

Mapping Mental Health Disparities: The Covid-19 Mental Health Impact on Latino And African American Communities in Los Angeles County

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Abstract

This paper examines mental health disparities in minority communities in Los Angeles County. We sought to answer the following questions: (1) Have minority communities faced a disproportionate impact of the Coronavirus Disease (COVID-19) infection in Los Angeles County? And if so, (2) Will these minority communities face a mental health crisis? Throughout the COVID-19 pandemic, the Los Angeles Department of Public Health (LADPH) collected data on COVID-19 cases and death rates in minority communities. This paper utilized LADPH data to conduct three statistical tests, including the following: Geographically Weighted Regression (GWR), Getis-Ord G_i^ , and Moran's I . In addition, a collection of scholarly work on the effects of respiratory virus pandemics on mental health suggested that respiratory-related pandemics exacerbate Post-Traumatic Stress Disorder (PTSD) and depression. Our findings revealed that COVID-19 case trends can be densely concentrated in a geographic area, which we identify as a COVID-19 cluster. Through statistical analysis and a literature review, we determined that a COVID-19 cluster was located between I-10 and I-105. A close analysis of the COVID-19 cluster revealed that the top five cities within it were predominantly Latino or African American. Our research questions were answered, and we concluded that the Latino communities within the City of Bell Gardens, City of Cudahy, City of Commerce, Boyle Heights Community, City of Maywood, and City of Lynwood are at the greatest risk of facing a mental health crisis post-COVID-19 pandemic. To conclude, the paper presents four recommendations for mental health providers serving minority populations in Los Angeles County.*

Keywords: Covid-19 Case Rate, Covid-19 Cluster, Latino Mental Health, Culturally Sensitive

1. Introduction

The COVID-19 pandemic had a severe impact on healthcare systems nationwide. With much of the focus on protecting physical health, newly emerging mental health issues were consequently understudied. For this reason, this paper seeks to examine the impact of the COVID-19 pandemic on the mental health needs of minority communities in Los Angeles County. This paper sought to answer two questions: Have minority communities faced a disproportionate impact of the Coronavirus Disease (COVID-19) infection in Los Angeles County? And if so, Will these minority communities face a mental health disparity? Our in-depth analysis of COVID-19 data from the Los Angeles Department of Public Health revealed the need to address mental health disparities in communities of color in Los Angeles County. Through a literature review and our quantitative analysis, clinicians can gain a deeper understanding of the mental health landscape in Los Angeles County. A socio-spatial analysis conducted with ArcGIS identified the specific geographical zones in Los Angeles County that will likely experience an increased risk of developing mental health disorders. The COVID-19 cluster identified in this study aligns with the statement

that minority communities in Los Angeles County faced a disproportionate burden of disease during the pandemic [1,2].

In California, healthcare providers are accountable for serving a diverse clientele, primarily a growing Latino population. In Los Angeles County alone, approximately 49% (or 4,725,059 individuals) identify as Latino. The term "Latino" used in this paper refers to any individual with ancestry from Latin America. In Los Angeles County, an estimated 65% of the total population, or 3,575,000 individuals, are foreign-born. Federal legislation enacted during the pandemic, such as the Coronavirus Aid, Relief, and Economic Security Act (CARES Act), excluded immigrants and mixed-status families from receiving economic relief. Many mixed-status families, spouses of immigrants, and their children who have full citizenship were excluded by the CARES Act. Civil rights organizations have filed lawsuits against the federal government over provisions contained in the CARES Act. The federal economic stimulus policy during the COVID-19 pandemic blatantly discriminated against mixed-status families and married couples, including

spouses of immigrants who filed their income taxes with an ITIN (Individual Tax Identification Number). In the recent decade, lawsuits have been brought against California's Department of Health Care Services, claiming that the state has not done enough to remove unnecessary obstacles to healthcare access for low-income patients and has been reluctant to implement adequate mechanisms to monitor and oversee the program. A combination of long-term disinvestment from Medi-Cal and exclusion from economic relief through the CARES Act has contributed to the risk factors within minority communities for developing a mental health disorder during the COVID-19 pandemic [1,2].

2. Literature Review

Respiratory infections have been the cause of multiple pandemics in the past, such as the 2002 severe acute respiratory syndrome (SARS) pandemic in China and the 2015 Middle Eastern Respiratory Syndrome (MERS) pandemic in South Korea. A review of scholarly work on previous pandemics shows that social factors experienced in a pandemic era can lead to an increase in post-traumatic stress disorder (PTSD), depression, and anxiety disorders. PTSD can be defined as intense feelings of stress or feeling afraid after experiencing a traumatic event (CDC, 2021, Types of Mental Disorders). Depression is when an individual experiences constant feeling of being in a bad mood, to the point that their mental, as well as psychological, well-being, is impacted nearly every day and for much of the day [3].

According to Lam et. al. (2009), from the Department of Psychiatry at The Chinese University of Hong Kong, a psychiatric evaluation of 181 SARS virus survivors in Hong Kong, China, found that PTSD and depression were prevalent among interview participants. Study participants were issued a psychiatric assessment to determine if SARS survivors had developed a mental disorder after recovery. The evaluation was conducted between 3 and 4 years after the participant's diagnosis of SARS. Among the 181 study participants, only six had a history of mental disorder. However, at the time of follow-up, 77 of the 181 (or 42.5%) of participants experienced at least one mental disorder (Lam et. al., 2009, P. 2043). More specifically, among the participants who were diagnosed with a disorder, the most common mental disorder found was PTSD (42 of 77) or 54.5%, and depression (30 of 77) or 39.0% (Lam et. al., 2009, P. 2043). Moreover, social factors such as stigmatization, stress, grief, and fear have been found to contribute to the development of a mental disorder. According to Abdelhafiz and Alorabi (2020) from the National Cancer Institute at Cairo University, fear and anxiety arise during a pandemic as a result of the unknown cause of the disease and the possible fatal outcome. A respiratory virus can be life-threatening, and the stigmatization of the infected flourishes with dramatic stories in the media and on the internet [4,5].

Studies have also shown that the SARS pandemic led to adverse mental health conditions among virus survivors in Beijing, China. A study by Hong et al. (2009), from the University of Rochester Medical Center in New York, measured the incidence of PTSD among 68 SARS

virus survivors. Clinical assessments were conducted periodically with subjects after they were discharged from the hospital following a SARS diagnosis. The assessments were performed by a trained psychiatrist using the Chinese Classification of Mental Disorders (CCMD-III) and the Diagnostic and Statistical Manual of Mental Disorders. The clinical evaluations revealed that among the 68 subjects who were hospitalized with SARS, 30 (44.1%) of survivors developed PTSD after being discharged [6].

In 2015, the Middle Eastern Respiratory Syndrome (MERS) outbreak in South Korea presented evidence that links mental disorders to respiratory virus pandemics. A study by Park et. al. (2020), from the Seoul National University Hospital in Seoul, revealed that PTSD and depression were commonly found among pandemic survivors in South Korea. A nationwide study was conducted one year after the initial MERS outbreak in South Korea. Trained clinicians interviewed 63 participants using the Impact of Event Scale and the Patient Health Questionnaire-9 frameworks to determine mental health outcomes. The questionnaire results showed that out of the 63 participants, 42.9% reportedly had significant PTSD symptoms, and 27% reportedly had depression. (Park et. al., 2020, P. 605). In the United States, a household pulse survey conducted by the Centers for Disease Control and Prevention (CDC) during the COVID-19 pandemic revealed that anxiety and depression disorders had increased across the country. In 2019, the CDC found that 10.8% of adults ages 18 and older had anxiety or depressive disorders. After the COVID-19 outbreak in late 2019, the CDC found that mental disorders had increased to 26.4% for adults ages 18 and older (CDC, 2020, Household Pulse Survey). The CDC stated that COVID-19 survivors experience social factors such as stigmatization, isolation, depression, anxiety, or public embarrassment. Additionally, studies on the SARS and MERS pandemics align with the CDC Household Pulse Survey results. The literature discussed in this section ties mental disorders, such as PTSD and depression, to the experience of minority groups most impacted by the COVID-19 pandemic. In the sections below, this paper identifies the minority communities in Los Angeles County that have been disproportionately affected by the COVID-19 pandemic [7].

3. Methods and Data

This study employed an instrumentalist perspective in its analysis methods. The goal of the analysis is to provide grassroots mental health providers with information that guides their mental health services in minority community's post-pandemic. In other words, the *instrumentalist perspective* asserts that organizations must utilize the appropriate instruments at their disposal, depending on specific conditions or situations. Selecting and combining programs to change is a key factor for community-based mental health providers post-pandemic. During the COVID-19 pandemic, the Los Angeles County Department of Mental Health (LADMH) published Strategic Plan 2030. The plan issued by the County outlines the structure, goals, and requirements for mental health partners post-pandemic. (Los Angeles Department of Mental Health, 2020) This study

provides critical insight into how mental health providers in minority communities can effectively distribute mental health services to clients most impacted by COVID-19, while remaining consistent with the LADMH Strategic Plan 2030 [8].

The analysis portion of this study consisted of two main approaches: a geospatial analysis that identified the spread of COVID-19 in Los Angeles County, and a statistical analysis that correlated race with a higher COVID-19 case rate. The geospatial analysis, used to identify the spread of COVID-19 in Los Angeles County, enabled this study to locate emerging mental health hotspots. For the COVID-19 analysis, this project used ArcGIS Pro to conduct three statistical analyses. Moran's I and Getis-Ord G_i^* statistical tests were used to identify the pattern of COVID-19 case spread. The outcomes of these tests show the autocorrelation between COVID-19 and space. Furthermore, the analysis included the socio-demographics of the population most affected by COVID-19 infections. A Geographically Weighted Regression analysis was conducted to determine the correlation between the African-American and Latino populations and COVID-19. This methodology is widely used among statisticians to understand the spatial characteristics and their relationships with socio-economic variables.

The data used to build the ArcGIS geospatial analysis has been collected from three different sources. Demographic information for Los Angeles County, including race and household income, was collected from the U.S. Census Bureau. The data used for statistical analysis of COVID-19 were collected from the Los Angeles County Department of Public Health. The COVID-19 data includes the final death count, death rate, total case count, and case rate from March 2020 to March 2021. (Los Angeles County Department of Public Health, 2020) The COVID-19 data is not organized by census tract, but rather by Community Standard District (CSD). The Community Standard District is the unit of analysis used by the Los Angeles Planning District to organize entire cities or unincorporated land for special topics, such as a pandemic. The case rate was calculated by dividing the final count of COVID-19 cases in a given district by the district's total population. Furthermore, from aggregating case rates

in the COVID-19 data, the average infection rate was 8.7%. This study considers a "high COVID-19 case rate," defined as a CSD with one to two standard deviations above the sample mean rather than the sample mean. This was elaborated upon in the analysis section of this project [9].

4. Definitions

Throughout this paper, the term "mental health hotspot" refers to COVID-19 clusters that are 1 or 2 standard deviations above the sample mean. The reason is that virus survivors living in high COVID-19 impact zones are at greater risk of developing mental health illnesses, such as PTSD or depression. Another requirement for a zone to be considered a "hotspot" is the prevalence of Latino or African-American residents living within the CSD. The Latino or African American population must comprise 40% or greater of the total population in the CSD to be considered in the findings. The study does not use the term "hotspot" alone, but rather in conjunction with other words (i.e., mental health hotspot). All in all, the COVID-19 burden areas correspond with the mental health hotspots identified by the ArcGIS spatial analysis. Table 1 provides an elaboration on the terms and definitions used throughout this paper. (see Table 1)

To narrow the scope of this project, PTSD and depression are the major mental health disorders that will arguably be most common within the COVID-19 cluster. Finally, the "COVID-19 cluster" is also defined. The data and analysis in this study include the number of COVID-19 confirmed cases. The Geographically Weighted Regression conducted in this study has identified that the virus spreads in clusters and is spatially correlated. Therefore, a "COVID-19 cluster" refers to a concentration of high virus infections in a specific geographical area. This analysis color-coded the areas within Los Angeles County most severely impacted by COVID-19, identifying them as COVID-19 clusters. The large red spot in the center of the LAC map indicates that residents in that area experienced COVID-19 cases at least one standard deviation above the sample mean. This large red spot has been identified as the most significant COVID-19 cluster in the county, due to its disproportionate impact on minority communities and its high concentration of infections.

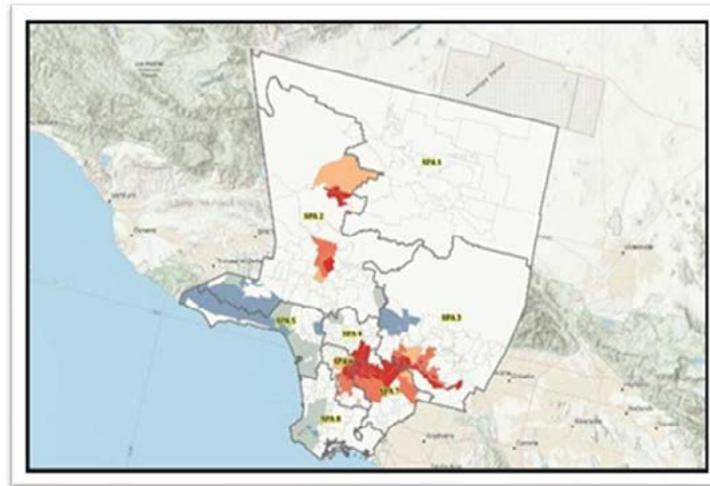
Suggested term and alternatives	Definition
Mental health hotspot	(a) An area within a Latino or African- American community within a high COVID-19 zone. Based on the literature, residents are at greater risk of experiencing adverse mental health effects because of the pandemic.
COVID-19 cluster	(a) Any areas colored in dark red/red on the maps. This indicates that there is at least 1 to 2 standard deviations above the sample mean. Identified by the Getis-Ord G_i^* and Moran's I statistical tests as a concentration of high COVID-19 cases.
Mental health/mental health illness	(a) Mental health includes a person's emotional, psychological, and social well-being. Based on the literature, Post-Traumatic Stress Disorder (PTSD) and Depression are common mental health illnesses that increase during a pandemic.

Table 1: Overview of Definitions

5. Statistical Analysis

During the peak of the pandemic, this study sought to pinpoint the exact communities that were disproportionately impacted by the virus and at risk of developing a mental disorder. The first step was to visually represent the geographical spread of COVID-19 infections. The Getis- Ord Gi* test was used to identify areas with high or low COVID-19 case rates within the county. To be considered a statistically significant COVID-19 cluster, a feature will showcase a high value (highlighted in Red on Map 1) and be surrounded by other features with high values as well (ESRI, 2021, Spatial Statistics). The Getis-Ord Gi* test also shows areas with high values (red). Maps 2 and 3 below show the statistically

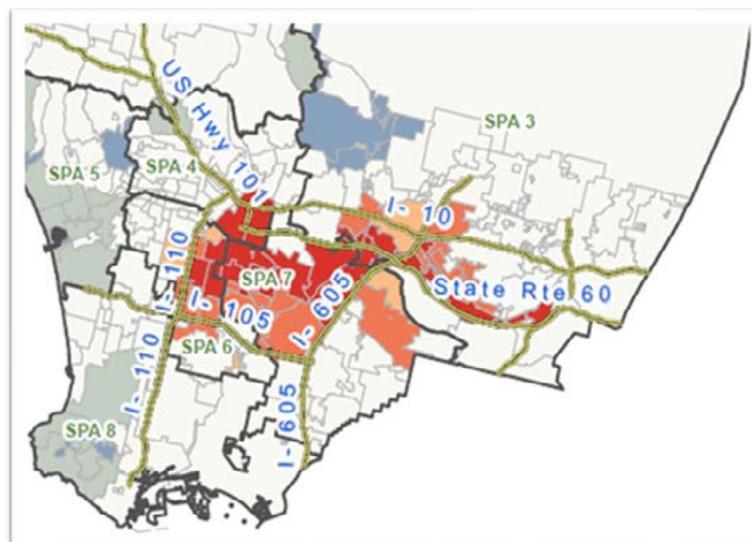
significant areas (red) where the virus spread clustered between Interstate 105 and Interstate 10 (see Map 2 and Map 3). The map below shows the statistically significant areas (Red) that are clustered with high COVID-19 case rates (see Map 1). The Red and Blue areas on the map are described by the legend below (see Table 2). The high and low clusters are determined based on the distance that the area's COVID-19 case rate is from the sample mean of the distribution. Red indicates that the area is one or more standard deviations above the sample mean. In other words, the red areas have a high number of COVID-19 cases and a statistically significant COVID-19 infection rate [10].



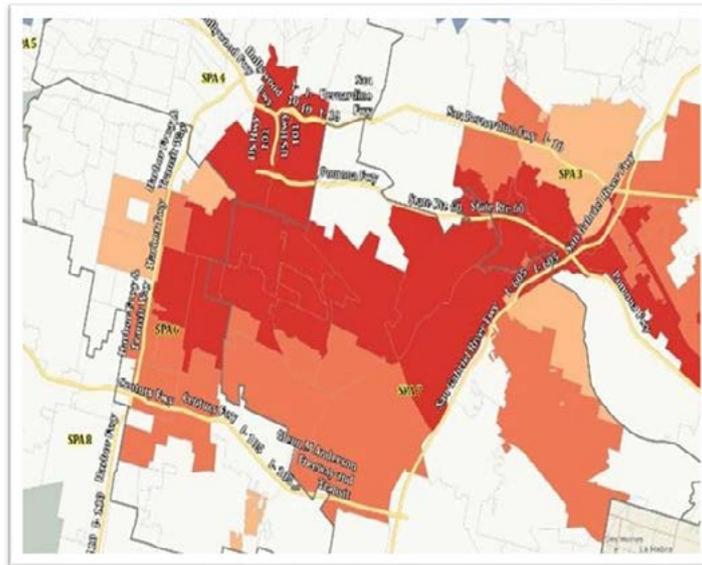
Map 1: Color Map of High Covid-19 Case Rate Areas

Confidence	Red			Gray	Blue		
%	99%	95%	90%	-	90%	95%	99%
p-value	0.01	0.05	0.10	-	0.10	0.05	0.01
St. Deviation	>2.58	1.96~2.58	1.65- 1.96	-1.65-1.65	-1.65~- 1.96	-1.96~- 2.58	<-2.58

Table 2: Color Legends for Map 1



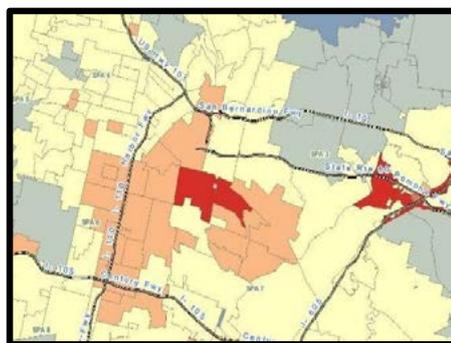
Map 2: Color Map of High COVID-19 Case Rate Areas



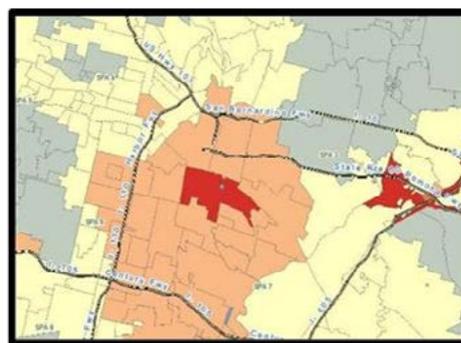
Map 3: Detailed View of COVID-19 Cluster

Secondly, a Geographically Weighted Regression (GWR) test was employed to examine the relationship between race and COVID-19 cases. The GWR statistical tool is a linear regression test in ArcGIS (ESRI, 2021, GeoAnalytics). The COVID-19 case rate was the dependent variable, and race was the explanatory variable. After inputting the variables, the GWR indicated a positive relationship between race and the COVID-19 case rate, with a model fit (R^2) of 0.14-0.2. More

specifically, the greater the fit (R^2) between race variables and COVID-19 case rates, the higher the percentage of the high COVID-19 case rates that race explains. The output features of the GWR show that the Latino communities and African American communities within the COVID-19 cluster are correlated with having experienced a greater burden of disease in Los Angeles County (see Figure 1 and Table 3) [11].



GWR, Latino Only R^2 , .18



GWR, African-American and Latino R^2 , .20

Figure 1: GWR Model Type for Covid-19 Case Rate and Race

Geographically Weighted Regression (GWR)		
Explanatory Power	Latino Only	African-American and Latino
AICs	7130.7792	7130.7910
R2	0.179	0.199

Table 3: Explanatory Power from GWR Model

Thirdly, a Global Moran’s I test was conducted to determine whether space and the spread of infection were correlated. The Global Moran’s I test produces an index value ranging from -1.0 to $+1.0$. The index value options are (> 0) clustered, ($= 0$) randomly distributed, and (< 0) dispersed (ESRI, 2021, Spatial Statistics). The Moran’s I test resulted in an index value of 0.3 , which is (> 0) clustered (see Figure 2). The results indicate that there is spatial autocorrelation

between COVID-19 and space. In other words, the spread of infection can be highly concentrated in a single geographic area. Therefore, the residents located in a statistically significant COVID-19 cluster are particularly vulnerable to experiencing adverse mental health conditions. The Moran’s I test shows that COVID-19 can disproportionately impact a specific community or city.

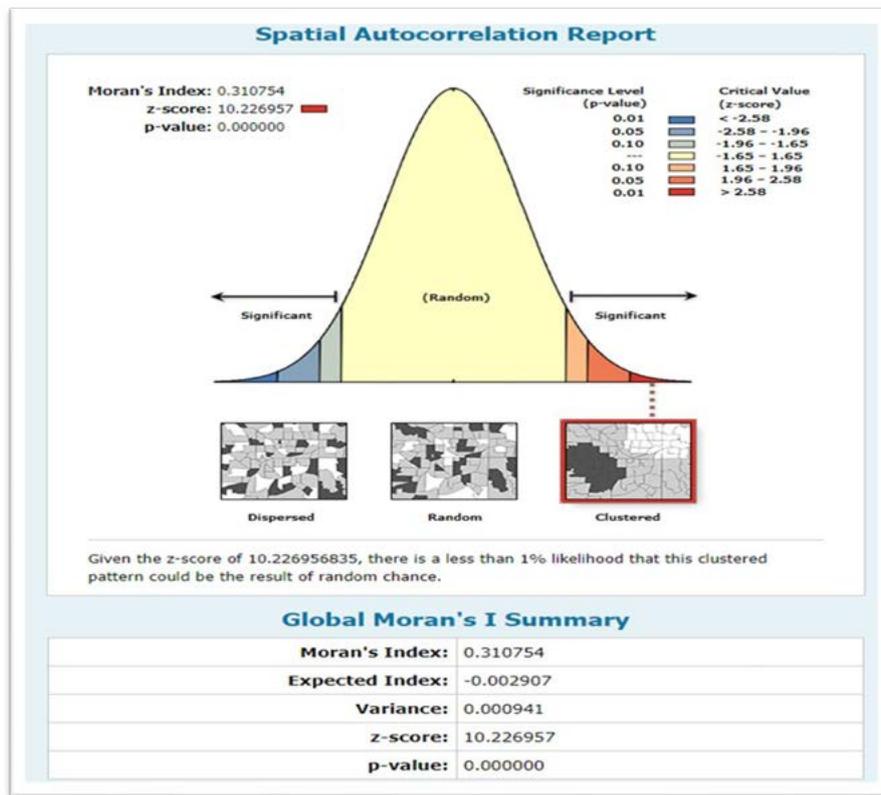


Figure 2: Global Moran's I Test Output

6. Findings

In the analysis above, this paper has determined that the Latino and African American communities living between Interstate I-105 and Interstate I-10 are at the most significant risk of experiencing a post-COVID-19 pandemic mental health disorder. According to the National Alliance on Mental Illness (NAMI), only 34% of Latino adults with mental disorders receive treatment each year compared to the U.S. average of 45%. A Latino might describe what they are feeling with a phrase like “Me duele el corazón,” which means “my heart hurts.” However, it is an expression of emotional distress and not of physical pain. (NAMI, 2021, Hispanic/Latino Tab) The misdiagnosis of mental or emotional disorders in the Latino community is a problem that can be mitigated. The section below presents recommendations for policymakers and mental health organizations on how they can better serve minority populations in Los Angeles County [12].

The GWR, Getis-Ord Gi*, and Moran's I statistical tests work together to show that high COVID-19 case rates are found in dense clusters throughout Los Angeles County. The location of the COVID-19 cluster is critical information for mental health providers, as it indicates the potential locations of new clients. Policymakers should utilize this information to consider innovative and culturally sensitive ways to serve the high-impacted minority communities of Los Angeles

County. Policymakers at the federal, state, and local levels can address risk by providing comprehensive support, such as economic stimulus and access to quality healthcare, to mitigate the disproportionate burden of disease for minority populations. Various studies on the burden of disease state that financial hardship is a risk factor for developing mental disorders (Cordes and Castro, 2020, P. 100355). This study has identified specific cities that can benefit from COVID-19 economic relief, as shown by the income data below. (See Table 4) [13].

Similar urban characteristics, such as ethnic enclaves, are common in the Top 5 cities/communities within the COVID-19 cluster. An ethnic enclave can be defined as an urban area where a particular racial group is densely concentrated and socially and economically distinct from the city's majority (Lim, 2017, p. 138). The towns and communities in the mental health hotspot are comprised of Latinos (See Table 5). In 2019, during the peak of the COVID-19 pandemic, the Latino population made up 48.6% of the total population in Los Angeles County. (US Census, 2019, Demographics Table) Furthermore, this study found that more than 90% of residents in the City of Bell Gardens, Cudahy, Maywood, and Lynwood were Latino. This study found that Latino ethnic enclaves accounted for the majority of residents in the COVID-19 cluster. (see Map 4) [14].

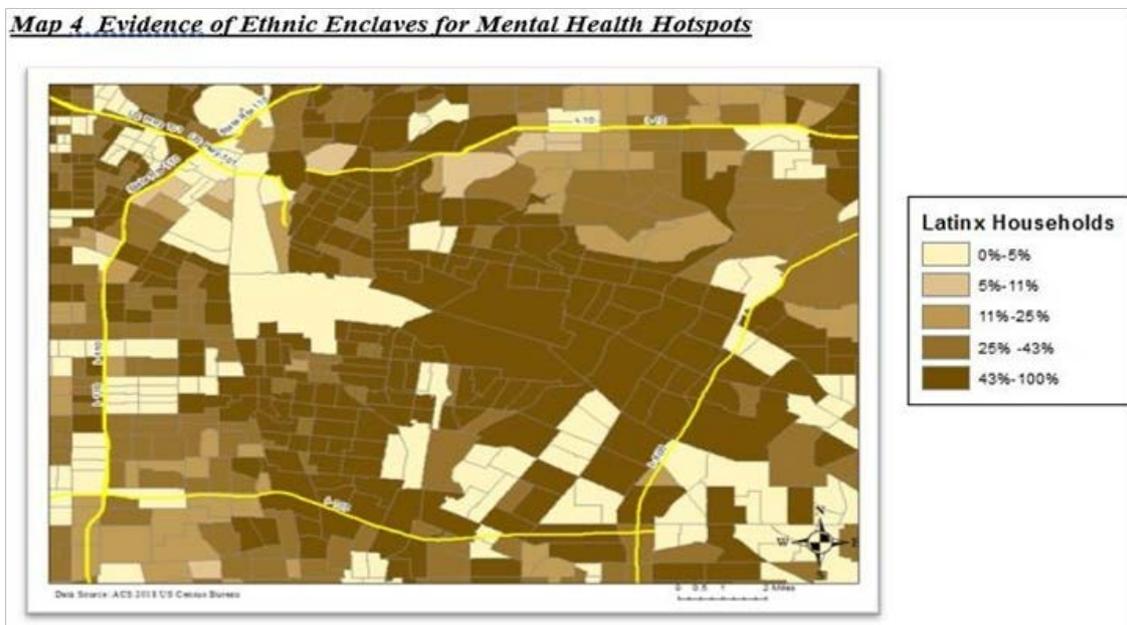
	Income Per Capita	Unemployment Rate	Below the Poverty Level*	SNAP/ Food Stamps**	No Health Insurance Coverage* **
City of Compton	\$17,707	8.72%	16.98%	19.25%	16.03%
City of Commerce	\$18,508	8.23%	12.76%	12.85%	17.68
City of Cudahy	\$14,545	8.66%	23.71%	20.85%	25.60%
City of Maywood	\$15,845	7.58%	20.58%	16.67%	21.26%
City of Vernon	\$36,450	5.1%	5.25%	9.65%	8%
C.A	\$39,393	5.1%	11.8%	8.4%	10.9%
U.S.	\$35,672	4.5%	12.03%	10.7%	12.9%

Table 4: Demographic Characteristics of Cities/Communities Within a Covid-19 Cluster (Source: ACS, US Census, 2019)

Note: *Percentage of families and people whose income in the past month is below the Poverty Level. ** Percentage of households with Food Stamp/SNAP benefits in the past 12 months. ***No health insurance coverage, including the civilian non- institutionalized population aged 19 to 64 years in the labor force.

Community Standard District	COVID-19 Case Rate	Total Population*	Latino Population**	SPA Location
City of Bell Gardens	17.60%	43,071	40,800	7
City of Cudahy	17.93%	24,347	23,000	7
City of Commerce	17.20%	13,069	9,090	7
Boyle Heights Community	18.70%	86,884	74,800	7
City of Maywood	17.10%	28,049	27,000	7
City of Lynwood	16.90%	72,047	71,000	6

Table 5: Evidence of Ethnic Enclaves Within the Covid-19 Cluster



Map 4: Evidence of Ethnic Enclaves for Mental Health Hotspots

7. Recommendations

Below, this study presents recommendations aimed at supporting a county-wide approach to reducing mental health disparities in the identified mental health hotspots:

- *Recommendation 1.* A COVID-19 cluster indicates a geographical area with a high COVID-19 case rate. These

areas should be a priority for local mental health service providers. The majority of high COVID-19 clusters are located between the I-10 and I-110 freeways/highways/interstates, which is also known as Service Planning Area (SPA) 7. It is recommended that mental health providers develop an outreach plan to target services and increase patient intake capacity, thereby better serving low-income clients living

within COVID-19 clusters.

• **Recommendation 2.** Providing culturally sensitive treatment is a critical recommendation that will help reduce the mental health disparities in Los Angeles County. More studies are needed to fully understand the impact of culturally competent mental health services. However, building on the philosophy of Instituto Familiar de la Raza (El Instituto) in San Francisco, California, mental health providers can begin incorporating a long-standing, culturally sensitive framework into their clinical services. For example, one of El Instituto's core philosophies is "La Cultura Cura," or "Culture Can Heal." By configuring treatment programs to embrace a shared Latino identity, such as indigenous and Meso-American roots, clinicians can be more effective in treating Latino clients. (El Instituto Familiar de la Raza, Mission and Vision, 2020) El Instituto practices this concept by incorporating culturally relevant coping skills into treatments such as knitting, pottery, painting, and other traditional arts native to Mexico and Central America. It is also crucial to hire translators or clinicians who are fluent in Spanish to incorporate the language effectively into treatment. In addition, El Instituto requires therapists to provide flexible meeting locations for Latino patients. El Instituto requires therapists to meet clients in public spaces. (El Instituto Familiar de la Raza, Our Resilience Fund Report, 2021). Based on El Instituto's philosophy and clinician framework, therapists in Los Angeles County should have a resource list of suitable public spaces near their clients' workplaces or homes to increase attendance at sessions [14].

• **Recommendation 3.** Collaboration with local CBOs with a strong rapport with the Latino population in Los Angeles is recommended to help clinicians recruit Spanish translators. CBOs such as the Coalition of Humane Immigrant Rights of Los Angeles (CHIRLA), the Mexican American Opportunity Foundation (MAOF), and Esperanza Community Housing have long-standing relationships with the Latino population in Los Angeles County. They could be a vital starting point for recruiting translators and clinician support.

• **Recommendation 4.** The Integrated Behavioral Information Systems (IBHIS) is an information system established by the LACDMH to enhance the administrative role of mental health providers. It is recommended that local providers utilize the IBHIS system to share information with community-based organizations (CBOs). The IBHIS can be a system that connects grassroots and community-based organizations to Latino-serving organizations that may have stronger ties to communities of interest. Examples of information that can be shared include medication information, recent changes in mental health assessments, laboratory and psychological test results, and clinician notes from prior visits, when appropriate.

8. Conclusion

This study has identified a COVID-19 cluster in Los Angeles County, located south of Interstate 10 and north of Interstate 105. Communities located in the COVID-19 cluster are at greater risk of experiencing a mental health impact from the COVID-19 pandemic, as evidenced by the literature. Based on previous research on mental health and respiratory pandemics, victims of the pandemic can develop adverse

mental health conditions. Studies show multiple social factors lead to an increase in PTSD and/or depression for COVID-19 victims post-pandemic. Using the GWR, Getis-Ord G_i^* and Moran's I , our results show that most COVID-19 cases are densely clustered in low-income neighborhoods that lack healthcare coverage and are predominantly Latino. The recommendations provided in this research paper aim to help reduce mental health disparities within the COVID-19 cluster in Los Angeles County. Recommendations emphasize the importance of intense collaboration, allocating resources to local grassroots organizations, and providing support for establishing culturally sensitive services.

In conclusion, mental health organizations serving minority communities should consider the literature presented in this paper. The data in this paper suggests a correlation between race and higher infection rates during the COVID-19 pandemic. Through our analysis, we have identified that the mental health hotspots in low-income communities are mostly comprised of Latino residents. Case in point: mental health providers will benefit from increasing outreach and services to Latino clients residing in SPA 7, creating a more robust outpatient treatment program, expanding culturally competent services, and collaborating with other organizations using the IBHIS system to address newly emerging mental health needs.

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Availability of Data

The data used to determine the COVID-19 cluster were drawn from the Los Angeles County Department of Public Health, COVID-19 Surveillance Dashboard. (2020)

Code Availability

Not applicable.

Conflict of Interest

The author(s) declare that there is no conflict of interest regarding the publication of this article.

Ethical Approval

The author(s) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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