

Investigating the Influence of Household Environmental Factors on Mental Health Using GIS

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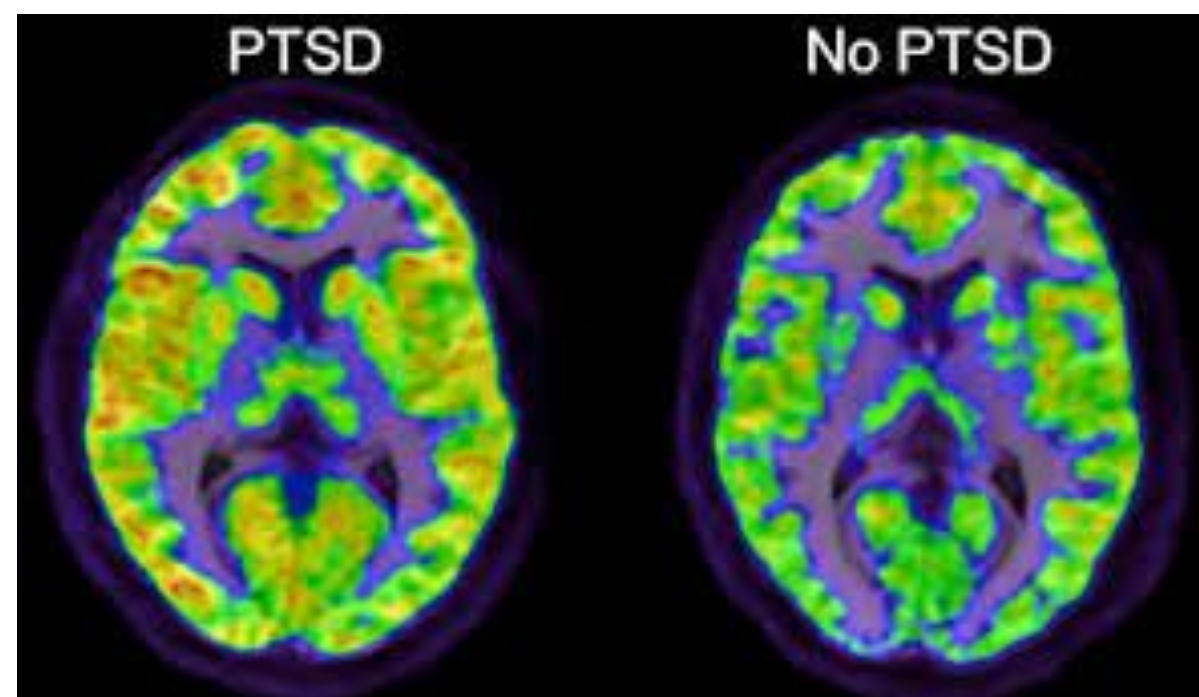


Abstract

This study utilizes Geographic Information Systems (GIS) analysis to explore the influence of household environmental factors, such as physical and emotional abuse, divorce and parental separation, and household substance use on mental health and trauma. The data used in this study is Adverse childhood experiences (ACE) Data which is collected from Centers for Disease Control and Prevention (CDC) behavioral risk factor surveillance system, which is from all the states across the United States. By using GIS techniques, the research aims to explore spatial patterns and relationships between household environmental factors and various aspects of well-being, including physical, mental, and emotional health. Through GIS techniques, the study will explore distribution of ACE factors nationwide and identify the predominant factors that contribute to mental health and trauma. In addition, an analysis will identify the correlation between household environment factors and mental instability. Insights gained from this study will provide valuable understanding of how household environmental factors impact overall well-being, offering insights for policymakers, and healthcare professionals to develop targeted strategies aimed at promoting overall wellness and lessening the effects of trauma.

Methodology

There was a survey study conducted across all of the 50 states in the United States from the years 2011-2020 (N=105,158)with at least 63.9% of U.S. citizens reported to have dealt with at least 1/8 of the



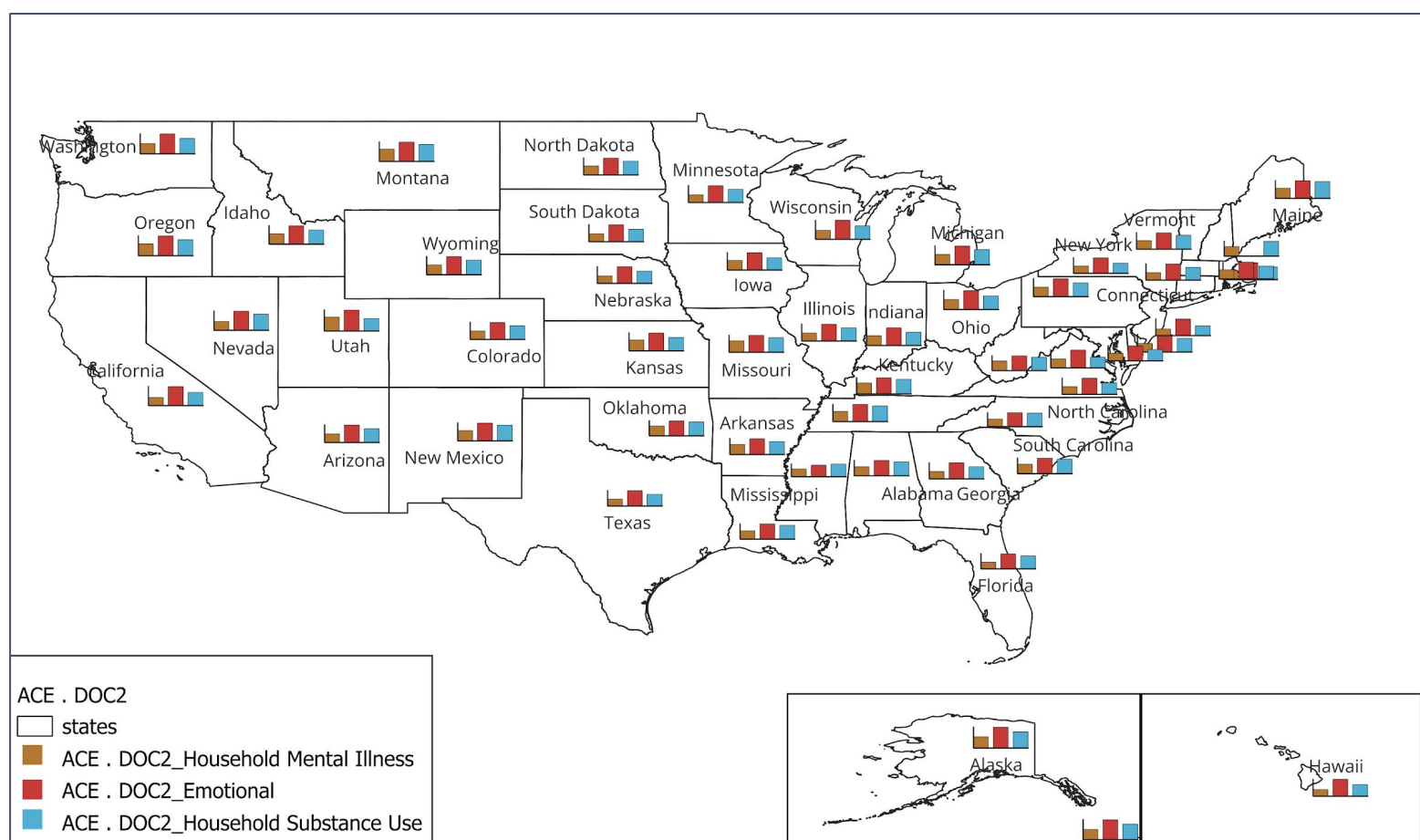
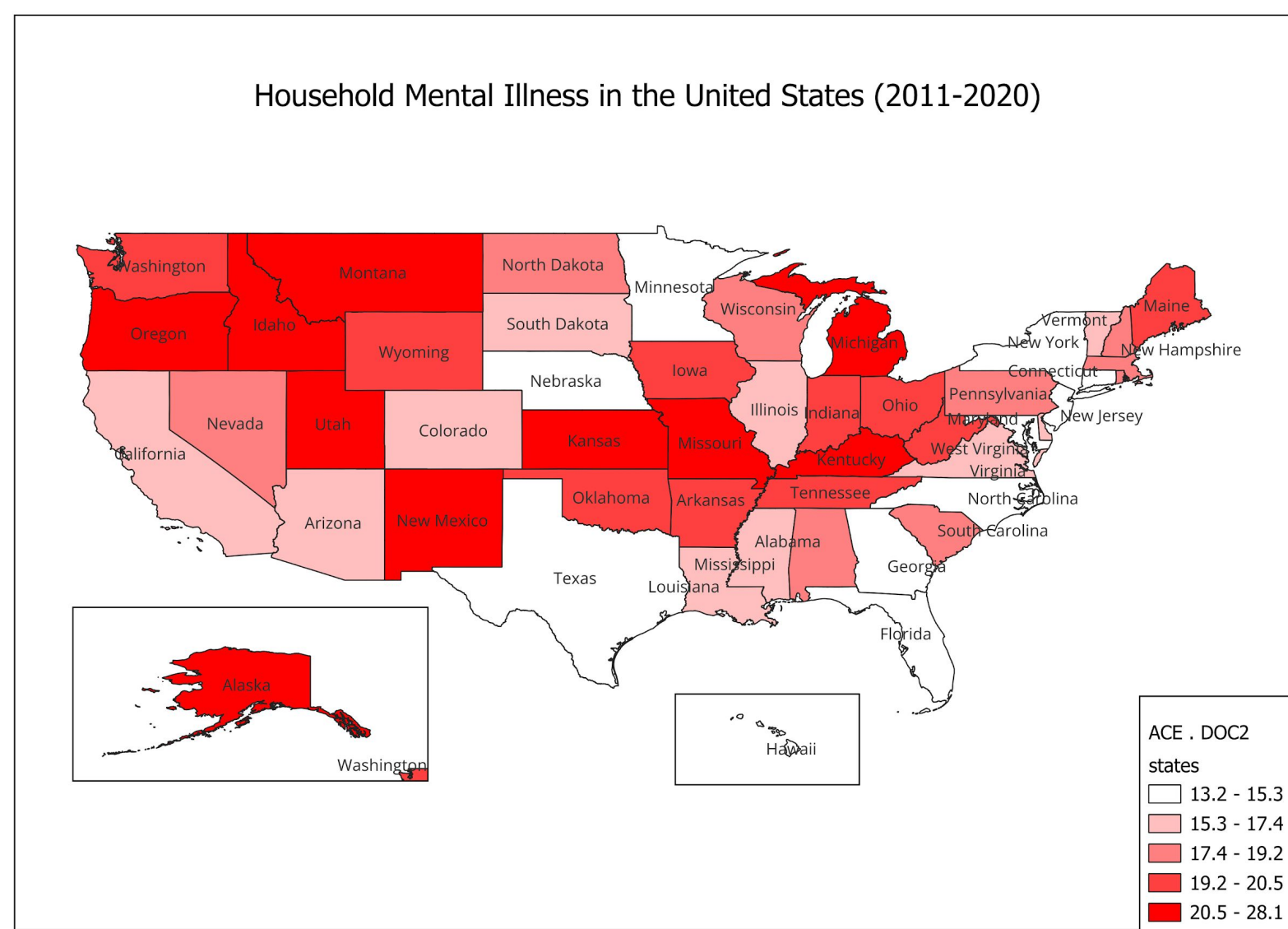
(Yale University study on PTSD)

Adverse childhood experiences reported. As well as conducting research on the adverse effects on ACE and trauma. A study done to show the results of the brain's functional changes that occurs during and after a traumatic event. This study was conducted by the NCBA and was then studied further for this project by using a control group, imaging, and a study group to compare necessary data collected. The population for this study

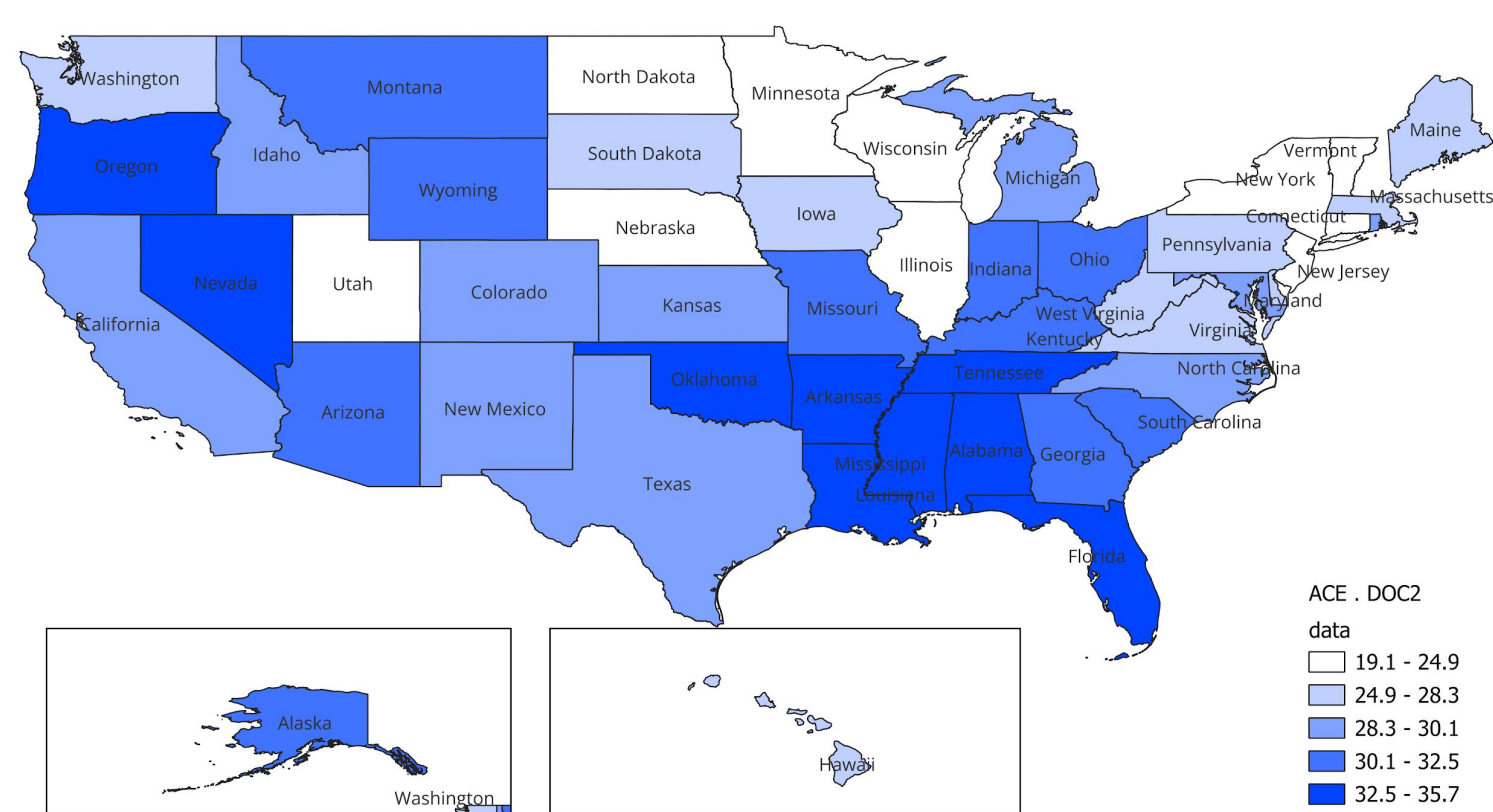
Result

The key findings was correlation data between ACE and mental instability. With this data it also includes the ratio of integrated responses to the mental disorders one may have compared to the environmental factors that have made a contribution to that. This was represented by the strength in correlation between substance abuse and poverty as well as those who are below the poverty line showing an substantial increase in serious mental illness in adults. Those living in poverty was even reviewed as having a significantly higher chance of PTSD and post trauma symptoms after 6 months.

This Map shows the distribution percentage of household mental illness across the United States the light colors are those with the lower percentages and the Darker red shows the states where Household mental illness is the greatest.



This Map data shows a bar graph representing the percent data recorded amongst the states. The brown representing the household mental illness, the red representing the emotional abuse and the blue representing the household substance use. This data shows correlational data across the states between these three ACE.



The map shows the different states rates of parental separation in percentages. The highest percentages are represented by the Darker blue areas while the lightest parts represents the least amount of parental separations.

Conclusion

The present study tested ACE around the country using GIS visualizations. The findings concerning our visual representations demonstrated the potential effects ACE could have on mental health insinuating that greater mental instability is associated with greater environmental traumas and lesser environmental opportunities. The ways in which environmental factors leads to overall mental health has been proven significant in not just the link between poverty but amongst other factors as well. There has been continuous data research on the the role poverty and substance abuse is linked to a higher rate in PTSD which can lead to an increase in ACE for future generations. The way to combat that is to work with these parents, schools, and organizations within the community to increase population stability through filtered community involvement.

Future Work

- There has already been communication between local schools based on program needs and connecting with community partners to reach future needs.
 - Create a new information system to track mental health status and needs in the school, office and workplaces using a survey tracking system that references the surveys answers to mental health diagnostics.
 - To further the research, by collecting data from schools in this area as well as Niagara University to understand the needs of those on campus and the surrounding areas.
 - Connect with other community partners to create a filtered system to connect with the best healthcare professionals in the community for specific health care needs.

Acknowledgement

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References

Centers for Disease Control and Prevention. (2023, June 29). *Prevalence of adverse childhood experiences among U.S. adults - behavioral risk factor surveillance system, 2011–2020*. Centers for Disease Control and Prevention. https://www.cdc.gov/mmwr/volumes/72/wr/mm7226a2.htm?s_cid=mm7226a2_w#T1_down

Knifton L, Inglis G. *Poverty and mental health: policy, practice and research implications*. *BJPsych Bull*. 2020;44(5):193-196. doi:10.1192/bjb.2020.78

Ravi, M., Powers, A., Rothbaum, B. O., Stevens, J. S., & Michopoulos, V. (2023). Neighborhood poverty prospectively predicts PTSD symptoms six-months following trauma exposure. *Mental Health Science*, 1, 213–221. <https://doi.org/10.1002/mhs2.35>