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EPIDEMIOLOGICAL BEHAVIOR OF COVID-19 AND CENTRAL AMERICAN COUNTRIES' HYGIENE APPROACH TOWARDS IT

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ABSTRACT

This paper aimed to analyze the hygienist strategies adopted by the Council of Ministers of Health of Central America (CMHCA), in the context of the coronavirus disease 2019 (COVID-19) pandemic and to describe the epidemiological profile of COVID-19 in such territory during 2020. A mixed study (quantitative and qualitative) was carried out. Firstly, we opted for a research framed in the mixed ecological type (of time series and multiple groups), of descriptive nature and with quantitative bias (to describe the epidemiological behavior of COVID-19). Next in order, a documentary critical review, with a qualitative bias and an analytical approach, which investigated official documents published by the CMHCA was carried out (to analyze the hygienist strategies adopted by the CMHCA). Up to December 31, 2020, a total of 2.538.723 (X=105.531; SD=89.225) infections by SARS-CoV-2 were notified in Central America. The three highest coefficient of contagion were noted in Panama (n=246.790; 9,72%), Costa Rica (n=169.312; 6,67%) and Guatemala (n=138.012; 5,44%). Furthermore, 22,26% of the total registered cases were recovered and the regional lethality coefficient of COVID-19 was 0,62%. Guatemala (n=4.813; 30,28%), Panama (n=4.022; 25,31%) and Honduras (n=3.130; 19,7%).

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INTRODUCTION

The current socio-sanitarian crisis triggered by the new manifestation of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) deserves to be accused as one of the most significant changes in the world order in recent centuries. It comes considerably closer to the Spanish flu, which has been labeled as the most devastating contagious disease of the 20th century (Souza, 2008). SARS-CoV-2 is responsible for the emergence of the coronavirus disease 2019 (COVID-19), which manifests itself through acute respiratory complications, ranging from a simple flu clinic, to a symptomatic critical pneumonia (Pérez, Gómez and Dieguez, 2020; Vázquez *et al.,* 2020). The scientific scenario worldwide refers to multidisciplinary research that, in most cases, has been concerned mainly with describing the bio-molecular characteristics of SARS-CoV-2 and tracing down the epidemiologicalprofile (morbidity, mortality and lethality coefficients) in the different continents (Hallo, Rojas and Hallo, 2020; Hernández, 2020). Such studies have provided constant updates, which allow us to follow and understand the aggressive behavior of this virus, also alerting us about the high coefficient of contagion and its rapid geo-spatial expansion capacity. Likewise, these same researches have justified the hygienic interventions (in the individual and collective spheres) promulgated by the Ministries of Health, in accordance with technical guidelines given by competent international organizations (Pérez *et al.,* 2020). In the current socio-sanitarian framework, it should be highlighted that the tasks of fighting pandemics are not an unexplored question for humanity. However, the fact that they appear in divergent social, environmental and temporal conditions, aligned with the significant number of deaths recorded in its course, tends to validate the feeling of worldwide commotion, expected in these scenarios. Pandemic diseases, as it is also the case of other diseases of collective sanitary importance (e.g., AIDS, dengue,

Zika, among others), may originate in less predictable places and in less expected moments. Nonetheless, it is possible to affirm that such diseases, with potential for pandemic development, stand out for having a characteristic profile that follows a logical sequence of interrelated stages. As explained by Rosselli (2020), we can think of five basic phases for the assumption of a pandemic picture, such as (1) the identification and monitoring of existing viruses in animals with potential for affection in humans; (2) detection of humans infected by the virus; (3) characterization and stratification of clusters; (4) detailing the mechanisms of local and community transmission/ contagion of the virus, causing measures of suppression and containment and (5) notification and confirmation of sudden cases in unmeasured national dispersion and with a potential for international involvement. Given the case of COVID-19, the first two basic phases were verified in December 2019, and then the last three basic phases were confirmed in March 2020 (Vázquez *et* al., 2020).

Thus, analyzing health surveillance approaches (epidemiological, environmental and sanitary), in times of a socio-sanitarian crisis, could represent important opportunities for the improvement of sanitary practices and the advancement of hygienist knowledge acts. Moreover, the benefits of this good practice can be glimpsed beyond the institutional lenses (which intend the axes of management, planning and evaluation of services and health programs), since by appropriating and qualifying updated and validated knowledge in the scientific mean, we will also be talking about human resources improvement processes (health professionals and areas for purposes). Therefore, it is worth understanding that the challenge of fighting the several obstacles imposed by COVID-19 becomes multidimensional, requiring collective and inter-institutional efforts (Ospina *et* al., 2020). In such apprehension, there is interest in analyzing the socio-sanitarian strategies against the COVID-19 pandemic adopted by the Continental Central American (CCA) countries and to describe the epidemiological profile in such territory during 2020, since this is a region of the American continent slightly mentioned in recent studies that attempt to explain the impact of this disease in the Latin America region.

MATERIALS AND METHODS

Study Design and Settings: This is a mixed study (quantitative and qualitative), which made it possible to trace down the epidemiological profile of COVID-19 in Central American territories and to analyze the collective strategies of combat enacted by these countries. In the first moment, we opted for a research framed in the mixed ecological type (of time series and multiple groups), of descriptive nature and with quantitative bias (to describe the epidemiological behavior of COVID-19). Next in order, a documentary critical review, with a qualitative bias and an analytical approach, which investigated official documents published by the Council of Ministers of Health of Central America (CMHCA) was carried out (to analyze the hygienist strategies adopted by the CMHCA). As stated by Murillo, Ospina & Rodríguez (2020), Central America is the sub-region of the American continent with the lowest population density and territorial extension, conformed by seven nations: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. In the present work, all the CCA countries were treated as study units. The information presented in Table 1 characterizes their socio-sanitarian profile, which takes into consideration the social, health and economic conditions in which citizens are born, grow up and age.

Data Collection and Processing

Official documents: For the extraction of official documents, we consulted the online site "Central America united against the coronavirus COVID-19", released on March 12, 2020, which aims to present official information to Central American citizens regarding the activities being performed by regional health institutions (CMHCA, 2020a). In that sense, this work observed official documents of the following typologies: Central American health law instruments, specific regional guidelines, press releases, epidemiological bulletins, specific health regulations for COVID-19, strategies, guides and recommendations and sectoral protocols.

Epidemiological data: For the extraction of data concerning the profile of morbidity and mortality, the COVID-19 Information and Coordination Platform was consulted, being a site of free access and with updated data from epidemiological bulletins generated by Ministries of Health (CMHCA, 2020b). Data entry was performed on Microsoft Excel software, compatible with iOS macOS Catalina 10.15.7 (Apple Inc., CA, USA). Data analysis followed the quantitative approach, through the descriptive statistics technique, with the use of dispersion measures (X=mean, SD=standard deviation, lower and upper limits). Then, simple formulas for mortality, morbidity, recovery and lethality coefficients were applied. The information was presented in the form of graphs and comparative tables, which made it possible to observe the main variations between countries and to draw general conclusions for the region.

Ethical matters: Good clinical practices were followed for the analysis of the information obtained, since this work did not share identifiable characteristics of individuals, nor institutional information of a confidential nature. All the sources used are freely available.

RESULTS

COVID-19 epidemiological behavior in CCA: a 2020's retroperspective: Table 2 contains the data regarding the morbidity, mortality and recovery coefficients from March 1 to December 31, 2020, recorded in CCA countries. The first case of SARS-CoV-2 infection in Central America was registered in Costa Rica on March 6, 2020. A few days later, the first death by COVID-19 was notified in Panama on March 11, 2020. Up to December 31, 2020, a total of 2.538.723 (X=105.531; SD=89.225) infections by SARS-CoV-2 were notified in Central America. The three highest coefficients of contagion were seen in Panama (n=246.790; 9,72%), Costa Rica (n=169.312; 6,67%) and Guatemala (n=138.012; 5,44%). It should also be noted that, if viewed together, these countries accounted for 21,8% of the total number of infections in the region, i.e., they recorded a total of 554.114 infections by SARS-CoV-2. On the other hand, the data also showed quite convergent epidemiological realities among some countries. For example, in Nicaragua, it was only possible to point out a total of 6.046 contagions, which is equivalent to 0,2% of the total number of cases for the region. Likewise, in Belize only 10.776 cases (0,4%) were reported. With regard to the regional recovery coefficient, 22,26% of the total registered cases were recovered. When the values were observed individually, it was possible to see that Guatemala (n=126.028; 91,31%); Belize (n=9.795; 90,89%) and El Salvador (n=41.398; 90,07%) were the countries with the highest recovery coefficients. Yet, Honduras (n=56.694; 46,53%) and Nicaragua (n=4.225; 69,88%) were the two countries with the lowest recovery coefficients. The regional lethality coefficient of COVID-19 in CCA was 0,62%, with Costa Rica as the country with the lowest (1,29%) and Guatemala with the highest (3,48%) lethality coefficients. Graph 1 shows the distribution of deaths caused by SARS-CoV-2 contagion in the different Central American countries. Most fatalities were counted in Guatemala (n=4.813; 30,28%), Panama (n=4.022; 25,31%) and Honduras (n=3.130; 19,7%), respectively. When observed together, these three countries accounted for 75,29% of total deaths in the region (n=11.965). In general, the CCA region registered until December 31, 2020, a gross total of 15.890 (X=2.270; SD=1.811) deaths related to COVID-19. Thus, considering its total population (Table 2), the mortality coefficient by COVID-19 was 0.3 per each 1000 inhabitants, which is to say that, for every 3,000 Central American inhabitants, one passed away from COVID-19 complications, in 2020.

CCA legal and sanitary instruments to combat COVID-19 pandemic: The documentary analysis found the existence of the following legal and sanitary instruments adopted within the framework of Central American Integration System (CAIS):

Table 1. Socio-sanitarian profile of Continental Central American countries:

Location	Population*	GBR*	GMR*	MR*	OLE*	$PSIGDP_{He}$**	PSIGDPEdu***	$PSIGDP_{SoS}$****
Belize	398,000	19,6%	4,9%	2,6%	75	6,20%	7,40%	-
Costa Rica	5.094.000	12,7%	5,4%	0,7%	81	8,10%	7,40%	24%
El Salvador	6.486.000	17,2%	7,2%	-5,2%	74	6,90%	3,80%	14,60%
Guatemala	17.916,000	23%	4,7%	-0,5%	75	5,70%	2,80%	7%
Honduras	9.905.000	20,3%	4,5%	-0,5%	76	7,60%	6%	8%
Nicaragua	6.625.000	18,7%	5,1%	-2,4%	75	7,80%	4,30%	11,10%
Panama	4.315.000	17,9%	5,3%	1,7%	79	7%	3,20%	8,80%
CCA_{RA}	**50.739.000**	**18,4%**	**5,3%**	**-3,6%**	**76**	**7%**	**5%**	**12,25%**

CCARA: Continental Central America regional average; GBR: gross birth rate; GMR: gross mortality rate; MR: migration rate; OLE: overall life expectancy (including male and female); $PSIGDP_{Edu}$: proportion of state investment under gross domestic product in education; $PSIGDP_{He}$: proportion of state investment under gross domestic product in health; $PSIGDP_{SoS}$: proportion of state investment under gross domestic product in social structure. *2020/2025 projections; **2015 projections; ***2017 projections; ****2018 projections.

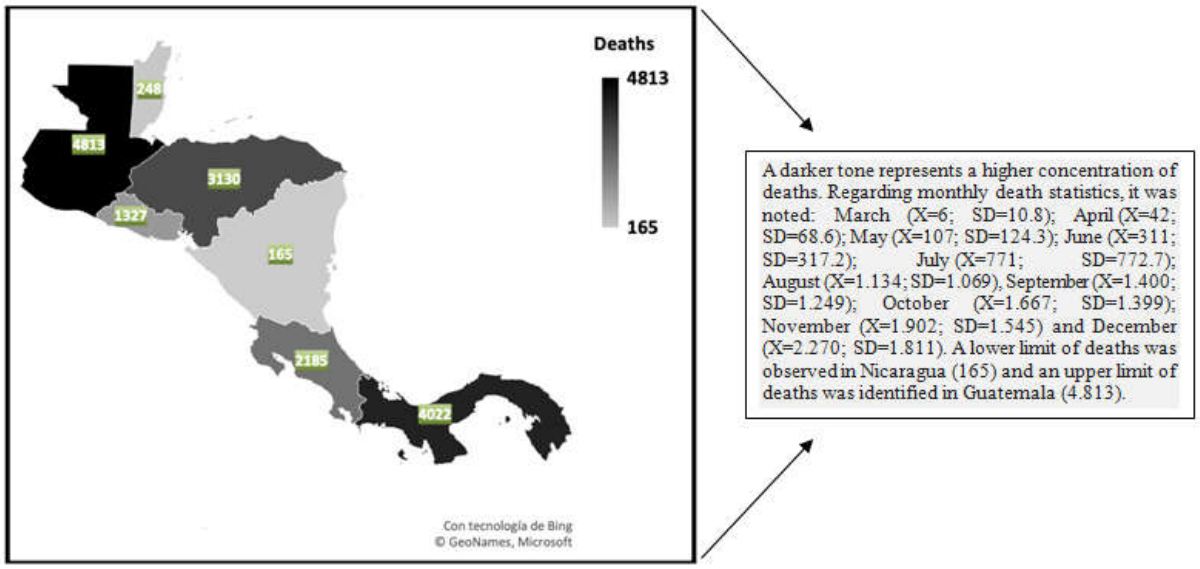
Source: Gutiérrez-Murillo *et* al., (2020).

Table 2. COVID-19 epidemiological behavior among CCA countries, 2020

Location	March	April	May	June	July	August	September	October	November	December
Laboratory Reagent Results (Positive Cases)										
Belize	3	18	18	24	48	1.007	1.992	3.487	5.854	10.776
Costa Rica	347	719	1.056	3.459	17.820	41.287	75.760	109.971	139.638	169.312
El Salvador	32	395	2.517	6.348	16.230	25.729	29.077	33.445	38.405	45.960
Guatemala	38	599	5.087	18.096	49.789	74.074	91.746	107.939	122.062	138.012
Honduras	141	771	5.202	19.558	42.014	61.014	76.900	96.888	108.253	121.827
Nicaragua	5	14	759	2.519	3.672	4.494	5.170	5.514	5.784	6.046
Panama	1.181	6.532	13.463	33.550	65.258	92.982	112.595	133.598	165.806	246.790
CCA	1.747	9.048	28.102	83.554	194.831	300.587	393.240	490.842	585.802	2.538.723
Recovered Registries										
Belize	0	9	16	18	30	173	1.246	2.160	3.151	9.795
Costa Rica	4	338	669	1.436	4.404	16.056	27.023	66.719	87.526	131.923
El Salvador	0	119	1.040	3.779	8.362	14.292	23.813	29.186	35.078	41.398
Guatemala	12	66	735	3.194	36.816	62.068	80.256	97.289	110.944	126.028
Honduras	3	79	537	2.060	5.554	10.396	27.922	40.129	48.073	56.694
Nicaragua	0	7	370	1.238	2.492	2.913	2.913	4.225	4.225	4.225
Panama	9	576	9.514	15.745	39.166	66.173	89.061	110.552	144.462	195.138
CCA	28	1.194	12.881	27.470	96.824	172.071	252.234	350.260	433.459	565.201
Deaths related to SARS-CoV-2 Contagion										
Belize	0	2	2	2	2	13	27	59	148	248
Costa Rica	2	6	10	16	150	436	812	1.385	1.726	2.185
El Salvador	1	10	46	174	448	717	843	975	1.114	1.327
Guatemala	1	16	108	773	1.924	2.760	3.246	3.729	4.171	4.813
Honduras	7	71	212	497	1.337	1.873	2.353	2.669	2.918	3.130
Nicaragua	1	3	35	83	116	137	151	156	160	165
Panama	30	188	336	631	1.421	2.002	2.372	2.700	3.079	4.022
CCA	42	296	749	2.176	5.398	7.938	9.804	11.673	13.316	15.890

CCA: Continental Central America; COVID-19: coronavirus disease 2019. The data informed above were extracted individually by country, month of the year (considering 1-30/31) and variable of interest, in COVID-19 Information and Coordination Platform (CMHCA, 2020b).

Source: The authors (2021).



Source: The authors (2021).

Graph 1. Geospatial distribution of recorded deaths related to COVID-19 in CCA countries, 2020.

⇒ Central American Integration System's Regional Health Policy: 2015-2022: It is an instrument with a regional perspective, which is based on the recognition of the expanded concept of health. Through it, CCA countries assume the responsibility of defending the right to health, which is a human right. To that end, its general objective is:

> To provide the CCA region with a political instrument that serves as a general framework to guide and enable the development of regional action and integration in health, for the strengthening of national action and the solution of regional jurisdiction processes with an intersectoral approach and a public health focus, with the ultimate goal of improving the health of populations and their ability to achieve their maximum health potential (CAIS, 2016).

⇒ Declaration of the Heads of State and Government of Belize, Costa Rica, Guatemala, Honduras, Nicaragua and Panama on the COVID-19 Pandemic: On March 12, 2020, a virtual meeting was held with the presence of the Central American Heads of State and Ministers of Health, whose objective was to agree on intersectoral approaches of a regional nature in response to the COVID-19 pandemic. As a result, the countries declared, "the importance that the governments of the member states give to the protection of human security, public health and the common good of the population in the region, especially in view of the expansion of COVID-19, which requires the adoption of joint and coordinated measures to address it" (CMHCA, 2020c). Regarding the CMHCA's attributions during the socio-sanitarian crisis, it was established:

> 1) To use the Joint Negotiation for the purchase of medicines and medical devices for the prevention, containment and treatment of COVID-19 and other diseases of rapid dissemination within the framework of the actions and measures of the Regional Contingency Plan; 2) To develop intersectoral actions that guarantee the supply of raw materials and other goods necessary for the production and commercialization of drugs and inputs required for the comprehensive care of the pandemic (CMHCA, 2020c).

⇒ Regional Contingency Plan for the Central American Integration System Against Coronavirus: The document was prepared through three main axes, namely, (1) health and risk management; (2) finance and trade and (3) security, justice and migration. Furthermore, it comprises two transversal axes: (1) strategic communication and (2) international cooperation management. The first axis, dealing with the specific case of hygienic actions, consists of five main components, such as (1) prevention and containment measures; (2) patient management measures for each type of case; (3) harmonization of informative, preventive and educational messages;(4) access to medicines, medical devices and other goods of health interest, through joint negotiation and (5) regional mechanisms to strengthen the capacity of preparation, mitigation, response and humanitarian assistance (CMHCA, 2020d).

⇒ Central American Social Integration Treaty: It stipulates the need to establish a legal institutional framework in the social area based on the premise that the human being constitutes the center and primordial subject of development, with the objective of guaranteeing the substantial improvement of the quality of life of the Central American people. Consequently, Article 6(h) considers the promotion of universal access to health, education, housing and recreation, as well as to decent and fairly remunerated economic activity (CAIS, 1995).

DISCUSSION

As a starting point, it is to observe that the Central American region shares several disparities among its territory. Primarily, the socio-sanitarian profile shows greater difficulties for human development in countries like Guatemala, Honduras, El Salvador and Nicaragua, pointing out an asymmetrical regional development. Such an assertion can be justified based on the low index of State's investment in the public sectors of health, education and social structure (Gutiérrez-Murillo *et* al., 2020; CAIS, 2016). Hence, low investment in these areas might indicate less favorable realities to face public health crises, now be the case of SARS-CoV-2 multidimensional implications. Next in order, the quality and the capacity of social and health care response, and the degree of coverage of such care systems themselves are directly limited by the Government's positioning to address the challenges imposed by COVID-19. It is, therefrom, a scenario that contemplates obstacles that are not solely the responsibility of a specific sector or public institution. Another throbbing observation can be made regarding the type of health management adopted by these countries, which in turn includes health surveillance strategies and collective health care activities.

Most CCA countries (except Costa Rica and Panama) are characterized by having obsolete health systems, which still present great difficulties to solve former health problems (Gutiérrez-Murillo *et* al., 2020; CAIS, 2016). And so, the emergence of the COVID-19 pandemic ought to be considered as one more sanitarian issue to be dispatched by these nations, through an immediate interference. Notwithstanding, such demanding context does not obviate the relevance of other areas of interest to be worked on still during the current health crises, involving control and care of chronic non-transmissible diseases, correct approach to health risks of compulsory notification, management of engorged health and social assistance systems and human resources improvement. Although some of the main outcomes of the COVID-19 pandemic can now be perceived in a global scope (e.g., overcrowding in the health services, especially in the third and fourth level of care; cessation of commercial activities in almost all sectors; increase in formal unemployment and strike of education systems, etc.), it is still presumptuous to announce a comprehensive discernment of this new virus. As for what is worth, CCA countries must focus their efforts on the finest desire to offer a timely and resolute response to the social and health needs of their users. This involves more than just offering effective drugs and conventional and alternative therapies, and the integration of health care networks. Recent studies also take on the distinctive need to comprehend and to promote the adoption of emerging care technologies within national health systems, as they may offer prompt solutions to complicated matters (Arshad *et al.,* 2020). Lack of preparation and poor technical competence to manage environmental disasters and health-related conditions has proved itself to be one of the main bottlenecks for most countries worldwide, from which CCA nations do not differ (CMHCA, 2020c; CMHCA, 2020d). Moreover, this fact can be further aggravated if considering structural impediments such as precarious physical structures of health establishments and public entities, low coverage coefficient in rural areas (populations living in forest and grassland territories), bounded public budgets aimed at improving the living conditions and development of socially disadvantaged communities, and slender sense of citizen empowerment on issues of collective interest (CAIS, 2016). Additionally, a hygienic reading of the drastic effects of COVID-19 also refers to the social boundaries already characteristic of CCA countries, in view of the high rate of violence, social inequalities and significant rates of immigration to other continental isthmuses (Murillo, Ospina & Rodríguez, 2020). Recently, a multi-focal study developed by renowned public health experts, which analyzed some of the main impacts of COVID-19 in the Latin American region, pointed out:

> This pandemic highlights the need to work on regional channels to coordinate the procurement of supplies; to strengthen regional intergovernmental cooperation on research, surveillance, and control; to effectively articulate the region's public and academic health institutes and laboratories; and to provide effective training of human resources to be able to better address future public health challenges in the region (García *et* al., 2020).

In order to think of future hygienist perspectives for the region, what is required, in the first instance, is the understanding of its own characteristics. Much more than being an asymmetric region, as already commented, CCA has gone through several integration processes that deserve to be highlighted, as these could mean key points to combat the challenges imposed by COVID-19, in a collective and integrated manner:

> Central American integration is a process whose complexity prevents it from being approached from unidimensional and timeless approaches. The high degree of similarity in the economic-social fabric and its evolution, the structural problems that have undermined the efforts within the region to generate competent Central American institutions capable of orienting and ordering the ideals of harmonious development and union over time, the relationship between sectors in the intra-national, intra-regional and extra-regional power play to influence the integrationist path and look after their interests; these are variables that must be addressed in a multidimensional and historicist way in order to carry out a more complete analysis that comprehends more fully the dynamics of the process and to be able to provide answers and proposals that are more in line with the region's economic and structural needs (Hernández *et al.,* 2016).

Also, it is fair to agree with Henriques & Vasconcelos (2020), when they affirm that the current scenario is complex and heterogeneous as is life in every corner of the planet: "the virus can be the same, it changes everything else: environmental conditions, demography, structure and organization of cities, culture, economy, political regime, habits, public policies and health services". In this same line of thought, Loaiza *et* al., (2020) complement that "understanding viral spread through human communities with different demographic and socioeconomic backgrounds, gender, age groups and geographic landscapes will help scientists recognize the dynamic (e.g., mode and speed) of person-to-person transmission and the behaviors that may expose or protect people from getting the infection". The regional epidemiological panorama drawn in this study allows some interesting considerations, although it is recognized in a preliminary sense. For example, the morbidity and mortality coefficients have been showing a more aggressive behavior precisely in the nations with the most decadent socio-sanitary profiles, which could detonate large environments for health and social assistance bodies in those territories (Murillo, Ospina & Rodríguez, 2020). In this sense, the impact of the pandemic would not be measured simply by the degree of resolution of the public health systems in the medical-assistance intervention, but also by the need to rethink the very sustainability of the national networks of basic and specialized care, especially the comprehensive networks of care for the aged population, merely because "COVID-19 has exposed critical vulnerabilities and raised uncomfortable questions about the duties of health care providers" (Cuneo and Janeway, 2020).

At the same time, the fact that the most fragile countries face more demanding realities in terms of management and social and health planning to combat natural disasters and health emergencies, in conjunction with high rates of infectious diseases, reaffirms CMHCA's commitment to achieving the goals of development and restructuring of Central American public health, through the perspective of health sovereignty. All the same, experts have already raised introductory notes that highlight as the main barrier to regional development in these countries, the weak adherence of some nations that, for purely ideological minding, are unable to appropriate the philosophy of brotherhood proposed by the CAIS, leading to the fact that, even in times of international public health crisis, these misunderstandings are not alien to the region (Murillo, Ospina & Rodríguez, 2020; Gutiérrez-Murillo *et* al., 2020; Hernández *et* al., 2016). In any case, "national leadership and coordination with local governments are paramount, together with clear and trusted communication of risks and measures such as distancing, face coverings, and hand washing" and this should not be obviated by any country (Pablos-Méndez *et* al., 2020). Broadly speaking, most Central American countries understood their state of vulnerability, compared to the experiences reported in European and Asian contexts, and decided to act directly on the form of suppression, and then transferred to the form of containment (CMHCA, 2020c; CMHCA, 2020d). However, recent studies conducted in the region refer discrepancies in compliance with the technical standards issued by the CMHCA. In particular, the mentality of the Head of State in Nicaragua, whom failed to respond to the international emergency call recommended by the WHO, is striking. That country, in addition to "being the poorest in the Central American region, registers a ratio of 0.9 hospital beds per every 000 inhabitants, which is even lower than the average for the Latin American region, set at 2.2 beds per 000 inhabitants" (Mather *et* al., 2020). Meanwhile, the country is partially sticking to the measures agreed upon collectively, that is, in the official CMHCA's meetings, yet this country seems to diverge in its own reasoning, regarding how the pandemic is being addressed in its national territory (CMHCA, 2020c; Perry, 2020).

The fact that Central America is currently the least affected region of the American continent (considering the record of deaths by COVID-19 and infections by SARS-CoV-2) must not give way to the deterrence of health surveillance measures established since March 2020. On the contrary, these countries "must deal with asynchronous waves of transmission within their borders by implementing widespread testing, tracing, and isolation of contacts without police repression; isolating sick and elderly people; and ensuring continuity of basic health services, including telemedicine" (Pablos-Méndez *et* al., 2020). In view of the obstacles exposed, it would be fair to say that a "post-pandemic" momentum will be of great value in strengthening the sanitary thinking of Central American integration, since it will provide spaces to reiterate positive experiences and to rethink the mistakes made throughout the sanitary crisis and, especially, the capacity to respond and adhere to the Central American sanitary standards respected by each State Party. Nevertheless, in a parallel vision, confrontations between such nations could also be foreseen, from the perspective of individual culpability, instead of the recognition of global obstacles not worked in a comprehensive and inter-regional approach. The fact is that it is still too early to establish such notes, but to confirm the risk of perception. Also, we affirm that this is an unprecedented situation for these countries, and in greater vision, for the world (Gutiérrez-Murillo & Gamarra, 2020). It is clear that nothing is yet written; much to the contrary, the final outcome will be seen in the next few years, since what we can infer at present does not linger on the epidemiological behavior and some aspects in the structure of the social and economic dynamics (Parikh *et* al., 2020). A future observation will be interesting, based on the hope that the pharmacological treatments would act effectively (Loaiza *et* al., 2020; Gutiérrez-Murillo & Gamarra, 2020). The above circumstances, along with the fact of Central America being the less developed axis of the American continent, reveal the severity of COVID-19 pandemic and the glaring need of gathering regional efforts, in order to establish medium and long-term objectives to achieve not only sanitary but multisectoral prosperity as well.

Limitations and further research recommendations: This study had some limitations. Firstly, the statistics projected in our study only took into consideration records with positive diagnoses for the disease, which makes a dichotomous comparison between positive and negative laboratory records difficult. In addition, comparisons in relation to the sex of people with positive diagnosis could not be made, precisely because the portal consulted only has raw data, without allowing extraction by sex. However, it is worth remembering that the objective defined in the research was achieved, as it shows the epidemiological behavior of the disease in the region (mortality, morbidity, recovery and lethality coefficients).

Implications for Public/Collective Health practice: To the best of our knowledge, this was the first work to describe the epidemiological profile of COVID-19 in countries of the Central American continental isthmus up to December 31 2020. Furthermore, we did not find any previous record of qualitative studies that have been concerned with

analyzing the CMHCA strategies and mechanisms to combat the pandemic in those specific countries. In this way, the contributions raised by this study can be considered as a starting point to develop multidisciplinary studies in the area of Central American public health in the context of the socio-sanitarian crisis. Considering that the emergence of COVID-19 has revealed the need to strengthen health surveillance measures in relation to infectious diseases, it is also worth noting the convenience of strengthening the strategies for organization and management of public health in the Central American region. In this line of thought, it is considered opportune to carry out further investigations that are oriented to these understandings, in fact, investigations that can be carried out in a multidisciplinary manner in the areas of environmental, animal and human health. From what has been exposed in this work, it is understood that the challenge of COVID-19 goes far beyond the human sphere, which is why such interventions could lead to new understandings and more efficient hygienic practices in the CCA countries.

CONCLUSION

This study had two main objectives. In relation to the first, it was possible to see the coordinated and integrated action between the countries, in order to establish regional strategies to account for the multidimensional impacts of the pandemic in the region. The effectiveness of integrationist processes in these countries, which led to the elaboration of a sanitary instrument with collective pretensions, should be highlighted. In this sense, the Regional Contingency Plan Against Coronavirus can be considered an important mechanism that defends the socio-sanitarian needs of these countries, from the perspective of sanitary sovereignty and international cooperation in global health. Regarding the second objective, this work pointed out that the epidemiological impact of COVID-19 presented significant variations between countries. In Panama, the highest coefficient of contagion was identified. Thus, Guatemala accounted for the highest mortality coefficient and, paradoxically, also registered the highest recovery coefficient. Finally, Costa Rica showed lower lethality coefficient, slightly higher than the regional average.

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