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Correlates of COVID-19 Transmission: Challenges and Opportunities to Access Our Most Vulnerable Populations

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Abstract

The novel coronavirus, also known as COVID-19, was recognized as a pandemic disease in March of 2020 [1]. In the months that followed, the number of cases reported has increased from 53,269 on March 9 to 63,965,092 as of December 3, 2020 [2]. The Americas carry the bulk (42.4%) of that number, and the United States of America is leading the world's countries in COVID-19 cases at 13,563,731, or 21.2% of the world's cases [2]. In the current study, the correlates of pandemic transmission were explored through the use of univariate frequency analyses, bivariate t-tests, and correlation analyses. Results indicated that states with higher frequencies of non-White residents, poverty, and underinsured and disabled residents. The Salutogenic Model was utilized to frame the discussion regarding challenges and opportunities for addressing the correlates in an equitable fashion [3].

Keywords: COVID-19; Coronavirus; Salutogenic model; Pandemic; Transmission

Abbreviations: WHO: World Health Organization, CDC: Centers for Disease Control and Prevention

Introduction

The coronavirus, also known as COVID-19, was recognized as a pandemic disease in March of 2020 with the number of worldwide cases reported at 53,269 on March 9 [1]. As of December 3, 2020, the World Health Organization (WHO) reported that the number of cases of COVID-19 had increased to 63,965,052 [2]. The Americas carry the bulk (42.4%) of that number, and the United States of America is leading the world's countries in COVID-19 cases at 13,563,731, or 21.2% [2]. This is the case, even as the United States holds only 4.3% of the world's population (approximately 330,667,000 and 7,704,107,400, respectively [3]. The United States also leads the world in deaths, with 268,482 of the 1,488,120 worldwide [3]. It is imperative that members of the helping professions assist in curbing the rise in cases and deaths, as the

colder weather may cause our current spike in cases to increase even further [4].

One challenge healthcare professionals may face surrounds the gap between the need for resources to help in decreasing the number of infections and the access to such resources among the more vulnerable members of the population. Whenever pandemics have occurred in the past, the people who have fared worst had less money, and therefore fewer resources, to help them prevent sickness or access proper treatment in the event of infection. Guidelines on preparedness for pandemics include purchasing extra non-perishable foods, water, first aid kits, and other items to keep ready for the type of occasion we are currently experiencing [5]. Calls for keeping a six-foot distance from others and for



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wearing masks when outside of households are also being made by the Centers for Disease Control and Prevention [6] and the WHO [2] among others.

Not all who need to protect themselves from transmission or complications of COVID-19 will have the resources to do so. It is imperative that members of the population who are disadvantaged receive aid in addressing the distance between their needs and their related resources. The current study explores the variables correlated to COVID-19 transmission in the United States and considers challenges and opportunities to connect those populations most likely to contract the disease with the tools to help them to prevent such transmission. The discussion of next steps will incorporate the Salutogenic Model as a guide for practice.

Materials and Methods

All data used for this study were secondary data collected from the CDC [6] and Census [7] websites. The information used for this study was open-access, population-level, and de-identified. Data were taken from all states which had reported at least forty thousand cases of COVID-19 by December 3, 2020. That number was chosen because of the way that the CDC had been reporting cases at the time that the researcher began collecting data: forty thousand or more the highest level indicated at the time [6]. The data were stored in Microsoft Excel, and the Excel Analysis Tool pak was used for all statistical analyses.

The number of states reporting cases at or above forty thousand by June 30, 2020 was compared to the number reported between July 1, 2020 and December 3, 2020 (1=By 6/30/20; 2= After 7/1/2020). The frequency of states reporting at least one overrepresented non-White ethnoracial classification among the three largest groups (Hispanic/Latinx only; Black/African American only; Asian only) was determined. State poverty, uninsured, and disability rates in excess of the national levels were recorded and compared against time of reporting, through the use of independent samples t-tests. This study compared state and county COVID-19 transmission numbers [6] to multiple factors, such as the representation of non-White residents in a given county relative to that of the United States Census [7] the rates of poverty, health insurance acquisition under age 65, and disability under age 65.

A frequency histogram was developed in order to determine the trends in non-White overrepresentation in counties with the highest COVID-19 cases. Where states had no county level overrepresentation relative to the national numbers, a further histogram analysis was performed to compare to state levels. Histograms were developed for the counties which between zero and three of the variables poverty, disability, or lack of insurance higher than that of the nation. Bivariate analyses were conducted through the use of t-tests, and a correlation analysis was performed among variables, including time of reporting; percentages of Hispanic/Latinx, White, Asian, and Black/African American residents; and poverty, disability, and uninsured rates.

Results and Discussion

Approximately 44.2% (19) of the 43 states included in this study had reported at least 40,000 COVID cases to the CDC by June 30, while the remainder reported that number on or after July 1. Over half (24; 55.8%) of the states had at least one non-White group overrepresented relative to the national percentages. The mode was 1, meaning that the majority of states indicating any relative overrepresentation had only one such group. States with overrepresented Black/African American numbers made up 34.9% (15) of the total states, while overrepresentation of Hispanic/Latinx population members was 23.3% (10) and of Asian was 18.6% (8). The frequency histogram results indicated that the majority (74.8%) of counties in which the rates of COVID infection were highest had over-representation of at least one non-White group relative to the national numbers. Seventy-eight (51.7%) out of the 151 counties studied had one over-represented non-White group, followed by 38 (25.2%) counties which had zero over-represented non-White groups. Counties with two and three over-represented non-White groups numbered 26 (17%) and 9 (5.9%), respectively.

Six of the 43 states studied did not have overrepresented non-White groups relative to the national levels of 60.1% [6]. These states were all found to have White populations which were well over the national percentages. These states were: Iowa, with a state-level White population at 85.0%; Nebraska, with 78.2% White population; North Dakota, at 83.7%; South Dakota at 81.5%; Montana at 85.9%; and West Virginia, with a White population of 92.0%. When the rate of non-White overrepresentation per county was analyzed relative to the non-White state percentages, the pattern which had been viewed with the other states reappeared. Of the 15 counties reviewed here, only two (13.3%) had zero overrepresented non-White categories. One-third of the counties had three overrepresented non-White groups relative to state numbers, while counties with one and two non-White categories in excess of the state numbers each numbered four (26.7%). At 86.7%, the counties in these states with at least one overrepresented non-White category was higher than the percentage of 74.8% of the counties relative to the national numbers. In addition, when the two are combined into a listing of overrepresentation of county versus state OR nation, the number of counties with zero overrepresented groups becomes 25 out of 151 (16.6%), and the number of counties which show at least one overrepresented group amount to 126 (83.4%). The majority (82; 54.3%) of the counties have one non-White group, followed by two (30; 19.9%) and three (14; 9.3%).

Histograms of each of the non-White categories when both state and county numbers are considered indicate that approximately one-third of the counties have an excess of Hispanic/Latinx residents relative to national rates, 29.1% have a recorded Asian excess relative to state or nation, and 64.9% of the 150 counties have Black/African American numbers overrepresented relative to state or nation. This information indicates that one of the elements

of vulnerability to transmission of COVID-19 is the presence of more non-White population members in excess of either state or nation counts, and that in particular, areas with higher counts of Black/African American individuals are quite vulnerable.

The frequency of counties having at least one of the poverty or health risk indicators showed that the number in excess of national levels which was most often identified was 2 (60; 40.0%). The next highest frequency was 3 indicators over national levels (40; 26.7%). The number of counties having one indicator was 23 (15.3%), and 27 (18.0%) counties had zero. When the numbers were broken down based on the specific indicators, the researcher found that 109 (72.7%) of the counties had higher poverty levels than that found in the nation, and over half (85; 56.7%) of the counties had higher rates of uninsured population members than overall U.S. rates, while slightly under half (70; 46.7%) of the counties had higher rates of disabled individuals under the age of 65.

The researcher performed t-tests to determine the relationships between time of reporting and percentage of non-White members of the state populations. There were significant relationships found for time of reporting (By June 30 or On or After July 1) relative to all three non-White groups ($p=0.00$), where the states reporting by June 30 were more likely to include over-representation of any of the non-White groups versus states reporting on or after July 1. A significant finding was recorded with a t-test comparing the time of reporting to disability percentage ($p=0.05$), where earlier reporting ($M=0.09$, $SD=0.00$) was related to higher disability percentages ($M=0.12$, $SD=0.01$). No significant results were yielded when time of reporting was analyzed relative to poverty or lack of insurance percentages, indicating that these were not important factors in timing of COVID-19 transmission.

A correlation analysis was performed for the variables of Time of Reporting, Percent Hispanic/Latinx, Percent White, Percent Asian, Percent Black/African American, Poverty Percent, Percent Disabled Under 65 Years, and Percent Without Health Insurance Under 65 Years. There was a high positive correlation between poverty percent and disability (0.77), and a moderate negative association between Asian percent in the population and percent disabled under 65 (-0.55). The weak to moderate correlations between the presence of non-White populations and time of reporting indicated that areas with higher percentages of non-White residents were more likely to have early reports of numbers over 40,000.

The Salutogenic Model of health promotion, developed by Aaron Antonovsky [8], asserts that health professionals should consider their patients as falling along a continuum of ease to disease, rather than a binary sick or not sick structure, and that the goal of health interventions would be to help the patients to move toward greater ease and lesser disease. In viewing the results of the study through the lens of the Salutogenic Model, we might first consider that the indicators of greater ease include higher percentages of White members of the population and insured

persons, and lower rates of poverty and disability. In this case, promoting greater ease and lesser disease would focus on ensuring that populations identified as disabled or in poverty have equitable access to knowledge and resources to help them avoid contracting COVID-19, and that insurance or alternative payment methods such as sliding scale options be made available in order to allow those who do contract COVID-19 to receive the best care possible, as early as possible. The presence of at least one non-White group in most areas suggests racism may be at play. While health professionals may not be able to address these issues on a larger scale, it is imperative to remain aware of this possibility and how it might affect access to healthcare options and likelihood of early detection and treatment of COVID-19 symptoms.

Limitations of the study include that the use of secondary data may mean that there are inaccuracies in reporting which the researcher is not able to address, and that the lack of standardization among states may affect whether and how data have been reported. In addition, data collection methods incorporated data from two sites, which were not developed to be comparable, and the researcher needed to choose from available data and work to ensure that comparisons between and among variables used could be properly identified. Another limitation is that the CDC information stops at the county level, meaning that while the researcher could make some educated guesses relative to the possibilities at the city or town level, they cannot be fully realized with the data as they currently are available.

Conclusion

The COVID-19 pandemic has caused a shift in the lives of many across the globe. The United States, in particular, has a very high percentage of cases having been reported since the start of the pandemic. Due to its relatively high rate of cases, and the recent uptick in numbers, it is necessary for researchers and health professionals to understand which factors might increase the likelihood of need among members of the population, and to target prevention and health promotion strategies to those whose needs do not match the availability of resources.

The current study highlights that people who are already at relative disadvantage in the United States have the added stressor of greater likelihood of contracting COVID-19, meaning that those who are diagnosed are more likely to need support in addressing it. Similarly, those same populations would likely require assistance in preventing transmission, including information and resources such as masks and hand sanitizers. Equitable solutions would need to incorporate knowledge of the challenges faced by residents of different areas, and seek to allay those challenges by empowering these residents with the knowledge and resources which can assist them, without requiring people who are already disadvantaged to choose between health-promoting behaviors connected to COVID-19 and health-promoting behaviors connected to their lives regardless of COVID. Salutogenic Model allows health professionals

the space to recognize the challenges, while simultaneously acknowledging the opportunities to bring about improved health. The model allows practitioners to incorporate empathy and understanding to the overarching circumstances, while starting the helping process by meeting the individual patient where they are.

Future research should seek to understand the phenomenon from a more localized perspective, such as cities or towns within different counties, or by studying the differences between rural and urban locations. In addition, further studies could compare the United States to other countries to determine any more widespread concerns. Variables such as percent of uninsured residents could be investigated relative to level of comprehensiveness of the states' insurance plans. Finally, analysis of this pandemic relative to prior pandemic diseases, especially the influenza of 1918 [9] could shed some light on patterns across time.

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Conflict of Interest

The author declares that there is no conflict of interest including relevant financial interests, activities, relationships, affiliations, and

any other conflict of interest in preparing this article as explicitly or implicitly expressed in the Editorial Policies for Authors.

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