:** public health; social gerontology; health law; coronavirus 2019; Latin America; health of older adults; infectious diseases; critical epidemiology.

1. Introduction

The beginning of the new decade marked an unprecedented epoch for humanity in terms of addressing infectious diseases of international concern. Resulting from the notification of the first case of infection by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) in Wuhan, China, all international, regional, and local health organizations were faced with the difficult task of managing public health systems at an accelerated pace and with a demand for care that was compromised by the already existing weaknesses of public healthcare systems [1]. Scientists around the globe worked collaboratively, sharing the most concise and up-to-date results that allowed us to quickly understand that SARS-CoV-2 would be the etiological agent for the emergence of the New Coronavirus Disease 2019 (COVID-19) [2].

Under no delay, the World Health Organization -in its authority as the governing body of international health- promoted the virtual meeting of health experts from all continents to draw up the first strategic plans for the containment and mitigation of the virus. This immediate action triggered the need to activate one of the highest international health alert mechanisms, i.e., on March 11, 2020, the state of international health calamity was decreed, and COVID-19 acquired the status of a pandemic [2].

From that onset, a list of circumstances attracted the concern of public health practitioners, gerontologists, and geriatricians during the first months of the international health crisis. On the one hand, SARS-CoV-2 was shown to be a virus with rapid transmissibility, affecting all age groups; however, the first epidemiological readings in all countries of the world explained higher mortality rates in older adults, mainly related to the frail health profile that characterizes the elderly bearing comorbidities, which was even more significant amongst the oldest elderly people [3]. Furthermore, concerns arose among scholars since elderly populations tend to experience greater socioeconomic disadvantages [4]. Thus, the COVID-19 pandemic positioned itself as a challenge not only in terms of health, but also involved, from any point of view, several multidimensional aspects to be addressed by the States in the swiftest possible way.

Despite the rapid roll-out of epidemiological surveillance programs and the current availability of preventive vaccines, which have demonstrated a high power to restrict infection, it is still possible to observe peaks of virus transmission among Latin American countries. Such a scenario becomes relevant because the Latin American region is one of the most socially unequal regions in the world [5,6]. Therefore, in addition to being a structural problem that mainly affects the availability of financial resources and access to goods and services, social inequity is held responsible for causing disparities in access to and quality of health services in the region, having an overwhelming impact on the elderly population [7,8].

From the above, the reading of the COVID-19 pandemic not only refers to the tragic number of passings but also invites us to analyze the legal and health protection mechanisms established by countries, specifically when considering their social responsibilities toward the aging population [9]. As was to be expected, some Latin American nations were less able to tackle these matters as the implications spread in the public spheres during the first months of the pandemic [10]. Alongside that scenario, the elderly suffered deprivations related to healthcare but also unveiled ruptures of legal frameworks that advocate for their wholesomeness [11].

Beyond core guidelines and epidemiological reports published by renowned health organizations (e.g., PAHO/WHO) little to no collective comparisons between the Central American countries exists for understanding the role of the health bodies in preventing and combating the pandemic within the aged population in that region. It is a highly relevant topic, considering the scarcity of gerontological scientific production seen in Central America. Ironically, the socio-health climate led by the pandemic reasserted the urgency of developing research on the living contexts of older adults mainly based on a longitudinal trace that would allow the identification of pathways for the reinforcement of social and healthcare systems for the aged. Considering that scenario, this paper aims to bring legal-health insights into the strategies followed by Central American governments in coping with population aging management during the first two years of the pandemic crisis.

*1.2. Background*

1.2.1. Central American integration paths and the recognition of health as a fundamental right of the aged

Continental Central America is the least demographic and territorial extension of the American continent, constituted by seven countries (namely: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama, and Nicaragua) that serve as a strategic point for the geographic union of the northern and southern regions [12]. Due to its geopolitical location, Central America plays a paramount economic role in Latin America, mainly in agricultural exports and ecotourism, which together are responsible for maintaining their economic growth, given the multisectoral nature of these activities [13].

From a historical standpoint, the path stepped by Central American countries includes, in particular, a continuum of failures and overcoming. The region has a list of local agreements that extend not only in the financial sphere but also in sociocultural, health, environmental and technological development [14]. In the 1990s, a new Central American reasoning began to conquer space for discussion to retake and reformulate the regional integration framework. Health became then understood as a right of the people and responsibility of the States emerged, albeit in embryonic silhouette, thus with a domino effect also influencing the social and legal field in these territories.

A regional milestone was the establishment by the hint of the Central American Integration Scheme (CAIS, from Spanish *Sistema de Integración Centroamericana – SICA*), and consummated by the effect of the “Tegucigalpa Protocol to the Charter of Organization of the Central American States” signed by all Central American Heads of State, in 1991 [15]. Such a legal instrument also served as the foundation for the advent of the Council of Central American Ministers of Health (CCAMH), the political body of the CAIS, whose purpose is to identify and prioritize regional health problems. Its mission is to support member states in their role of guaranteeing citizens' rights to access, universal coverage, and quality of health services. To achieve the proposed goals, CCAMH is projected as a regional instance in sectoral articulation, within the framework of the social determinants of health, through knowledge management and cooperation for sustainable development of the region [16].

Full access to qualified health services and programs is an issue in which several aspects and actors play a determining role. It, in turn, makes it necessary to consider the decision-making capabilities of each country when making decisions that might have a regional impact. Sociodemographic studies show that, despite sharing near distances between them, Central American countries have divergent socio-health profiles, including significant gaps regarding the access to and quality of public health services [17,18]. Although these countries convey the importance of social participation in strengthening and optimizing public health policies, it is still possible to observe underlying mechanisms that weaken and distort the healthcare cores to the extent that they hinder and exacerbate internal social inequities in each country [19].

Thus, the conditions for living a healthy and active old age vary greatly from country to country [20]. In fact, healthcare access and social welfare of older adults have recently been put in sharp relief, yet prematurely [21]. Despite having a strong presence in regional and international events that seek to strengthen the legal frameworks that forfend the comprehensiveness of the elderly, it is no secret that most Central American countries still allege difficulties in incorporating and enforcing these norms [22]. This circumstance is closely related to the fact that they have not shouldered the same liabilities within their territories; not all States consider along their Constitutional Charter the fundamental right to health, much less address specific constitutional items for the elderly [23]. Wherefore, inconsistency in the interpretation of health law averts the foundation of a robust legal framework in the region and produces unequal readings of the fundamental rights of older persons.

In 2014, the Heads of State reacknowledged their commitment to public health for the region, announcing the CAIS's Regional Health Policy 2015-2022 at the 44th ordinary meeting [24]. The policy laid on an understanding of national responsibilities and competencies insofar as the document has a political-strategic character that embodies the basic principles and interests in health from a collective perspective. Such a legal item represents the supreme drive of CCAMH and the most evident intersectoral experience of the CAIS-derived bodies since it claims even participation from the fields of economy, law, environment, education, and food. More recently, Resolution CCAMH 08-2020 [25], signed on December 11, 2020, instituted a special secretariat and an executive committee to elaborate the 2021-2025 Regional Health Plan, which suffered delays due to the pandemic. The resolution also called for the submission of a situation report on the achievements and setbacks of the former regional health plan.

Even though the CCAMH provides opportunities to strengthen public health systems in the region, the discussion on geriatric-gerontological care has not been a priority for the countries, partly because the countries still seem to favor the trade axis over the social and health ones. In line with the above, the challenges become evident in clinical practice involving contact with the elderly; low healthcare quality is a vivid example of the shortcomings between countries since not all have, for instance, a national hospital specializing in geriatrics and gerontology [26]. Furthermore, the Neoliberal tendencies that affect quite rigidly the healthcare field in Latin America are already taking root in the healthcare offered in Central America. It is seen in the lack of medical supplies [27], but more drastically, in the low rate of trained/skilled professionals in the various themes of human aging [28].

2. Materials and Methods

*2.1. Study design*

In line with the objective of this study, we carried out a documentary-integrative review, with a mixed and descriptive approach. We propose to look at the current health crisis from a social and historical perspective, trying to understand the socio-historical context that marked the performance of Central American public health systems during the first two years of the pandemic. As explained by Freitas [29], this perspective overcomes the empiricist and idealist conceptions since it is concerned with studying the individual as a unity of body and mind, biological and social being, thus allowing the recovery of political, historical, and social trajectories.

We also handled secondary source data from official online platforms to provide statistically referred readings. In this case, we propose the use of critical epidemiology based on the theoretical framework of Breihl [30], who develops a critique of the empirical-functionalist paradigm of Latin American epidemiology as a tool to work on the relationship between social reproduction, ways of life, and ways of getting ill and dying. Moreover, it allows us to infer that in the vast field in which it expands, critical epidemiology approaches the place, the person, and the time as a result of the interactions that interfere with human health.

*2.2. Settings*

We considered each continental Central American country as a unit of analysis. Table 1 shows a list of sociodemographic data based on prospects for the year 2022 made by the Economic Commission for Latin America and the Caribbean (ECLAC) [31]. Overall, continental Central America is a divergent region where countries with gross populations that do not even reach five million inhabitants (e.g., Belize, El Salvador, and Costa Rica) coexist with neighbor nations that exceed their population density (e.g., Guatemala and Nicaragua).

Table 1. Sociodemographic prospects for Central America, by country and corresponding variables, 2022.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variable observed** | **BLZ** | **CRC** | **SLV** | **GTM** | **HND** | **PNM** | **NRG** | **CCA** |
| Total population (1,000 people at mid-year) | 394,9 | 5,123.1 | 6,292.7 | 17,362.7 | 10,121.4 | 4.,294.4 | 6,755.9 | 50,345.1 |
| Annual population growth rate (60 and over) | Unda | 33.9 | 16.9 | 13.4 | 30.5 | 40.2 | 38.0 | 28.8 |
| Crude birth rate (1,000 people) | 17.8 | 11.7 | 15.8 | 20.9 | 20.9 | 17.4 | 20.0 | 17.8 |
| Total fertility rate (children per woman) | 2.0 | 1.5 | 1.8 | 2.4 | 2.3 | 2.3 | 2.3 | 2.1 |
| Life expectancy at birth, absolute years (male/female) | 68/75 | 75/80 | 67/76 | 66/72 | 68/73 | 74/80 | 72/78 | 70/76 |
| Infant mortality rate (deaths per 1,000 live births) | 10.1 | 6.8 | 9.9 | 19.8 | 12.8 | 12.7 | 12.3 | 12.1 |
| Public expenditure on education, as a % of gross domestic product | 8.7 | 6.7 | 3.4 | 3.3 | 6.4 | 3.9 | 4.6 | 5.3 |
| Public expenditure on health as a % of gross domestic product | 6.0 | 7.3 | 8.5 | 6.2 | 7.3 | 7.6 | 8.4 | 7.3 |
| Population according to housing status (tenant), by per capita income quintile (%) | Unda | 18.8 | 12.8 | Unda | 14.6 | 11.3 | Unda | 14.3 |
| Population in overcrowded households (%) | Unda | 7.6 | 46.5 | Unda | 49.8 | 32.3 | Unda | 34.1 |
| Households with availability of water in the dwelling (%) | Unda | 99.4 | 70.4 | Unda | 87.8 | 94.9 | Unda | 88.1 |
| Households with availability of electricity in the dwelling (%) | Unda | 99.6 | 87.7 | Unda | 89.4 | 92.0 | Unda | 92.2 |
| Households with availability of sanitation in the dwelling (%) | Unda | 47.8 | 47.1 | Unda | 50.3 | 48.8 | Unda | 48.5 |
| Population without internet access at home (%) | Unda | 10.2 | 74.0 | Unda | 72.9 | 27.5 | Unda | 46.2 |
| Hospital beds (10,000 inhabitants) | 10.4 | 11.4 | 12.0 | 4.4 | 6.4 | 9.3 | Unda | 9.0 |
| Population without medical insurance (%) | Unda | 14.8 | 72.7 | Unda | 84.6 | 45.8 | Unda |  |
| Public social protection expenditure, as a % of gross domestic product | Unda | 4.6 | 6.5 | 3.0 | .8 | Unda | .8 | 3.1 |
| Population aged 60 and over without own income (%) | Unda | 19.4 | 30.0 | 29.3 | Unda | 7.5 | Unda | 21.6 |
| Distrust in the political and state institutions (2020, %) | Unda | 72.0 | 76.0 | 78.0 | 85.0 | 77.0 | 63.0 | 75.2 |
| People who consider that income distribution if unfair (2020, %) | Unda | 87.0 | 58.0 | 78.0 | 84.0 | 78.0 | 59.0 | 74.0 |
| Trust in the Police Forces (%) | Unda | 50.0 | 58.0 | 28.0 | 27.0 | 48.0 | 32.0 | 40.5 |

Unda: Unavailable data. BLZ: Belize. CRC: Costa Rica. SLV: El Salvador. GTM: Guatemala. HND: Honduras. PNM: Panama. NRG: Nicaragua. CCA: Continental Central America.

**Source**: Elaborated by the authors based on ECLAC Population Division: World Population Prospects [32].

*2.2. Data typification and collection*

For the data collection, we accessed the CAIS's COVID-19 Regional Observatory [33] (*Observatorio Regional SICA-COVID-19,* from Spanish). It is a digital tool that promotes decision-making based on scientific information from a regional perspective to generate added value to the process of economic, social, and environmental recovery of CAIS member countries in the post-COVID-19 stage. Data are made available to the public strictly for academic and educational research purposes.

We targeted official documents approaching the senior population from the following typologies: specific regional and national guidelines, press releases, situational and epidemiological bulletins, health regulations, strategies (national and regional), technical recommendations, and sectoral protocols. Moreover, documents published by the PAHO/WHO (epidemiological situation reports) and recent geriatric-gerontological literature on COVID-19 support the discussions.

*2.3. Analytical procedures*

We selected all documents related to the regional management of the COVID-19 pandemic for an initial review, which included a thorough reading of the title and objectives of the instrument. We then screened documents that directly or indirectly approached the elderly population. These steps allowed us to extract specific contents that the Central American countries made available to prevent contagions and deaths in the elderly, besides maintaining their health profiles during the health crisis.

Untreated data on morbidity and mortality were extracted from the WHO's Geo-Hub COVID-19 Information System for the Region of the Americas [34] selecting each country individually, which allowed us to plot regional values. We performed a monthly categorization with a start period in March 2020 and an end period in December 2021. We observed contagion peaks and calculated the COVID-19 case fatality rate using the simple formula (deaths divided by laboratory-confirmed diagnoses) \*100.

To rank the hygienic measures adopted by countries, we elaborated individual queries on the COVID-19 Central American Panel, simultaneously linked with the WHO Epidemiological Panel [35]. We then applied filters for Public Health and Social Measures (PHSM) and observed behaviors in school (adaptation or closure of schools), business (adaptation or closure of business), masks (facial coverings and/or mask-wearing), meetings (limits and restrictions on public and private gatherings), household movements (restrictions on domestic movements, public transport and stay at home orders), and international travel (entry restrictions, quarantining and testing) under criteria set by the WHO [36]. Further, we extracted the PHSM Severity Index (a composite measure of the six above-mentioned) based on a Likert scale (1 being the least and 5 the most severe), which allowed us to track individual severity rates.

*2.4. Ethical matters*

Given that we consulted data available on websites with immediate and unrestricted access, it became unnecessary to submit the proposal to a research ethics committee. Worth saying that, during all stages, the concepts of integrity, inviolability, and confidentiality were fully acknowledged.

3. Results

*3.1. Epidemiological impact of COVID-19 in the older adult population*

Epidemiological patterns recorded between the nations showed asymmetrical findings from the outset (Table 2). The Republic of Costa Rica announced the first laboratory-confirmed SARS-CoV-2 infection on March 6, 2020. The case was an American 56-year-old female who reported having entered the country two days before the testing date [37]. Immediately, health authorities warned of the existence of the virus on network television, urging all inhabitants to stick to legal COVID-19 regulations to downshift the spread of the virus [38]. This positioning banned the virus from advancing the stage of community transmissibility during the first five months of crisis [39,40]. On the other hand, the first death was registered in Panama, attributed to a 64-year-old male patient with diabetes type 2 and hypertension. This country led the case fatality rate until the end of the first year, and accounted for the highest number of contagions [41].

**Table 2**. Epidemiological summary of the first month (March 31st, 2020) of the COVID-19 pandemic in Central America.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Location** | **Transmission classification** | **Confirmed cases** | **Deaths** | **First case** | **First death** | **Quarantine** | **Curfew** |
| Belize | Local only | 3 | None | March 23rd | April 07th | No | No |
| Costa Rica | Local only | 314 | 2 | March 06th | March 18th\*\* | Yes | No |
| El Salvador | Local only | 30 | 1 | March 18th | March 31st\* | Yes | Yes |
| Guatemala | Local only | 36 | 1 | March 13th | March 15th\*\* | Yes | Yes |
| Honduras | Local only | 139 | 2 | March 11th | March 25th\* | Yes | No |
| Nicaragua | Imported only | 4 | 1 | March 18th | March 26th | No | No |
| Panama | Local only | 989 | 24 | March 09th | March 10th\* | Yes | Yes |

\*Patient over 60 years of age. \*\*Patient over 85 years of age.

**Source**: Elaborated by the authors based on WHO's COVID-19 Situation Report - 71 [42].

As of mid-2020, the region had performed 422,549 laboratory tests, with 87,036 positive results (positivity rate of 20.6%). Of the total of 2,297 deaths, 76% occurred in the geriatric population, with Belize (7.1%), Guatemala (4.3%), and Nicaragua (3.3%) being the three nations with the highest case fatality rates [43]. Male sex and pre-existing conditions were two shaping variables for case fatality among older adults in all Central American countries. Li and colleagues [44] also found more deaths among older adults in their multi-country study, including Asian and European locations. During the same period (mid-2020), Andrus and colleagues [45] saw a hospital bed ratio (1/1000 population) of 1.3 in Belize and El Salvador, 1.2 in Costa Rica, and 0.7 in Honduras. The unavailability of hospital beds played a decisive role, given that universal quality medical coverage is strongly correlated with the age distribution of deaths [46].

What is more, the hospital stay with fatal outcomes in the COVID-19 gates was remarkably lower in the geriatric population, confirming the correlation of higher age with higher case fatality [47,48]. According to Ioannidis and colleagues [49] COVID-19 “had the potential to overwhelm specific hospitals, especially in settings where hospitals run close to maximum capacity even under regular circumstances, and when they serve high-risk populations” (p. 7). The region was susceptible to three waves of SARS-CoV-2 contagion [50]. The first one (March to May 2020) was the most moderate, so to speak, in which fewer infections and consequent deaths emerged. The second wave (January to February 2021) was the most devastating, concentrating the highest peaks of lethality. The third wave (May to June 2021) kept a significant number of infections yet recorded fewer deaths due to the effect of vaccination campaigns (Figure 1A; Figure 1B).

From March to December 2020, the region recorded 894,192 laboratory-confirmed cases for SARS-CoV-2 and 18,145 fatalities. Thus, during the first pandemic year, the COVID-19 case fatality rate was given at 2.02%. As expected, the second year of the pandemic saw an exponential increase in laboratory-confirmed cases, although the same did not apply to the case fatality rate. The first half of 2021 ended with 1,957,356 cases and 37,146 deaths. Together, the above figures represented a case fatality rate of 1.89%, demonstrating a gradual trend of negative behavior in this indicator. The region surpassed more than 2,500,000 positive laboratory confirmations by the end of December 2021 (n=2,647,872), with case fatality remaining the same as the value seen in the first six-month cut-off, i.e., 1.89% (with 50,160 deaths).



**Source**: Elaborated by the authors based on PAHO/WHO's Geo-Hub COVID-19: Central America Situation [34].

Genetic variations of the virus also appeared in Central American territories, corroborating the epidemiological scenario of SARS-CoV-2 in the global trend [51]. The concern was that more rapid and silent mutations could emerge, as seen with Alpha, Beta, Delta, Gamma, and Omicron [52]. Therein would be a geriatric-gerontological and thus a public health challenge since it would make it difficult to work with molecular targets for vaccines and drugs to be delivered to older adults [53]. According to the WHO's 71st Epidemiological Bulletin (December 21st, 2021), Central America had registered Alpha, Beta, Delta, and Gamma variations in six countries, Panama being the only one to detect the Omicron variation in addition to those mentioned above [54].

Vaccination strategies were developed in different ways by the health authorities of each country, but all placed older adults into the priority groups. The availability of pharmacological treatment via attenuated vaccine rekindled people's hopes of finding a more effective solution to the high rate of contagion seen in 2021. However, the countries did not have the same interests or possibilities in acquiring vaccines. For instance, Costa Rica was the first Central American country and one of the first three in Latin America to release the vaccination, including frontline healthcare professionals as recipients of the first batches, followed by the oldest elders, on December 24, 2020 [55]. Panama started its vaccination schedule on January 20, 2021. The other countries took two months to make the vaccines available to the elderly population: El Salvador (February 17, 2021), Nicaragua (February 23, 2021), Belize (February 24, 2021), Honduras, and Guatemala (February 25, 2021).

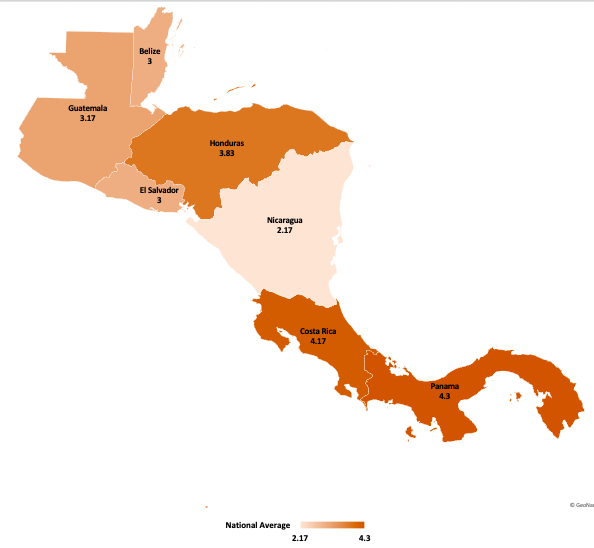
Until June 2021, the rate of vaccines acquisition against COVID-19 oscillated abysmally among countries. Panama led with 105.3%, followed by Costa Rica with 49.8%. In the case of El Salvador and Honduras, the countries even failed to reserve 15%. These values represent the percentage of vaccines requested concerning the total of their population. Nicaragua and Guatemala did not publish statistics on their vaccination schedules during the first months [56]. By November 2021, Nicaragua (8.9%), Guatemala (19%), and Honduras (34.4%) had reached less than 50% population coverage with two doses. The rest of the countries already had values that exceeded half of their populations [57].

The restrictive approach to combat contagion in public spaces was not synergistic among Central American countries, as each opted to apply varying degrees of restriction in their territories [58]. We found that Panama, Costa Rica, and Honduras were more restrictive than their peers during the first half of 2020, although more flexible during the second semester. On the other hand, Guatemala, El Salvador, and Belize needed to be more drastic and had to limit movement and trade for longer during mid-2020. Nicaragua presented statistical oscillation in the reports sent to WHO, so we could not define the final values.

As expected, higher PHSM severity indexes were seen in all countries during the first six months of the pandemic, a period in which there was less clinical-epidemiological knowledge of the disease, which limited the functioning of other public areas, such as education, trade, and transportation (See Figure 2A). The decree of more severe restrictions was directly related to the peaks of contagion and mortality, which indicates that the countries decided to act in accordance with the epidemiological behavior of the virus. During 2021, the measures began to gradually disregard by the end of the year, in view of the declines in mortality and infection rates related to the increase in the population's vaccination coverage rate (See Figure 2B).

*3.2. Legal-health framework for a regional approach to the pandemic*

Concerning the national (n= 11) and regional (n= 9) lawmaking, this study found a solid framework of intersectoral guidelines aimed at protecting the biopsychosocial wholesomeness of older adults in Central America. The approach in the oldest population segment respected a line of work based on the socio-health risk scales, where most fragile people received priority attention in all stages of the fight against the pandemic (Table 3). The countries were concerned with establishing technical standards to promote comprehensive healthcare for the institutionalized elderly, especially those with pre-existing conditions that placed them at greater risk of death. The community-based medicine vision seems to have predominated in all countries through national decrees with equal repercussions at the local and regional levels. Among the instruments identified, there was a general concern for mental health and nutritional support for the elderly.

2A

2B

**Figure 2A** shows the PHSM Severity Index averages (including the six domains) adopted by the countries during 2020. The three domains with the strongest restrictions were, respectively: Masks (4.43), International travel (3.78), and Household movements (3.57). **Figure 2B** shows that restrictions decreased considerably during 2021, which could be related to the waves of contagion described in **Figure 1A**, although we do not have correlational information that would allow us to defend this hypothesis. The three most flexible measures in 2021, were: Business (2.28), Meetings (2.57), and Household movements (2.57).

**Source**: Elaborated by the authors (2022).

**Table 3**. List of national guidelines enacted to address the COVID-19 pandemic, Central America, 2020.

|  |  |  |
| --- | --- | --- |
| **Country** | **Guidelines** | **Action lines and contents addressing the geriatric population** |
| **Belize** | COVID-19 Response Project – P177987 [59]. | Older adults are at higher risk for coronavirus disease. Health actions should prioritize this population at all levels of care. Special programs should be implemented to maintain their integrity during the crisis. |
| **Costa Rica** | Comprehensive Proposal for the Protection of the Elderly Before COVID-19 [60]. | To raise awareness and educate the elderly throughout the country about the risks of the coronavirus (COVID-19) and the pertinent and official measures to reduce the risk of infection, as well as the timely detection of the virus in this age group. |
| Guide for the Care of the Elderly in the Territory in the COVID-19 Emergency [61]. | The document articulates the flows of social and health care to the elderly during the pandemic. To this end, it establishes joint action between public institutions at the local, regional and national levels. It proposes risk stratification among the different age and ethnic groups that make up the Costa Rican elderly population. |
| Guideline for Telephone Follow-up of the Elderly in the Face of the Pandemic by COVID-19 [62]. | This is a northern document for the telephone accompaniment of elderly people with or without a positive diagnosis. It includes assistance to general health, mental health, and strengthening with local health services. |
| **El**  **Salvador** | National Preparedness and Response Plan for Novel Coronavirus (2019 - nCov), El Salvador 2020 [63]. | The document guides public and private sector institutions to reinforce efforts to evaluate and readjust the components of the rapid response plan, ensuring the reduction of the impact on the elderly population. Legal and technical advice is promoted in collective housing institutions and geriatric clinics, as well as reinforcing protection measures in the geriatric units of regional and national hospitals. |
| **Guatemala** | Plan for the Prevention, Containment and Response to cases of Coronavirus (COVID-19) in Guatemala [64]. | To prioritize the implementation of prevention, containment and response measures in the areas of greatest biological and social risk, with special attention to the elderly population. To provide medical assistance in specialized centers or geriatric units for the management and treatment of coronavirus. |
| COVID-19 Humanitarian Response Plan [65]. | To strengthen capacities to guarantee quality care that is culturally relevant and respectful of the differentiated needs of the population, especially the elderly due to their physio-pathological vulnerability to SARS-CoV-2. To increase the health budget in a sustained and progressive manner, through the identification of adequate fiscal space, in favor of universal access to the right to health. To temporarily expand the social protection programs of the different institutions to be implemented at the end of the first emergency phase, articulated with the pre-existing ones and oriented to generate greater welfare and resilience of the people, containing aspects of food, health and education as a minimum, so that they can avoid the greatest risks left by the pandemic. |
| **Honduras** | COVID-19's National Risk Communication and Social Participation Plan in Honduras [66]. | It raises a series of national recommendations to combat ageism and fake news that involve prejudices against the elderly. It proposes ways of articulation between public ministries to provide accurate, immediate, and pointful information for the elderly population. |
| Guidelines for the Implementation of Temporary Shelters in Emergency and Disaster Situations in the Context of COVID-19 [67]. | This document provides health personnel of the health regions with specific functions and recommendations for the institutions integrated into the National Risk Management System, as well as an updated guide on how to set up temporary shelters in the context of the COVID-19. Furthermore, it provides recommendations for the joint approach between the different levels of health care for the elderly and other at-risk groups. |
| **Nicaragua** | We could not locate any specific guidelines addressing the aged during the COVID-19 pandemic. | |
| **Panama** | Guidelines for the Management of Suspected or Confirmed COVID-19 Patients in Nursing Homes for the Elderly [68]. | It brings together the technical standards for dealing with symptomatic cases of elderly patients in group homes. It includes the procedures for prevention and mitigation of contagion and proposes an articulation of referral centers specialized in the health of the elderly, at local and national level. |
| Return to Normality Guide in the Development of the National Palliative Care Program in Ministry of Health Facilities [69]. | This document provides guidelines to be applied in the development of the National Palliative Care Program in the national territory in order to integrate biosecurity measures in palliative care for the benefit of all those involved. Palliative Care teams should have the basic elements required to comply with the precautions required for the care of all patients according to the risk identified in each modality of care and circumstance. |

**Source**: Elaborated by the authors (2022).

At the regional level, technical meetings with public and private institutions, together with the corresponding health authorities in each country, made it possible to establish intersectoral guidelines for gradually resuming social activities without involving greater risks for the elderly (Table 4). Through the Health Ministers' meetings, the countries shared their successful experiences and discussed the challenges that their public health systems encountered during the implementation phases of the national combat plans.

**Table 4**. List of regional legal-health documents enacted to address the COVID-19 pandemic in the geriatric population, Central America, 2020-2021.

|  |  |  |
| --- | --- | --- |
| **Title and enacting date** | **Typology** | **Implications for the geriatric population** |
| Declaration of the Heads of State and Government of Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama and the Dominican Republic on the COVID-19 Pandemic: “Central America united against COVID-19”, March 2020, [70]. | Specific regional guideline | Main regional instrument for the intersectoral articulation of all CAIS-derived bodies. Urges CCAMH to: 1) use the Joint Negotiation within the framework of CAIS/CCAMH for the purchase of medicines and medical devices for the prevention, containment and treatment of COVID-19 and other rapidly spreading diseases within the framework of the actions and measures of the Regional Contingency Plan; and 2) develop intersectoral actions that guarantee the supply of raw materials and other goods necessary for the production and commercialization of medicines and supplies necessary for the integral care of the pandemic. Establishes socioeconomic protection mechanisms for vulnerable groups. |
| CCAMH 02-2020 Resolution regarding the approval of the Regional Contingency Plan aimed at complementing national efforts for prevention, containment, and treatment of COVID-19 and other rapidly spreading diseases, March 2020, [71]. | Specific regional guideline | Complements national efforts for prevention, containment, treatment, and recovery of COVID-19 and other rapidly spreading diseases in CAIS member states. It structures health actions in five components, being: 1) prevention and containment measures, 2) patient management measures in each type of case, 3) harmonization of informative, preventive, and educational messages, 4) access to medicines, medical devices, and other goods of health interest, and 5) joint negotiation to strengthen preparedness, mitigation, response, and humanitarian assistance capacity. |
| Regional Contingency Plan Aimed at complementing national efforts for prevention, containment, and treatment of COVID-19), March 2020, [72]. | Sectoral protocol | It is structured in five axes, three central axes: 1) health and risk management, 2) trade and finance, 3) security, justice, and migration, and two of a transversal nature: 1) strategic communication and 2) management of international cooperation, identifying the set of actions to be carried out in each of them, which group by components. It had a dynamic character and experienced modifications according to the evolution of the situation of the pandemic. Also, established continuous training for healthcare professionals involving the most updated knowledge of clinical manifestations in the elderly according to the International Health Regulations. |
| Report 1: Central America united against COVID-19, March 2020, [73]. | Situational and epidemiological bulletin | It provides the first epidemiological summary for the region up to March 13, 2020, indicating a total of 63 cases and a single death. It defines a case fatality rate of 1.59% and a geriatric infection rate of 61.9%. The document called for an extraordinary meeting to fine-tune the national strategies in each country, intending to immediately implement the Contingency Plan. Gerontologists and geriatricians reinforced the epidemiological impact on older adults, demanding more rigid interventions to contain the peaks of contagion. |
| Recommendations for healthy eating during COVID-19, March 2020, [74]. | Health regulations, strategies and technical recommendations | Gathers recommendations for maintaining adequate diets among groups vulnerable to food shortages (highlighting the elderly). It highlights the need to plan food supply and consumption at the household level and include healthy foods from each country's dietary guidelines and store them properly. It also provides information on hydration and physical activity in the elderly under the gerontological provisions of each country. Application of the international scale of the integrated phased classification of acute and chronic FNS (IPC) that guides humanitarian aid. Indicators of household FNS food and nutrition security and nutrition status. |
| Shelter management considerations in the COVID-19 context, June 2020, [75]. | Health regulations, strategies and technical recommendations | The document provides technical recommendations for SARS-CoV-2 infections' management in group settings. It divides itself into six areas: management of the physical environment, infection control and prevention, sanitation and hygiene, waste management, coordination with health services, and human dignity and vulnerable populations. The elderly is understood to be the main risk group. The articulation with primary and tertiary care services establishes through care flows with red, yellow, and green risk flags. |
| Letter for the Future of Central American Integration - Vinicio Cerezo, Secretary-General of the CAIS, October 2020, [76]. | Situational and epidemiological bulletin | In the words of the Secretary-General: "The economic, political, social, environmental and now also health crises that our countries are experiencing, must propitiate, in the face of adversity, an integration that promotes tools to face these challenges together, generating new knowledge and actions that lead to more democratic, plural, just, peaceful, inclusive, equitable and socially cohesive societies" (p. 4). It further explains that "the common future must be based on the respect, protection and promotion of human rights; on gender equality and the empowerment of women and girls; on the construction of a Central American identity; on solidarity; on the promotion of peace and democracy; on respect for the cultural and ethnic diversity of the region; in the greater inclusion of indigenous peoples and Afro-descendant population; in the respect, harmony and conservation of nature in a vision of ecodevelopment; in the creation of more spaces for dialogue and effective participation for youth; in a greater projection as a region; in the strategic and effective management of international cooperation" (p. 6). |
| Progress Report on the Implementation of the CAIS Regional Contingency Plan against Coronavirus: Implementation of actions Aimed at Complementing National Efforts, December 2020, [77]. | Situational and epidemiological bulletin | It highlights the regional scenario of the first pandemic year. Overall, it indicates that the percentages of progress by the axis of implementation of the regional contingency plan are: health and risk management (85%), trade and finance (83%), security, justice and migration (83%), strategic communication (100%) and cooperation management (88%). It reported more than 123 interventions adopted by the countries, related to sanitary and epidemiological measures, medical-hospital infrastructure, training of medical personnel and scientific research. |
| CCAMH 02-2021 Resolution, regarding the approval of the Central American and Dominican Republic Health Plan 2021-2025), June 2021, [78]. | Specific regional guideline | The document acts structurally, functionally, and operationally to fulfill the post-COVID-19 Central American Health Agenda without neglecting the pre-existing and re-emerging socio-health challenges in all human life cycles. It reinforces the need to strengthen intersectorality among all CAIS-derived bodies, taking a comprehensive view of health and its determinants. Moreover, it emphasizes the discussion of the SDGs and the individual commitment of each country to achieve the regional goals, which should be achieved through a population-based approach to public health and increased social awareness. |

**Source**: Elaborated by the authors (2022).

The above instruments only followed a technocratic line of work once their rationale is in accordance with the canons of international and administrative law that govern the CAIS's institutional framework and therefore do not superimpose the final decisions adopted internally in each country. In the context of the pandemic, they functioned more as pieces of advice from a multitasked team.

4. Discussion

The advent of the COVID-19 pandemic highlighted the deteriorated public health services and programs worldwide by revealing high unsolvability to deal with situations involving health calamities and unsound leadership. Incidentally, we did not intend to give a weighting to Central American public health systems or rank countries on a quality index in this work. We are aware that the ranking may be attractive to public health practitioners and, at times, could improve State accountability, leading to respect for human rights and improved health services for the aged. Such an event resumed the issue of the quality of public health services that was the focus of extensive discussions covenanted in the WHO's report [79] published in 2018, which considers that “effective governance of health systems comprises several tasks, including maintaining strategic of goals and priorities; generating the information and analysis required to track whether goals are being met; designing rules, policies and processes to steer the system in the desired direction; and creating and nurturing collaborations within and beyond the system” (p. 52).

Regional coordination strategies for the containment and mitigation of the virus during the first months of the pandemic received significant contributions from the sanitary sovereignty channels proposed by CAIS. During the first month of the pandemic, each country set national strategies that differed from one another. Before confirming the first contagions, countries such as Costa Rica, Panama, El Salvador, and Guatemala had incorporated merely containment measures. Paradoxically, the high socioeconomic vulnerability and structural weaknesses that characterize these countries (except for Costa Rica and Panama) did not act as a constraint to keep case fatality rates below 5% until September 2020 [80]. It became possible to draw a network of social actors committed to striking immediate responses to the massive requests observed in the axis through the virtual meetings of the Central American Ministers of Health and the corresponding National Heads Offices. In that vein, we believe the existence of the CAIS/CCAMH positively drew a regional approach to population aging during the pandemic amid the hardships already known, an argument that we support through the following key points for reflection.

From the pandemic onset, the guidelines were updated based on international recommendations and changes approved by local health authorities [81]. Accordingly, the commitment to follow the most up-to-date knowledge is evident through a perspective of evidence-based medicine, which underpins the actions proposed by public health practitioners and policy-makers and requires a solid interrelation between countries to achieve meaningful outcomes. Nevertheless, the actions of Central American health authorities followed a consistent behavior only during the first eight months of the pandemic, once the governments of Nicaragua (President Ortega) and El Salvador (President Bukele) decided on health measures that gainsaid the regional agreements [82,83]. Justifications offered by these nations relied on the socioeconomic instability the countries were suffering because of the curtailment of trade activities [84], echoing voices of a necropolitical vision of the pandemic that wounded the basic principles of democracy and health sovereignty [85]. This negligence resulted in an exponential increase in contagion and case fatality rates, the latter being unrestrained in the aged.

Despite the numerous calls to reflect on the consequences that such hostile acts would bring to the inhabitants, the Heads of State were forceful by warning that although they were part of the regional agreements, the inward management of the pandemic was the sole responsibility of the states [86]. It occurs because the CAIS/CCAMH does not have a legal path that forewarns administrative charges for the inconsideration of norms, thus fanning gaps for ideological divergences to override collective interests, as described above. Taking into consideration Paisano's statements [87], it reads that:

"In the application of this decision-making model, the Central American governments sustain the CAIS's institutionality under a system of legal and political relations centered on the control of the common bodies through their official representatives. The Consensus implies that only through the participation of national officials each State expresses its assent so that the normative acts have full application in the internal scope or can be adapted by internal acts in a unitary way" [87 (p. 167)].

Forsooth, the COVID-19 pandemic has been just one more of many regional misunderstandings to test the response of governments to disturbing pictures that ask for a well-articulated policy response. As seen, there is a long road ahead for the CAIS to strengthen its integration pillars, especially those related to democratic security, social integration, and regional institutionality. Some say history always repeats itself. Not differently, in countries with an anti-democratic background, such as El Salvador, Nicaragua, and Honduras, the haphazard approach to the pandemic made notoriously marked by the lack of public governance, which unfortunately led to the inability to identify cluster transmissions, resulting in the avoidable deaths of thousands of people, mostly older adults [88]. Political and territorial factors play decisive roles during turbulent events. For instance, a recent study that sought to understand the efficiency of health resources to cope with the pandemic found that countries that still face significant difficulties in dealing with pandemic diseases (e.g., HIV, Tuberculosis, Dengue, and Influenza) constitute the country group with the worst responsiveness capacity [89]. Nonetheless, CAIS/CCAMH expressed its goal to continue advancing in the consolidation of regional strategies to mitigate and contain the spread of the virus within neighboring members.

As in the rest of the world, the infodemic waves hit Central American countries bringing some misconduct toward the aged. Ministries of Health, in particular, had to deal with the shot, the message, and the messenger concomitantly, since the dissemination of fake news linking the image of older adults and the pandemic meant to distort the epidemiological reality and jeopardize the role of public health in those territories. Likewise, Nieves-Cuervo and colleagues [90] described similar circumstances in six Southern American countries, in which a large volume of information propagated untruthful news about the causes of the disease, symptoms, available therapeutics, and the actions of the authorities. In response, the Pan American Health Organization admitted that there is no quality control in what is published, and sometimes there is no quality control in the information used to take action and make a decision [91].

In light of this, CAIS/CCAMH proposed structuring a technical committee to advise and clarify emerging doubts in the official channels of all Central American countries. Geriatrics and gerontological societies, universities, and organized civil society groups established partnerships and collaborations to fight against ageism while understanding that such behaviors would only promote a phenomenon of double violence against the elderly. In addition, the National Councils for Older Persons played a leading role in knowledge refinement, mainly from the infodemiology perspective. In doing so, these public agencies had to predict effective health communication to weasel unhealthy behavior and, on occasion, strengthen health promotion practices in the geriatric community, with topics not limited to nutrition, mental health, and physical activity. Therein, National Councils for Older Persons provided reliable and up-to-date information through two main channels: on the official websites and social networks.

Interestingly, the pandemic brought about changes in Central American countries that perhaps would have taken many more years. In most countries, the practice of telemedicine/telehealth/e-health before the pandemic was more of an exception to the rule; few countries currently have regulatory frameworks for its implementation [92,93]. Still and all, the health crisis demanded split-second responses, including information and communication technologies endorsement in public sectors such as health and education. Gradually, this type of tool became commonplace in the daily lives of healthcare professionals, to the point where its dearth came to condition the healthcare provided to older adults. On the one hand, this allowed complying with social isolation measures while outstretching an active bond with the elderly, the public health system, and health professionals. Although some countries took a little longer to set up COVID-19 e-Health Observatories to monitor diagnosed and suspected cases, all nations saw overall profits in the short term.

The concern, however, remained with those technologically illiterate seniors without access to an internet network at home or a smart device once going digital became necessary for all. In Latin America, the profile of the users who browse the Internet the most are adolescents and adults [94]; about 47% of the Central American inhabitants (except Costa Rica, 10.2%) do not have this service in their homes (See Table 1). In this respect, Seifert and colleagues [95] discuss a double burden of exclusion (the digital and social ones) by understanding that the lack of necessary devices and network connectivity or even the very inexperience of their use marked a deep inequality among older adults, especially institutionalized ones. Given those scenarios, the community health teams approached the elderly residents to gather information on their symptomatologic progress and provide appropriate guidance. In addition, collected data made it possible to update the databases of the Geographic Health Information Systems, subsequently used in the daily epidemiological bulletins. Some authors perceive the successful experiences of COVID-19 management as opportunities routing onto the digitalization of Central American public health systems [96-100]. Indeed, it is not a recent reflection for Latin American countries, given the First Regional Conference on Health Research and Innovation, held in 2008 in Rio de Janeiro, whereby the topic already echoed [101].

Building gerontological assistance with strength and agility -two institutional pillars required for a comprehensive approach to population aging- implies, for instance, the collective effort of Central American countries to achieve active and healthy aging in the region, even during times of socioeconomic tenseness. In contrast, not all nations own a well-established institutional structure and internal mechanisms for the multifaceted challenges posed by the exponential increase in their populations. On the other hand, despite recent efforts in the region, mainly aimed at reducing poverty rates and social inequality among societal groups [102], there are still significant gaps in the role that older adults play in contemporary Central American societies.

The above-described scenario becomes even more salient when considering the socioeconomic impacts levied by the health crisis [103]. In any case, the pandemic has raised a gerontological question, the advancement of post-COVID-19 inclusive social policy in these countries [104]. The deepening of the collateral effects makes it critical to join forces so that the protectionist frameworks of the rights of the elderly do not suffer seizures by the neoliberal waves, which commonly endanger the maintenance of social agendas for older persons. In a global picture, older individuals, due to their stigmatized condition in the labor market and, all the more, due to the changes in social roles resulting from old age, were much more impacted than other age groups in society during the pandemic. The regional positioning was to make it possible for families with at least one senior citizen to receive financial aid from the government, with figures ranging from half to one minimum wage. Although each country set different criteria for such assistance, the focus was to screen-out families undergoing functional or socioeconomic fragility. According to the Inter-American Development Bank [105], the countries showed flexibility in sectoral and corporate policies that sought economic equilibrium in the region. It varied according to the response capacity installed, yet all countries opted to relax specific tariff and non-tariff restrictions [106]. Special decrees also aimed to avoid job losses or to allow temporary suspensions, accompanied by social protection programs for those older workers under informal or precarious working conditions [107]. In addition, CAIS's performance was extremely valuable, since through the Central American Bank for Economic Integration, each country received US$1 million, thus strengthening the countries' crisis response and assistance capabilities [106].

Social determinants of health demand sound judgment since older adults are quite a heterogeneous population segment. Actions must start from a person-centered reading of the aged and all the intrinsic and extrinsic elements that this involves. The major obstacle for social assistance bodies in Central America is not only extinguishing the current fire of the pandemic in terms of guaranteeing a decent monthly income for the survival of older adults but also dearly inquiring about the efficiency of this kind of time-bound program. Despite this, beyond simply providing minimum conditions to face the ongoing health crisis, it is worth questioning the overall impact that the cutback in assistance will have on households (i.e., out-of-pocket health expenditures), especially in families with the older adult being the provider of needs, or even more eerily, in single-person families. As voiced by Martínez-Franzoni and Sánchez-Ancochea [108], "inclusive social policy in Central America –and other regions of the global South– necessarily calls for a significant redefinition of macroeconomic policies and a narrative around the state as a solution rather than a problem" (p. 5).

Another important observation is that techniques of obituary registry and notification of viral contagions disported suggestive dissimilarity between Central American countries, which makes it harsh to obtain a more accurate approximation regarding the case fatality among the elderly age groups. De facto, the WHO considers the low degrees of completeness and accuracy of hospital records recurring concerns across-the-board, not being different implications during COVID-19. Extraordinary conditions displayed by the pandemic have boosted talk about Public Health 3.0, notably when considering the objectives for sustainable development. Such a promising vision of new public health, now more efficient and adapted to the characteristics of the modern world, stresses five main components to achieve its goals, namely a chief health strategist, engaged community stakeholders, public health accreditation, improving data for decision-making, and an adequate public health funding [109]. Together, these elements would provide better scenarios for geriatric-gerontological care management.

The performance of the Republics of Costa Rica and Panama deserves merit since these countries have a higher degree of universal medical coverage (80% and 72%, respectively), which facilitated a more comprehensive approach during the screening and follow-up campaigns for older persons. Furthermore, being the two wealthier countries, Costa Rica and Panama stood in better conditions to perform more tests and make them available free of charge to the neediest, as reflected in the higher testing rates reported during the first pandemic year [110]. Public investment in Science, Technology, and Education, already salient in these two countries, was the key to grasping the health crisis [111]. In the Panamanian case, the Gorgas Memorial Institute isolated SARS-CoV-2 strains circulating in the country during 2020, thus providing essential biomedical insights to understand the clinicopathological manifestations of the disease in geriatric cases [84]. Likewise, several reports and online newscasts recognized Costa Rica's role in the coordinated management of all levels of care, serving as an example for neighboring countries [112-114]. Although Costa Rica has a unified healthcare model and Panama is a segmented one, these nations demonstrated expertise in preparedness and mitigation plans, just as in the consecutive phases of suppression.

With a strong envisioning and organizational structure of the public health system, Costa Rica delivered geriatric-gerontological healthcare based on community medicine by establishing longitudinal pathways with multi-professional health teams. Historical landmarks separate the vision of the Costa Rican government from that of its neighboring countries. In 1940, the country decided to abolish its army and thus direct considerable public spending to the health and education sectors [115]. It then became clear that the best path to social progress lay in the dignity and welfare of the population; an example of this is the creation of the Costa Rican Social Security Fund, which manages one of the most robust public health systems in Latin America [116]. The presence of this emblematic institution has been responsible for the most solid model of primary care in Central America, frequently featured in international reports from the WHO/PAHO [117].

Transitional laws promoted the construction of field hospitals and third-level care units for the elderly. This measure sought to ameliorate geriatric-gerontological management in most countries in at least two main ways [118]. Firstly, referenced points streamlined the routing of older patients in more aggravated conditions and avoided contact with the rest of the population, thus ensuring integrality on both sides. This intervention also furnished the Pathology departments with better scenarios for forensic examinations and the handling of corpses per current bio standards. A second positive outcome shone concerning the approach to other types of patients deemed at high risk, such as pregnant women and immunocompromised persons. Thus, referral of patients to these types of geriatric clinics for COVID-19 served as a decreasing factor for the bed occupancy rate in the other medical centers, propping the care offered to the abovementioned groups. Similar actions were registered in Japan [119], China [120], and the United States of America [121,122], pointing to the same effects seen in Central America, i.e., a significant reduction in the demand for hospital admissions due to COVID-19, which in turn allowed the care flow for other sensitive chronic diseases to be maintained.

Admittedly, the capacity to counter public health threats left much to desire in most countries, so both sides of the coin deserve mentioning. Primarily, health information systems in Central American countries seem designed to meet expected demand, and in some cases, an outranging one, but they do not comport the capabilities to cope with exponentially unforeseen workflow [112]. It should not come as a surprise, at least for two reasons. The first supports demographic principles that describe the density of health professionals in contrast to the gross population. Theoretically, countries with smaller populations (i.e., Belize, Costa Rica, and El Salvador) would require fewer hospital admissions and reporting capacity than neighboring countries with larger populations (i.e., Guatemala and Nicaragua). Notwithstanding, such an assumption comes rejectable when considering developed countries such as the United States of America, England, Spain, Italy, and Japan also acknowledged having the said difficulties during the pandemic [123,124].

A second explanation of the problem positioned bears precisely a complementary answer since some authors defend the idea that the monitoring of infectious-contagious diseases, as in the case of COVID-19, is not only dependent on the variables of completeness or accuracy of medical records. For them, the existing inequalities in the territories must be taken into account as they directly influence the underreporting rates, as well as veil the real impact of this type of ailments [123,125,126]. Thus, the immediate direction would be to make notifications on a defined time basis, i.e., following the pattern of the epidemiological year, rendering special attention to areas with lower health coverage and to underlying variables such as ethnicity, gender, age, and socioeconomic menace. This way, epidemiological surveillance systems would benefit from accurate national cutoffs amid unexpected emergencies.

In this review, we found regional and national guidelines for the complexity contained within the sociodemographic variable of race, although its inclusion in the several epidemiological bulletins surveyed was not corroborated. From a public health outlook, we consider this an extremely relevant element, as it allows public policymakers to infer the impact of infectious diseases among elderly individuals from diverse racial contexts. Along that thought, a recently published study estimated the ethnic diversity ongoing in Central America based on a comprehensive review of the last five censuses in each country. Its results point out the existence of 64 ethnic and 30 Afro-descendant groups, which amplifies the need to include the race variable as mandatory data in all public reports in the health and social fields [127].

This matter correspondingly prompted ECLAC to make a swift pronouncement in the form of a guideline to Latin American countries so that they would not overlook the fact that the elderly, indigenous, and Afro-descendant peoples were at high hygienic risk for contagions and death [128]. Specifically, the document recognizes the productive dynamics within traditional cultures, where older persons play an active role until old age and the very understanding of old age itself gains a myriad of meanings, all equally valid. In addition to the loss of loved ones, COVID-19 triggered the discontinuity of the knowledge and social practices that constitute the heart of native Central American communities, given that elders are generally seen as the holders of ancestral knowledge, playing leadership roles, also as spiritual advisors, and traditional medicine referents [129]. Nevertheless, the pandemic management in native populations has flagged a series of anthropological and bioethical considerations, mainly due to vaccination being the most effective mechanism to reduce contagion waves and mortality peaks. It is worth remembering that the approach with this population group demands greater sensitivity, absence of prejudice, and respect for the diversity of the other; for such individuals, the understanding of the health-illness continuum escapes the Western immediatism, that is, it lacks biomedical foundations [130].

Whereas it is still too early to draw inferences about a drastic change in the Central American population structure, it is plain that the COVID-19 pandemic produced a significant reduction in the number of older inhabitants. For older adult survivors, the effects extend beyond the pathological sequelae of the disease, as it is equally valid to consider the psychological burden of this historical event. Recent research has been alerting to the need to identify psychosocial changes in this group, as this could be a sentinel factor for the early diagnosis of depression, burnout syndrome, and weakening/rupture of social ties. For instance, Mendoza-Ruvalcaba and colleagues [131] found that quarantine due to COVID-19 negatively influenced physical and mental health as the lifestyle of 712 older adults from four Central American countries. In our study, we located guidelines to approach mental health issues in Costa Rica [132], Panama [133], and Guatemala [134], formulated in a holistic perspective of the psychiatric, psychological, and existential grounds.

Even so, this field still presents multiple voids in countries such as Belize, El Salvador, and Nicaragua because all three nations do not have specific policies or intersectoral plans on mental health [135]. Hence, the actions that arose from the pandemic could provide positive experiences for framing the biopsychosocial concept of health. On December 11, 2020, the countries arranged, through joint negotiation channels, Resolution CCAMH 11-2020 [136] regarding a regional mental health strategy to promote a set of mental health interventions from a community perspective, differentiated by life cycles, vulnerability, and social risks. In doing so, the countries mold their discernment of health, delivering special awareness to biopsychosocial facets.

As if the challenge of taking control over the epidemiological behavior of the virus was not already of outstanding importance, there is no way to obviate the discouraging panorama that the pandemic imposed on the Central American economies [137]. It is, therefore, imperative to propose approaches that are necessarily intersectoral and intergenerational in nature, contemplating an equal degree of responsibility in the public and private sectors. What may seem to be only a task for the Government, relatively speaking in terms of the State's obligations to care for the welfare and development of the aging population, in practice requires efforts from both parties. With significantly less participation in recovery strategies, older citizens claim inclusion with their health and social needs addressed in light of the differences between their age groups [138-140]. It is time for governments to focus their human development goals on their capacity as a region, providing enhanced support and visibility to CAIS-derived agencies. In particular, it is up to the health and social assistance bodies to strengthen the role of older persons in the different programs and plans to be incorporated into the strategic meetings. We borrow Burgos's words [141] to reinforce our statement:

“The re-emergence of a new political subject is crucial in these times of pandemic. The new scenarios allow men and women - protagonist subjects of history - to be responsible for ensuring that structural mechanisms do not become alienating or absolute. Political subjects are challenged to face the events that may occur, as long as they are mediated by ethical principles” (p. 107).

For its part, the chaotic landscape drawn by the pandemic flourished setbacks that increased the tension in the performance of governments, including their capacity and form of public governance, infrastructure, and available resources (human and medical), and the establishment of financial forecasts for the critical recovery stages, and the degree of confidence of their inhabitants to adhere to the prevention and containment strategies decreed. As shown in Table 1, the overall distrust in the State and public institutions is significantly high (75.2%) in Central America, indicating people face more difficulties accepting the impositions and incorporating them without subsequent questioning or disregard, especially in Honduras (85%) and Guatemala (78%).

Data published by ECLAC stress that the degree of confidence in the government's public policy to address the health crisis varied abysmally among countries; the three highest degrees of confidence were found in Costa Rica (92%), Panama (77%), and El Salvador (72%). Conversely, the inhabitants of Honduras (25%) and Nicaragua (32%) indicated the least confidence in the government's ability to remedy the problem [142]. The lack of hinged responses to the emergency coupled with the absence of transparency in management and public health expenditure were supporting variables in the high degree of distrust in public authorities [143]. In Nicaragua, El Salvador and Guatemala, “unless extraordinary phenomena occur that force the governments to return to the democratic path, the possibilities of advancing in the solution of the political crisis through the development of social pacts are remote” [144, (p. 14)].

All these impasses reaffirm the suitability of working from a community-based perspective, which advocates listening to the community itself, from its needs, its context, and its response capabilities once disadvantaged communities find hardships to comply with sanitary measures given the worse hygiene and healthy conditions for human development [145,146]. Such a perspective can shed light on a new way of managing older people's health insofar as the idea of building greater confidence in science and public institutions in Central America goes hand in hand with collaborative work between the political and scientific fields. It is a well-known fact that the partisanship in these territories has created, so to speak, a conflictual environment that holds back regional development strategies [147]. More than ever, people call for transparent mechanisms to identify sources of bias and end suspicions that carry partisan ideologies overshadowing scientific evidence [148]. Seemingly building bonds with community leaders proved to be an excellent way to increase adherence to hygienic measures, despite social inequality gaps.

We are aware of some limitations that may have arisen in this work due to its design. Epidemiological and sociodemographic data are subject to constant variations since they are retrospective data that tend to lose immediate significance when setting prospective explorations. There is also a possibility of underreporting COVID-19 cases due to asymptomatic clinical pictures reported in some patients that hinders diagnosis without biomolecular testing. Hence, the prospects shown in our study should only be from a static standpoint. In line with the above, we admit that the interpretation of our results should not be subject to generalizations precisely so as not to fall into the methodological error of the ecological fallacy. On the other hand, we assert the complexity of qualitative research and so, to reduce the degree of subjectivism, we opted to take the WHO guidelines as the interpretative framework in harmony with the local recommendations and guidelines of CAIS/CCAMH. Noteworthy, data included in this study are of official origin from public institutions, which infers the veracity of the information provided and, at the same time, serves as a methodological strength for this study.

To the best of our knowledge, this is the first study that sought to analyze in comparative perspective the strategies adopted by Central American countries to cope with population aging management during the first two years of the pandemic. We hope that the results shown in our study will serve as a reference to understand the leading role of Central American governments in accounting, according to the possibilities highlighted, for such an unimaginable phenomenon for the entire world. Similarly, we believe the work reinforces the regional debate on successful experiences in Latin America that embrace the aging population as a unit of analysis. In closing, we would like to highlight the urgency of developing studies aimed at the multidimensional impacts posed by the COVID-19 pandemic on Central American elders. We raise the recommendation for scholars/colleagues to consider the development of empirical research through the perspective/experience of the older adult. It would give a voice to an essential element in geriatric-gerontological care, namely the recipient of multidisciplinary healthcare.

We could not fail to give merit to those who deserve it. The response of all health professionals has been exemplary, especially those from geriatrics and gerontology, as they have had to face a heavier care load. To all of you our societies will forever be indebted!

**Declarations**

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References

1. Pal, M.; Berhanu, G.; Desalegn, C.; Kandi, V. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): an update. *Cureus*, 2020, *12*, e7423.
2. Cucinotta, D.; Vanelli, M. WHO declares COVID-19 a pandemic. *Acta Biomed*, 2020, *91*, 157-160.
3. Kang, S.J.; Jung, S.I. Age-related morbidity and mortality among patients with COVID-19. *Infect Chemother*, 2020, *52*, 154-164.
4. Radwan, E.; Radwan, A.; Radwan, W. Challenges facing older adults during the COVID-19 outbreak. *European Journal of Environment and Public Health*, 2021, *5*, 1-6.
5. Abramo, L.; Cecchini, S.; Ullmann, H. Addressing health inequalities in Latin America: the role of social protection. *Cien Saude Coletiva*, 2020, *25*, 1587-1598.
6. Rodríguez-Apolinar, S.; Fernández-Arias, E. The productivity gap in Latin America: lessons from 50 years of development. IDB Working Paper ADB-WP-692. *Inter-American Development Bank*, 2016.
7. Amarante, V.; Colacce, M.; Manzi, P. Aging and productivity in Latin America. *Latin American Research Review*, 2021, *56*, 844-866.
8. Dávila-Cervantes, C.; Agudelo-Botero, M. Health inequalities in Latin-America: persistent gaps in life expectancy. *The Lancet Planetary Health*, 2019, *3*, 492-493.
9. Ali, I.; Alharbi, O.M.L. COVID-19: disease, management, treatment, and social impact. *Science of the Total Environment*, 2020, *728*, 1-6.
10. Cervantes, A.; Matarrita, M.; Reca, S. Los estados de excepción en tiempos de pandemia: un estudio comparado en América Latina. *Cuadernos Manuel Giménez Abad*, 2020, *20*, 179-206.
11. Bonilla-Cruz, N.J.; Cudris-Torres, L.; Mendoza-Rincón, B.M.; Gamboa-Aldana, A.S.; Fiogiony-Santos, J. Health strategies in Latin America for the elderly in relation to COVID-19. *Gac Méd Caracas*, 2020, *128*, 301-311.
12. Quesada-Román, A.; Torres-Bernhard, L.; Ruíz-Álvarez, M.A.; Rodríguez-Maradiaga, M.; Velázquez-Espinoza, G.; et al. Geodiversity, geoconservation, and geoturism in Central America. *Land*, 2022, *11*, 1-16.
13. Báez, R.R. The economic role of tourism in Central America. *SIECA's Directorate of Economic Intelligence: Policy Brief*, 2015, *13*, 1-12.
14. Alvarez, M.V. Latin American public opinion vis-à-vis regional integration (1995-2018). *Estudios Internacionales*, 2021, *53*, 33-60.
15. Central American Integration Scheme (Sistema de Integración Centroamericana, SICA). Protocolo de Tegucigalpa a la Carta de la Organización de Estados Centroamericanos (ODECA). Available online: <http://www.sice.oas.org/trade/sica/SG121391.asp>. (Accessed on 10 October 2022).
16. Council of Central American Ministers of Health (Consejo Centroamericano de Minsitros de Salud, COMISCA). Legal framework. Available online: <https://www.sica.int/comisca/marco_juridico.aspx>. (Accessed on 10 October 2022).
17. Monge, P.; Carmenate, L.; Piedra, N.; Aragón, A.; Partanen, T. Work and health in Central America. *Arch Prev Riesgos Labor*, 2010, *13*, 84-91.
18. Rubio, X.A.B.; Ugarte, V.S.R. Normativity and social vision about participatory public healthcare policies in Central America. *R. Katál.,* 2014, *17*, 242-251.
19. Delgado, B.M.G.; Silva, AP.; Rodríguez, J.M. Concept map on health and intellectual property in Central America and the Dominican Republic. *Rev Panam Salud Publica*, 2019, *43*, 1-9.
20. Vega, J.; Frenz, P. Latin America: priorities for universal health coverage. *The Lancet*, 2014, *385*, e31-e32.
21. Marzioni, S.C. Pandemic, aging and public policies in Latin America. Theoretical notes to think about the problem of unequal old age from the perspectives of the life course and the political economy of aging. *Anthropologica*, 2021, *39*, 157-181.
22. Gutiérrez-Murillo, R.S. Health and social rights of older adults in continental Central America: a comparative historical and legal analysis. *J Aging Sci*, 2021, *9*, 1-10.
23. Backman, G.; Hunt, P.; Khosla, R.; Jaramillo-Strouss, C.; Fikre, B.M.; Rumble, C.; et al. Health systems and the right to health: an assessment of 194 countries. *The Lancet*, 2008, *372*, 2047-2085.
24. CAIS's Regional Health Policy 2015-2022. Approved at the 44th Ordinary Meeting of Heads of State and Government of the Central American Integration Scheme, December 2014. Available online: <https://centro.observatoriorh.org/sites/centro.observatoriorh.org/files/webfiles/fulltext/2014/politica_salud_sica_15_22.pdf>. (Accessed on 10 October 2022).
25. Council of Central American Ministers of Health (CCAMH). Resolution CCAMH 08-2020, Regarding the final evaluation of the Central American and Dominican Republic Health Plan 2016-2020. Available online: <https://www.sica.int/documentos/resolucion-comisca-08-2020-relativa-a-la-evaluacion-final-del-plan-de-salud-de-centroamerica-y-republica-dominicana-2016-2020_1_127447.html>. (Accessed on 10 October 2022).
26. Hirakawa, Y. Defining and implementing value-based healthcare for older people from a geriatric and gerontological perspective. *Int J Environ Res Public Health*, 2022, *19*, 1-13.
27. Fortín-Magaña, M.; Gómez-Casanovas, J.; López-Saca, M. Current status of palliative medicine training in Central American universities. *Educ Med*, 2017, *18*, 242-248.
28. Morales-Martínez, F.; Salazar-Sánchez, L. Teaching of geriatrics and gerontology in Latin American and the Caribbean. *J Lat Am Geriat Med*, 2020, *6*, 17-24.
29. Freitas, M.T.A. A abordagem sócio-histórica como orientadora da pesquisa qualitativa. *Cadernos de Pesquisa*, 2002, *116*, 21-39.
30. Breihl, J. Introduction: Critical epidemiology – Bold scientific thinking and global irruption of inequity. In *Critical Epidemiology and the People's Health, SMALL BOOKS BIG IDEAS POPULATION HEALTH*. 1st ed.; Krieger, N.; Oxford Academic: United States, 2021; Volume 1; pp. 1-18.
31. Gietel-Basten, S.; Giorguli-Saucedo, S.E.; Scherbov, S. Prospective measures of aging for Central and South America. *PLoS ONE*, 2020, *15*, 1-14.
32. ECLAC. Statistics and indicators: demographic and social. Available online: <https://statistics.cepal.org/portal/cepalstat/dashboard.html?theme=1&lang=en>. (Accessed on 10 October 2022).
33. Observatorio Regional SICA-COVID-19. Available online: <https://www.sica.int/coronavirus/observatorioSICACOVID19>. (Accessed on 10 October 2022).
34. PAHO/WHO. Geo-Hub COVID-19 Information System for the Region of the Americas: Central America COVID-19 Situation. Available online: <https://paho-covid19-response-who.hub.arcgis.com/pages/paho-central-america-covid-19-response>. (Accessed on 10 October 2022).
35. WHO. Public Health and Social Measures Response to COVID-19. Available online: <https://phsm.euro.who.int/>. (Accessed on 10 October 2022).
36. WHO. A systematic approach to monitoring and analysing public health and social measures (PHSM) in the context of the COVID-19 pandemic: underlying methodology and application of the PHSM database and PHSM Severity Index. Copenhagen: WHO Regional Office for Europe; 2020.
37. Jiménez-Montero, J.G.; Villegas-Barakat, M.; Cerdas-Salas, O.; Coto-Hernández, M.; Sancho-Ugalde, H. COVID-19 in Costa Rica: achieved goals and imminent risks. *Int J Biomed Res Prac*, 2020, *1*, 1-4.
38. Salas, A.; Prado, A.M. The coronavirus pandemic and the Costa Rican health system (INCAE Business School). *Health Management, Policy and Innovation*, 2020, 5, 1-7.
39. Barboza, L.A.; Vásquez, P.; Mery, G.; Sánchez, F.; García, Y.E.; Calvo, J.G.; et al. The role of mobility and sanitary measures on the delay of community transmission of COVID-19 in Costa Rica. *Epidemiologia*, 2021, *2*, 294-304.
40. Sanchez, F.; Calvo, J.G.; García, Y.E.; Barboza, L.A.; Vásquez, P.; Mery, G.; et al. A multilayer network model of COVID-19: implications in public health policy in Costa Rica. *Epidemics*, 2022, 1-17.
41. Rivera, R.; Ramírez, M.; Rodríguez, A.; Hernández, J. COVID-19 in Panama and the world: literature review. *Rev Méd Cient*, 2021, *32*, 37-60.
42. WHO COVID-19 Situation Report Edition 71, 2020. Available online: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200331-sitrep-71-covid-19.pdf?sfvrsn=4360e92b_8>. (Accessed on 10 October 2022).
43. Henriquez-Marquez, K.I.; Zambrano, L.I.; Orteaga-Livias, K.; Rodríguez-Morales, A.J. Prevention and early identification of COVID-19 suspected cases at the first level of care in Central America. *Aten Primaria*, 2021, *53*, 115-116.
44. Li, Guangdi.; Liu, Y.; Wang, Y.; Miao, M.; Toa, L.; Zhou, Z.; et al. Mortality risk of COVID-19 in elderly males with comorbidities: a multi-country study. *Aging-US*, 2021, *13*, 27-60.
45. Andrus, J.K.; Evans-Gilbert, T.; Santos, J.I.; Guzman, M.G.; Rosenthal, P.J.; Toscano, C.; et al. Perspectives on battling COVID-19 in Latin America and the Caribbean. *Am J Trop Med Hyg*, 2020, 103, 593-596.
46. Fantin, R.; Brenes-Camacho, G.; Barboza-Solís, C. COVID-19 deaths: distribution by age and universal medical coverage in 22 countries. *Rev Panam Salud Publica*, 2021, *45*, 1-9.
47. Velásquez-García, E. Analysis of two age groups with COVID-19 to assess survival using the Kaplan-Meier tests. *Rev Méd (Col Méd Cir Guatem)*, 2021, *160*, 133-139.
48. Bonilla-Carrión, R.; Zapata-Quintanilla, E.A. Geospatial analysis of COVID-19 in Honduras after 18 months of pandemic. *Rev Méd (Col Méd Cir Guatem)*, 2021, *160*, 212-223.
49. Ioannidis, J.P.A.; Axfors, C.; Contopoulos-Ioannidis, D.G. Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying diseases in pandemic epicenters. *Environmental Research*, 2020, *188*, 1-10.
50. Araujo-Banchon, W.; Aveiro-Róbalo, T.R.; Fernández, M.F.; Castro-Pacoricona, D.; Moncada-Mapelli, E.; Chanava, W.; et al. Progression of coronavirus cases in Latin America: comparative analysis of one week after the start of the pandemic in each country. *Kasmera*, 2020, *48*, 1-11.
51. Hernández-Huerta, M.T.; Pérez-Campos, L.M.; Romero-Díaz, C.; Martínez-Cruz, M.; Mayoral-Andrade, G.; et al. Analysis of SARS-CoV-2 mutations in Mexico, Belize, and isolated regions of Guatemala and its implication in the diagnosis. *J Med Virol*, 2021, *93*, 2099-2114.
52. Lundberg, A.L.; Lorenzo-Redondo, R.; Ozer, E.A.; Hawkins, C.A.; Hultquist, J.F.; Welch, S.B.; Prasad, P.V.S.; et al. Has Omicron changed the evolution of the pandemic? *JMIR Public Health Surveill*, 2022; *8*, e35763.
53. Felix, P.T.; Ramos, R.S.; Venâncio, D.B.R.; da Silva, E.D.A.B.; Albuquerque, R.M. The new Coronavirus (SARS-CoV-2) in Central America: Demographic-spatial simulations, Analyses of Molecular Variance (AMOVA) and Neutrality Tests in complete genomes from Belize, Guatemala, Cuba, Jamaica and Puerto Rico. *medRxiv*, 2020, *12*, 1-17.
54. WHO's COVID-19 Situation Report Edition 71, 2021. Available online: <https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---21-december-2021>. (Accessed on 10 October 2022).
55. Malamud, C.; Núñez, R. Vacunas sin integración y geopolítica en América Latina. *ARI*, 2021, *21*, 1-12.
56. Castillo, Z.C.; Castillo, J.M. Estudio de distribución de vacunas contra el COVID-19 en América Latina y el Caribe: el caso de Panamá. Documentos de Proyectos (LC/TS.2022/67), Santiago, Comisión Económica para América Latina y el Caribe (CEPAL), 2022.
57. Zambrano, L.I.; Henríquez-Márquez, K.I.; Fuentes-Barahona, I.C.; Sierra-Santos, M.A.; Muñoz-Lara, F. Vaccination against COVID-19, challenges and challenges for the Honduran health system until May 2021. *Gac Méd Caracas*, 2022, *130*, 370-381.
58. Organisation for Economic Co-operation and Development. COVID-19 in Latin America and the Caribbean: An overview of government responses to the crisis. Available online: <https://read.oecd-ilibrary.org/view/?ref=129_129907-eae84sciov&title=COVID-19-in-Latin-Amercia-and-the-Caribbean_An-overview-of-government-responses-to-the-crisis>. (Accessed on 10 October 2022).
59. Belize. Belize COVID-19 Response Project P177987. Available online: <https://documents1.worldbank.org/curated/en/099140001122250774/pdf/Project0Inform0e0Project000P177987.pdf>. (Accessed on 10 October 2022).
60. Costa Rica. Comprehensive proposal for the protection of the elderly before COVID-19. Available online: <https://www.ministeriodesalud.go.cr/index.php/biblioteca-de-archivos-left/documentos-ministerio-de-salud/vigilancia-de-la-salud/normas-protocolos-guias-y-lineamientos/situacion-nacional-covid-19/estrategias-guias-y-recomendaciones-covid-19/3192-version-1-22-de-abril-2020-estrategia-de-comunicacion-propuesta-integral-para-la-proteccion-de-personas-adultas-mayores-ante-lacovid-19/file>. (Accessed on 10 October 2022).
61. Costa Rica. Guideline for the care of the elderly in the territory in the COVID-19 emergency. Available online: <https://www.ministeriodesalud.go.cr/index.php/biblioteca-de-archivos-left/documentos-ministerio-de-salud/vigilancia-de-la-salud/normas-protocolos-guias-y-lineamientos/situacion-nacional-covid-19/estrategias-guias-y-recomendaciones-covid-19/3195-version-1-22-de-abril-2020-guia-para-la-atencion-a-las-personas-adultas-mayores-en-territorio-ante-la-emergencia-por-la-covid-19/file>. (Accessed on 10 October 2022).
62. Costa Rica. Guideline for telephone follow-up of the elderly in the face of the pandemic by COVID-19. Available online: <https://www.ministeriodesalud.go.cr/index.php/biblioteca-de-archivos-left/documentos-ministerio-de-salud/vigilancia-de-la-salud/normas-protocolos-guias-y-lineamientos/situacion-nacional-covid-19/estrategias-guias-y-recomendaciones-covid-19/3193-version-1-22-de-abril-2020-guia-para-el-seguimiento-telefonico-y-acompanamiento-en-territorio-a-las-personas-adultas-mayores-segun-riesgo-ante-la-covid-19/file>. (Accessed on 10 October 2022).
63. El Salvador. National preparedness and response plan for Novel Coronavirus (2019 - nCov), El Salvador 2020. Available online: <https://recursos.elsalvador.com/documentos/2020/04/20200401-plan-nacional-respuesta-covid19.pdf>. (Accessed on 10 October 2022).
64. Guatemala. Plan for the Prevention, Containment and Response to cases of Coronavirus (COVID-19) in Guatemala. Available online: <https://covid19-evidence.paho.org/handle/20.500.12663/772>. (Accessed on 10 October 2022).
65. Guatemala. COVID-19 humanitarian response plan. Available online: <https://guatemala.un.org/es/92048-plan-de-respuesta-humanitaria-covid-19-guatemala>. (Accessed on 10 October 2022).
66. Honduras. COVID-19's National Risk Communication and Social Participation Plan in Honduras. Available online: <http://www.salud.gob.hn/site/index.php/component/edocman/plan-comunicacion-de-riesgo-covid-19>. (Accessed on 10 October 2022).
67. Honduras. Guidelines for the implementation of temporary shelters in emergency and disaster situations in the context of COVID-19. Available online: <http://www.salud.gob.hn/site/index.php/component/edocman/sesal-lineamientos-implementacio-n-de-albergues-covid-19-honduras-091120-1>. (Accessed on 10 October 2022).
68. Panama. Guidelines for the Management of Suspected or Confirmed COVID-19 Patients in Nursing Homes for the Elderly. Available online: <https://www.minsa.gob.pa/sites/default/files/publicacion-general/guia_para_el_manejo_de_pacientes_sospechosos_o_confirmados_por_covid-19_en_casas_hogares_para_personas_adulta_mayores_def_0.pdf>. (Accessed on 10 October 2022).
69. Panama. Return to Normality Guide in the Development of the National Palliative Care Program in Ministry of Health Facilities. Available online: <https://www.minsa.gob.pa/sites/default/files/publicacion-general/guia_de_cuidados_paliativos.pdf>. (Accessed on 10 October 2022).
70. Declaration of the Heads of State and Government of Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama and the Dominican Republic on the COVID-19 Pandemic: “Central America united against COVID-19. Available online: <https://www.sica.int/coronavirus/declaracion>. (Accessed on 10 October 2022).
71. CCAMH 02-2020 Resolution regarding the approval of the Regional Contingency Plan aimed at complementing national efforts for prevention, containment, and treatment of COVID-19 and other rapidly spreading diseases. Available online: <https://www.sica.int/documentos/resolucion-comisca-02-2020-relativa-a-la-aprobacion-del-plan-de-contingencia-regional-orientado-a-complementar-los-esfuerzos-nacionales-para-la-prevencion-contencion-y-tratamiento-del-covid-19-y-otras-enfermedades-de-rapida-propagacion_1_121785.html>. (Accessed on 10 October 2022).
72. Regional Contingency Plan Aimed at complementing national efforts for prevention, containment, and treatment of COVID-19). Available online: <https://www.sica.int/coronavirus/plan>. (Accessed on 10 October 2022).
73. Report 1: Central America united against COVID-19. Available online: <https://hica.csuca.org/attachments/article/295/Informe%201-%20Centroamerica%20unida%20contra%20el%20coronavirus%20(COVID-19).pdf>. (Accessed on 10 October 2022).
74. Institute of Nutrition of Central America and Panama. Recommendations for healthy eating during COVID-19. Available online: <http://www.incap.int/index.php/es/noticias/213-recomendaciones-alim-saludable-covid19>. (Accessed on 10 October 2022).
75. Shelter management considerations in the COVID-19 context. Available online: <https://www.sica.int/documentos/cepredenac-consideraciones-para-manejo-de-albergues-en-contexto-covid-19_1_122357.html>. (Accessed on 10 October 2022).
76. Letter for the Future of Central American Integration - Vinicio Cerezo, Secretary-General of the CAIS. Available online: [https://www.sica.int/integracion/2020/carta#:~:text=La%20carta%20se%20divide%20en,Honduras%2C%20Nicaragua%2C%20Costa%20Rica%2C](https://www.sica.int/integracion/2020/carta" \l ":~:text=La%20carta%20se%20divide%20en,Honduras%2C%20Nicaragua%2C%20Costa%20Rica%2C). (Accessed on 10 October 2022).
77. Progress Report on the Implementation of the CAIS Regional Contingency Plan against Coronavirus: Implementation of actions aimed at complementing national efforts. Available online: <https://www.sica.int/documentos/sica-informe-de-9-meses-del-plan-de-contingencia-frente-al-coronavirus_1_125857.html>. (Accessed on 10 October 2022).
78. CCAMH 02-2021 Resolution, regarding the approval of the Central American and Dominican Republic Health Plan 2021-2025). Available online: <https://www.sica.int/documentos/informe-de-gestion-de-la-secretaria-ejecutiva-del-comisca-02-2021_1_129042.html>. (Accessed on 10 October 2022).
79. World Health Organization. *Delivering quality health services: a global imperative for universal health coverage*. 1st Ed. World Health Organization, Organisation for Economic Co-operation and Development, and the World Bank. Geneva, Switzerland, 2018, pp. 1-100.
80. Parthenay, K. Uniting (regionally) against COVID-19: SICA and CARICOM. *Foro Internacional (FI)*, 2021, *61*, 387-425.
81. Huenchuan, S. COVID-19: Recomendaciones generales para la atención a personas mayores desde una perspectiva de derechos humanos (LC/MEX/TS.2020/6/Rev.1), Ciudad de México, Comisión Económica para América Latina y el Caribe (CEPAL), 2020.
82. Berg, L.; Alm, E. A conversation about the state in pandemic times: necropolitics and the legacy of social democracy in Sweden and Nicaragua. *Kulturella Perspektiv – Svensk Etnologisk Tidskkrift*, 2021, *30*, 1-9.
83. Jarquín, M.C. COVID-19 and the state: Nicaragua case study. World Institute for Development Economics Research. *WIDER Working Paper*, 2022, *41*, 1-21.
84. Chaves, F.L.; Friberg, M.D.; Hurtado, L.A.; Marín-Rodríguez, R.; O’Sullivan, D.; et al. Trade, uneven development and people in motion: used territories and the initial spread of COVID-19 in Mesoamerica and the Caribbean. *Socio-Economic Planning Sciences*, 2022, *80*, 1-14.
85. Thaler, K.M. Nicaragua and COVID-19: Authoritarian indifferences. In *COVID-19 and Governance*. 1st Ed; Pieterse, J.N.; Lim, H.; Khondker, H. Routledge: London, United Kingdom, 2021, Volume 1, pp. 229-241.
86. Hotez, P.J.; Huete-Pérez, J.A.; Bottazzi, M.E. COVID-19 in the Americas and the erosion of human rights for the poor. *PLoS Negl Trop Dis*, 2020, *14*, 1-7.
87. Paisano, D.C.S. Antecedentes y desafíos actuales de la gobernanza en el proceso de integración centroamericano. *Revista de Estudios Europeos*, 2018, *72*, 161-184.
88. Salazar-Mather, T.P.; Gallo-Marin, B.; Medina-Pérez, G.; Christophers, B.; Paiva, M.L.; et al. Love in time of COVID-19: negligence in the Nicaraguan response. *The Lancet Global Health*, 2020, *8*, e773.
89. Martínez-Córdoba, P.J.; Benito, B.; García-Sánchez, I.M. Efficiency in the governance of the COVID-19 pandemic: political and territorial factors. *Globalization and Health*, 2021, *17*, 1-13.
90. Nieves-Cuervo, G.M.; Manrique-Hernández, E.F.; Robledo-Colonia, A.F.; Grillo-Ardila, E.K. Infodemia: fake news and COVID-19 mortality trends in six Latin American countries. *Rev Panam Salud Publica*, 2021, *45*, 1-8.
91. Pan American Health Organization. Fact sheets: understanding infodemic and misinformation in the fight against COVID-19. Washington, DC: PAHO/WHO, 2020.
92. Durón, R.M.; Salavarría, N.; Hesse, H.; Summer, A.; Holden, K. Perspectivas de la telemedicina como alternativa para la atención en salud en Honduras. *Innovare*, 2016, *5*, 49-55.
93. Valerio-Monge, C.J. Telemedicine. A look at international ethical and legal best practices. In particular, confidentiality and informed consent in Latin American legislation. *Bioderecho.es*, 2021, *14*, 1-21.
94. Siles, I. The Internet as a transnational project: connecting Central America through computer networks (1990–1996). *Internet Histories*, 2018, *2*, 230-246.
95. Seifert, A.; Cotton, S.R.; Xie, B. A double burden of exclusion? Digital and social exclusion of older adults in times of COVID-19. *J Gerontol B Pyschol Sci Soc*, 2021, *76*, 99-103.
96. Barrantes-Sotela, O.; Solano-Mayorga, M.A. Spatial behavior of COVID-19 pandemic in Costa Rica during the months of March and April 2020 through a spatial autocorrelation analysis. *Posicion*, 2020, *3*, 1-17.
97. Durón, R.M.; Sánchez, E.; Choi, J.N.; Peralta, G.; Ventura, S.G.; Soto, R.J.; et al. Honduras: two hurricanes, COVID-19, dengue and the need for a new digital health surveillance system. *Journal of Public Health*, 2021, *43*, e297-e298.
98. Chaves, L.F.; Hurtado, L.A.; Ramírez-Rojas, M.; Friberg, M.D.; Maríz-Rodríguez, R.; et al. COVID-19 basic reproduction number and assessment of initial suppression policies in Costa Rica. *Math Model Nat Phenom*, 2020, *15*, 1-13.
99. Galán-Rodas, E.; Zamora, A. e-Health literacy for strengthen the health systems in Central America. *Rev Hisp Cienc Salud*, 2015, *1*, 29-33.
100. Pineda, G.M.; Sánchez, E.; Bardales, J.; Rodríguez, G.; Rodríguez, O.; Peralta, G.; et al. Data management for departmental epidemiology and local actions against COVID-19 in Honduras. *INNOVARE Revista de Ciencia y Tecnología*, 2021, *10*, 120-123.
101. Alger, J.; Espinoza-Salvadó.; Valenzuela, R.; De Haan, S.; Cuervo, L.G.; et al. Primera conferencia Latinoamericana sobre investigación e innovación en salud, Rio de Janeiro, Brasil, abril 14-18, 20008. *Rev Med Hondur*, 2008, *76*, 88-93.
102. Mothe, J.; Vacaflor, L.E.; Castro-Arroyave, D.M.; Cuervo, L.G.; Gore-Saravia, N. Exploring social innovation in health in Central America and the Caribbean. *Rev Panam Salud Publica*, 2020, *44*, 1-6.
103. Hechavarría-Cabrera, C.L. Balance of the commercial and productive integration of the Central American Common Market. The impact of the pandemic. *Revista Cubana de Economía Internacional*, 2021, *8*, 160-177.
104. World Bank. Post COVID-19 - Building a Resilient and More Sustainable Recovery in El Salvador, Guatemala, and Honduras. Central America Competitiveness Report, 2022. Available online: <https://elibrary.worldbank.org/doi/pdf/10.1596/37689>. (Accessed on 10 October 2022).
105. Inter-American Development Bank. El impacto del COVID-19 en las economías de la región (Centroamérica). Official Report, 2021. Available online: <https://publications.iadb.org/es/el-impacto-del-covid-19-en-las-economias-de-la-region-centroamerica>. (Accessed on 10 October 2022).
106. Prunier, D.M.; Salazar, S. Central American borders and mobility in 2020. A region of fractures and inequalities impacted by COVID-19. *Estudios Fronterizos*, 2021, *22*, 1-31.
107. Webster, A.; Khorana, S.; Pastore, F. The effects of COVID-19 on employment, labor markets, and gender equality in Central America. *IZA Journal of Development and Migration*, 2022, *13*, 1-43.
108. Martínez-Franzoni, J.; Sánchez-Ancochea, D. A lost opportunity to build social protection for all? Scenarios following emergency transfers in Central America. *United Nations Research Institute for Social Development*, 2022, 1-5.
109. Benjamin, G.C. Ensuring health equity during the COVID-19 pandemic: the role of public health infrastructure. *Rev Panam Salud Publica*, 2020, *44*, 1-4.
110. Pearson, A.A.; Prado, A.M.; Colburn, F.D. Nicaragua's surprising response to COVID-19. *J Global Health*, 2020, *10*, 1-5.
111. Leite, J.A.; Vicari, A.; Perez, E.; Siqueira, M.; Resende, P.; Motta, F.C.; et al. Implementation of a COVID-19 Genomic Surveillance Regional Network for Latin America and Caribbean region. *PLoS ONE*, 2022, *17*, 1-12.
112. Díaz-Arias, D.; Viales-Hurtado, R. Central America: neoliberalism and COVID-19. *Geopolítica(s)*, 2020, *11*, 53-59.
113. Abbas, M.Z. Treatment of novel COVID-19: why Costa Rica’s proposal for the creation of global pooling mechanism deserves serious considerations? *J Law Biosci*, 2020, *26*, 1-10.
114. Pearson, A.A.; Prado, A.M.; Colburn, F.D. The puzzle of COVID-19 in Central America and Panama. *J Global Health*, 2021, *11*, 1-7.
115. Campbell-Barr, E.; Marmot, M. Leadership, social determinants of health and health equity: the case of Costa Rica. *Rev Panam Salud Publica*, 2020, *44*, 1-4.
116. Martínez-Franzoni, J.; Sánchez-Ancochea, D. Good jobs and social services: how Costa Rica achieved the elusive double incorporation. 1st Ed. Palgrave Macmillan London. Geneva, Switzerland, 2013, pp. 1-176.
117. Pan American Health Organization. *Health in the Americas+*, 2017 Edition. Summary: Regional outlook and Country profiles. Washington, D.C.: PAHO; 2017.
118. Bello, M.; Segura, V.; Camputaro, L.; Hoyos, W.; Maza, M.; Sandoval, X.; et al. Hospital El Salvador: a novel paradigm of intensive care in response to COVID-19 in Central America. *The Lancet Global Health*, 2021, *9*, 241-242.
119. Kim, M.H.; Son, N-H.; Park, Y.S.; Lee, J.H.; Kim, D.A.; Kim, Y.C. Effect of a hospital-wide campaign on COVID-19 vaccination uptake among healthcare workers in the context of raised concerns for life-threatening side effects. *PLoS ONE*, 2021, *16*, 1-14.
120. Cao, Y.; B, Li, Q.; Chen, J.; Guo, X.; Miao, C.; Yang.; et al. Hospital emergency management plan during the COVID-19 epidemic. *Academic Emergency Medicine*, 2020, *27*, 309-311.
121. Baum, A.; Schwartz, M.D. Admissions to veterans affairs hospitals for emergency conditions during the COVID-19 pandemic. *JAMA*, 2020, 324, 96-99.
122. Nourazari, S.; Davis, S.R.; Granovsky, R.; Austin, R.; Straff, D.J.; Joseph, J.W.; et al. Decreased hospital admissions through emergency departments during the COVID-19 pandemic. *American Journal of Emergency Medicine*, 2021, *42*, 203-210.
123. Fryers, P.T.; Barnard, S.; Burton, P.R.; Fox, S.; Waller, Z.; Fitzpatrick, J. Excess mortality in England during the COVID-19 pandemic. In Proceedings of the 14th European Public Health Conference, Brussels, Belgium, 10 November 2021.
124. Andrasfay, T.; Goldman, N. Reductions in 2020 US life expectancy due to COVID-19 and the disproportionate impact on the Black and Latino populations. *Proc Natl Acad Sci*, 2021, *118*, 1-6.
125. Aburto, J.M.; Schöley, J.; Kashnitsky, I.; Zhang, L.; Rahal, C.; Missov, T.I.; et al. Quantifying impacts of the COVID.19 pandemic though life-expectancy losses: a population-level study of 29 countries. *International Journal of Epidemiology*, 2022, *51*, 63-74.
126. Goldstein, J.R.; Lee, R.D. Demographic perspectives on the mortality of COVID-19 and other epidemics. *Proc Natl Acad Sci*, 2020, *117*, 22035-22041.
127. Flores, K.L. Rescuing the identity of indigenous and Afro-descendant peoples in Central America as a tool for integration after 200 years of independence. *Revista de Fomento Social*, 2022, *302*, 73-86.
128. Economic Commission for Latin America and the Caribbean. *The impact of COVID-19 on indigenous peoples in Latin America-Abya Yala: Between invisibilization and collective resistance*. Project Documents (LC/TS.2020/171), Santiago, 2020, 1-87.
129. Acosta, M.L. Pueblos indígenas y afrodescendientes y las medidas para enfrentar el COVID-19. In *COVID-19, el caso de Nicaragua: aportes para enfrentar la pandemia*, 2nd ed; Huete-Pérez, J.A.; Ortega-Hegg, M.; ACN Academia de Ciencias de Nicaragua: Managua, Nicaragua, 2020, Volume 1, pp. 23-30.
130. Junior, D.S.; Leivas, P.G.C. The right to health of indigenous peoples and the paradigm of recognition. *Rev. Direito e Práx.*, 2017, *8*, 86-117.
131. Mendoza-Ruvalcaba, N.M.; Gutiérrez-Herrera, R.; López, C.; Hesse, H.; Soto-Añari, M.; et al. Impact of quarantine due to COVID-19 pandemic on health and lifestyle conditions in older adults from Centro American countries. *PLoS One*, 2022, *17*, 1-11.
132. Leandro-Astorga, G.; Barrientos-Calvo, I. COVID-19 infection in the elderly: recommendations for professionals. *Rev Med Cos Cen*, 2020, *85*, 44-50.
133. Republic of Panama. Public Defender’s Office. Report of visits made to elderly care centers. April-May, 2021, 1-35.
134. Osorio-Figueroa, C.D. Guatemala's primary healthcare role in COVID-19: limits and potentialities. *Saude Debate*, 2021, *45*, 778-794.
135. Rodríguez, J.J.; Barrett, T.; Narváez, S.; Caldas, J.M.; Levak, I.; Saxena, S. Mental health systems in El Salvador, Guatemala, and Nicaragua: results of a WHO-AIMS evaluation. *Rev Panam Salud Publica*, 2007, *25*, 348-357.
136. Council of Central American Ministers of Health (CCAMH). Resolution CCAMH 11-2020, Regarding the CCAMH Regional Strategy for Mental Health. Available online: <https://www.sica.int/documentos/resolucion-comisca-11-2020-relativa-a-la-estrategia-regional-de-salud-mental-del-comisca_1_127449.html>. (Accessed on 10 October 2022).
137. Caruso, G.D.; Cucagna, M.E.; Ladronis, J. The distributional impacts of the reduction in remittances in Central America in COVID-19 times. *Research in Social Stratification and Mobility*, 2021, *71*, 1-5.
138. Child, J. Organizational participation in post-covid society- its contributions and enabling conditions. *International Review of Applied Economics*, 2021, *35*, 117-146.
139. Robles, C.; Rossel, C. Social protection tools for copings with the impacts of the COVID-19 pandemic: the Latin American experience. Project Documents (LC/TS.2021/135), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2022, 1-73.
140. Juárez-Padilla, F.; Machorro, L.; Pira, M.S. Priorities for a fair recovery from COVID-19 in Latin America. Policy Brief Nº. 6. Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2021, 1-22.
141. Burgos, J.A.B. A new political concept for post-covid political culture: reflections from democracy and citizen participation. *Estado & Comunes, Revista de Políticas y Problemas Públicos*, 2022, *15*, 101-113.
142. Economic Commission for Latin America and the Caribbean. Enríquez, A.; Sáenz, C. Primeras lecciones y desafíos de la pandemia de COVID-19 para los países del SICA. Serie de Estudios y Perspectivas – Sede Subregional de la CEPAL en México, Nº 189 (LC/TS.2021/38; LC/MEX/TS.2121/5), Ciudad de México, 2021, 1-106.
143. Segovia, A. Las respuestas de Centroamérica ante la pandemia: distintas prioridades y apuestas riesgosas. *Canálisis Carolina*, 2020, *14*, 1-12.
144. Segovia, A. Centroamérica en su laberinto: reflexiones sobre la naturaleza de la crisis y criterios para abordarla. Documentos de trabajo N.º 72 (2ª época), Madrid, Fundación Carolina, 2022, 1-24.
145. Moran, C.; Campbell, D.J.T.; Campbell, T.S.; Roach, P.; Bourassa, L.; et al. Predictors of attitudes and adherence to COVID-19 public health guidelines in Western countries: a rapid review of the emerging literature. *J Public Health*, 2021, *43*, 739-753.
146. Weiss, B.D.; Paasche-Orlow, M.K. Disparities in adherence to COVID-19 public health recommendations. *Health Lit Res Pract*, 2020, *4*, 171-173.
147. Pignataro, A.; Treminio, I.; Chavarría-Mora, E. Democracy, citizen support, and new generations in the face of democratic blacksliding in Central America. *Anuario de Estudos Centroamericanos*, 2021, *47*, 1-30.
148. Cortés-Zea, C. Bringing forward the 2030 development agenda to revitalise Central American integration. *Revista Fomento Social*, 2022, *77*, 57-72.