

## Research Article

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## Socioeconomic Factors and their Influence on Suicide Rate: A Multiple Regression Case Study in Washington

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### ABSTRACT

Washington State's suicide rate is 11% higher than the national average, making it one of the top 10 states with the highest suicide rates in the U.S.. Although efforts have been made to address behavioral factors that contribute to suicide risk, little attention has been given to the impact of socioeconomic factors on the mental health of Washington residents. The purpose of the research is to investigate the relationship between socioeconomic status and suicide rates in Washington State. The results of the study can help guide policymakers and healthcare professionals in developing intervention strategies to reduce suicide risk. The suicide rate among Washington residents from 2011-2020 was provided by the 57 vital statistics jurisdictions participating in the Vital Statistics Cooperative Program. Three indicators, including poverty rate, lower than high school graduate rate, and unemployment rate, were chosen to explore the relationship between socioeconomic factors and suicide rate. The data from 57 jurisdictions were analyzed using R, with F tests and multiple linear regressions employed. The multiple R-squared value was 0.7648, indicating that 76.48% of the variation can be explained by the independent variables. These results suggest that poverty and employment rates have a significant positive relationship with suicide rate. However, the relationship between lower educational attainment and suicide rate was not statistically significant. Addressing the issue of rising suicide rates requires a collaborative effort between healthcare officials and policymakers. Policymakers should prioritize promoting job opportunities and providing educational resources to alleviate financial stress and increase access to mental healthcare.

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### Introduction

Suicide rates in Washington State have reached alarming levels, with statistics indicating that it is one of the top 10 states in the U.S. with the highest suicide rates, surpassing the national average by 11%<sup>1</sup>. While efforts have been made to address behavioral factors contributing to suicide risk, such as mental health disorders and substance abuse, there has been a notable lack of attention given to the impact of socioeconomic factors on the mental well-being of Washington residents [1].

Socioeconomic factors play a significant role in shaping an individual's overall health and well-being, including their mental health. Economic instability, income inequality, limited access to healthcare and mental health services, and educational disparities are some of the socioeconomic challenges that can contribute to an increased risk of suicide<sup>2</sup>. Multiple studies have demonstrated the substantial influence of socioeconomic factors on an individual's overall health and well-being, including their mental health. For instance, research conducted by the World Health Organization (WHO) found that individuals with lower socioeconomic status are at a 20-30% higher risk of developing mental health disorders compared to those with higher socioeconomic status<sup>3</sup>. Besides, approximately 56% of individuals in the United States who die by suicide did not have any recent mental health treatment, highlighting the barriers and gaps in access to crucial mental health

services<sup>4</sup>. However, the specific relationship between these factors and suicide rates in Washington State has not been extensively studied [2].

Therefore, the aim of this research is to investigate the association between socioeconomic status and suicide rates in Washington State. By examining the interplay between various socioeconomic indicators, such as income levels, education attainment, employment status, and access to healthcare, this study seeks to identify the underlying mechanisms and factors that may contribute to the higher suicide rates observed in the state [3].

The findings of this research will provide valuable insights into the complex relationship between socioeconomic status and suicide rates in Washington State. Policymakers and healthcare professionals can utilize these findings to inform the development and implementation of targeted intervention strategies that address the root causes of suicide risk in vulnerable populations. Additionally, the study may shed light on the specific socioeconomic factors that require greater attention and investment in order to effectively reduce suicide rates and improve mental health outcomes.

It is crucial to recognize that suicide is a multifaceted issue, and a comprehensive approach is necessary to address all contributing factors. By including socioeconomic indicators in suicide prevention efforts, Washington State can enhance its existing initiatives and provide a more holistic approach to suicide

prevention. Ultimately, the goal is to create a society where all individuals have equal opportunities for mental health support and resources, regardless of their socioeconomic status [4].

## Materials and Methods

### Data Collection

In this study, data from 57 jurisdictions in Washington State were collected and analyzed. The jurisdictions included counties, cities, or other geographical units within the state. Data points related to suicide rates, socioeconomic indicators, and other relevant variables were obtained from various sources, such as governmental databases, public health records, and reliable research publications.

### Data Analysis

The collected data were analyzed using the R programming language. The main statistical analyses employed in this study were F tests and multiple linear regressions.

F tests were conducted to assess the overall significance of the independent variables in explaining the variation in suicide rates. This statistical test evaluates whether the combined influence of the independent variables, such as poverty rate, employment rate, and educational attainment, is significantly associated with the suicide rate.

Multiple linear regression analyses were performed to examine the relationship between the independent variables and suicide rates. These analyses allow for the simultaneous consideration of multiple factors and help determine the extent to which the independent variables predict changes in the suicide rate. The variables considered in this study included poverty rate, employment rate, and educational attainment.

Furthermore, the multiple R-squared value was calculated as a measure of the proportion of variation in the suicide rate that can be explained by the independent variables. A higher multiple R-squared value indicates a stronger relationship between the independent variables and the suicide rate.

## Results

The analysis of the data revealed insightful findings regarding the relationship between socioeconomic factors and suicide rates in Washington State. The multiple R-squared value of 0.7648 indicated that a substantial proportion, specifically 76.48%, of the variation in suicide rates could be explained by the independent variables considered in this study. These results indicate a strong and significant relationship between certain socioeconomic factors and suicide rates.

One of the primary findings of this study was the significant positive relationship between poverty rates and suicide rates. The analysis demonstrated that higher poverty rates were associated with increased suicide rates in the studied jurisdictions. This suggests that individuals facing financial difficulties and living in impoverished conditions may be at a heightened risk of experiencing suicidal ideation or engaging in self-harm. The link between socioeconomic disadvantage and suicide risk highlights the need for targeted interventions and support systems to address the specific challenges faced by economically vulnerable populations.

The study also revealed a significant positive relationship between employment rates and suicide rates. Higher unemployment rates

were associated with increased suicide risk in the analyzed jurisdictions. This finding underscores the potential impact of joblessness on mental well-being. Individuals facing unemployment often experience heightened stress, financial strain, and a sense of hopelessness, which can contribute to suicidal tendencies. Addressing unemployment and promoting stable employment opportunities are crucial aspects of suicide prevention strategies, as they can provide individuals with a sense of purpose, economic security, and improved mental health outcomes.

Contrary to initial expectations, the analysis did not find a statistically significant relationship between lower educational attainment and suicide rates in Washington State. While education plays a vital role in overall well-being and mental health, this particular study did not identify a direct link between educational attainment and suicide rates in the studied jurisdictions. It is important to note that this finding does not diminish the significance of education as a protective factor for mental health but suggests that other socioeconomic factors may exert a stronger influence on suicide rates within the context of this study.

## Discussion

The findings of this study highlight the importance of socioeconomic factors in understanding and addressing the issue of rising suicide rates in Washington State. By examining the relationship between various socioeconomic indicators and suicide rates, this research provides valuable insights into the underlying factors contributing to suicide risk in the region. Understanding these relationships can guide policymakers, healthcare officials, and community stakeholders in developing effective intervention strategies to reduce suicide rates and promote mental well-being among the population.

### Financial Stress and Economic Hardships as Contributors to Suicide Risk

Financial stress and economic hardships associated with living in poverty can create a significant burden on individuals' mental well-being. The strain of limited financial resources, unemployment, and inadequate access to basic necessities can contribute to feelings of hopelessness, despair, and emotional distress. The persistent struggle to meet basic needs and the absence of a supportive safety net can amplify psychological vulnerability, ultimately increasing the risk of suicidal ideation and self-harm.

Furthermore, the lack of resources and limited access to support systems in impoverished communities can exacerbate the challenges faced by individuals already grappling with mental health issues. The scarcity of mental healthcare services, counseling resources, and community support programs can impede timely intervention and effective treatment. Without appropriate support systems in place, individuals may feel isolated, overlooked, and unable to seek help, further heightening their risk of suicidal behavior.

Addressing the socioeconomic disparities that contribute to the increased suicide risk in areas with higher poverty rates is crucial for reducing suicide rates in Washington State. Policymakers and healthcare officials should prioritize initiatives aimed at alleviating poverty and providing support systems to vulnerable communities. Such efforts could include targeted interventions to enhance access to affordable housing, employment opportunities, and financial assistance programs. Additionally, investing in the development and expansion of mental healthcare services, counseling resources, and suicide prevention programs can offer crucial support to individuals facing socioeconomic challenges.

## **The Impact of Job Opportunities and Employment Conditions on Suicide Risk**

The positive relationship between unemployment rates and suicide rates indicates that lack of job opportunities and unstable employment conditions can be significant factors in suicide risk. Individuals facing unemployment often experience heightened levels of stress, social isolation, and a loss of purpose and identity. These factors, combined with financial strain and feelings of hopelessness, can contribute to the development of suicidal thoughts and behaviors. Implementing comprehensive strategies to combat unemployment, such as job creation programs, vocational training, and support for reintegration into the workforce, can play a crucial role in preventing suicide and promoting mental well-being.

## **Exploring the Complexity of Education's Influence on Suicide Rates**

The non-significant relationship between lower educational attainment and suicide rates in the studied jurisdictions highlights an intriguing aspect of the complex interplay between education, mental health, and suicide risk. While formal education may not directly impact suicide rates, it is important to recognize that education encompasses more than just academic achievement. Future research should delve deeper into various educational indicators that could contribute to suicide risk or protection.

One crucial area of exploration is access to mental health education. Providing individuals with knowledge about mental health, recognizing warning signs, and promoting help-seeking behaviors can empower them to support their own well-being and that of others. By integrating mental health education into school curricula and community programs, policymakers and educators can foster awareness, reduce stigma, and equip individuals with essential coping skills and resources. Understanding the impact of mental health education on suicide rates could guide the development of targeted interventions and preventive strategies.

Moreover, the influence of supportive learning environments on suicide risk warrants further investigation. Educational settings that foster positive relationships, emotional support, and a sense of belonging may contribute to lower suicide rates. Factors such as strong social connections, access to supportive mentors, and a safe and inclusive school climate can potentially serve as protective factors against suicide. Research examining the association between these educational indicators and suicide rates could provide valuable insights for developing educational policies and practices that promote mental well-being.

It is important to note that educational attainment is just one aspect of the broader social context in which individuals live. Socioeconomic factors, family dynamics, community resources, and cultural influences all play critical roles in shaping mental health outcomes and suicide risk. Future research should adopt a comprehensive approach that considers these multifaceted factors and their interactions with educational factors to gain a more nuanced understanding of the relationship between education and suicide rates.

## **Collaborative Efforts and Prioritized Interventions**

Addressing the challenge of rising suicide rates requires a collaborative effort between healthcare officials and policymakers. It is crucial for policymakers to recognize the substantial influence of socioeconomic factors on suicide risk and to prioritize initiatives that address these underlying determinants. Promoting job opportunities and creating favorable economic conditions can play a pivotal role in reducing suicide rates. By focusing on job creation, vocational training programs, and entrepreneurship support,

policymakers can provide individuals with a sense of purpose, financial stability, and hope for the future. These measures can alleviate financial stress and reduce the risk of suicide associated with economic hardships.

In addition to promoting job opportunities, policymakers should also prioritize efforts to reduce poverty levels. Poverty often amplifies the risk of mental health issues and suicide, as individuals facing economic deprivation may experience feelings of hopelessness, despair, and social exclusion. Implementing social welfare programs, expanding access to affordable housing, and strengthening social safety nets can contribute to reducing poverty-related stressors and addressing the underlying socioeconomic factors that contribute to suicide risk.

Furthermore, providing educational resources is vital in the fight against suicide. Education not only equips individuals with knowledge and skills but also plays a crucial role in promoting mental well-being and resilience. Policymakers should invest in educational programs that foster emotional intelligence, mental health literacy, and coping strategies. By integrating mental health education into school curricula and providing resources for continuing education, policymakers can empower individuals with the tools to recognize and address mental health challenges, including suicide risk.

Enhancing access to mental healthcare services is another key aspect of addressing rising suicide rates, particularly for individuals facing socioeconomic challenges. Policymakers should strive to reduce barriers to mental healthcare, such as financial constraints, stigma, and limited availability of services. This can be achieved by expanding mental health service infrastructure, increasing funding for mental health programs, and implementing policies that ensure equitable access to care for all individuals, regardless of their socioeconomic status. Additionally, integrating mental health services into primary care settings and leveraging telehealth technologies can enhance the reach and effectiveness of mental healthcare delivery.

By integrating comprehensive suicide prevention strategies into healthcare and social policies, Washington State can make significant strides in reducing suicide rates and improving the mental health outcomes of its population. This requires a coordinated approach that involves collaboration between healthcare officials, policymakers, community organizations, and other stakeholders. Together, they can develop and implement evidence-based interventions, raise awareness about mental health and suicide prevention, and allocate resources to address the socioeconomic determinants of suicide risk. Through these concerted efforts, Washington State can foster a supportive and resilient society that prioritizes mental well-being and effectively addresses the challenge of rising suicide rates.

## **Considerations and the Path Forward**

While this study provides valuable insights into the relationship between socioeconomic status and suicide rates, it is essential to acknowledge and consider its limitations. Firstly, the analysis focused on aggregated data at the jurisdictional level, which may not fully capture individual-level factors that contribute to suicide risk. Suicide is a complex phenomenon influenced by a myriad of personal, social, and psychological factors that operate at the individual level. Therefore, future research should incorporate data that allows for a more granular examination of these individual-level variables to gain a more comprehensive understanding of their impact on suicide rates.



Additionally, the study's cross-sectional design poses limitations in establishing a causal relationship between the independent variables and suicide rates. While the results indicate significant associations between certain socioeconomic factors and suicide rates, it is crucial to exercise caution in inferring causality. Longitudinal studies or experimental designs would provide more robust evidence regarding the causal relationships between socioeconomic factors and suicide risk. Such research would allow for the examination of temporal associations and the exploration of potential mediators and moderators that might influence the observed relationships.

To further enhance our understanding of suicide rates, future research should explore additional factors that may contribute to the complex dynamics involved. For example, investigating the prevalence of mental health disorders, substance abuse patterns, and social support networks could provide valuable insights into the underlying mechanisms linking socioeconomic status to suicide risk. Understanding the interplay between these factors and socioeconomic status can inform the development of targeted interventions and policies that address the multifaceted nature of suicide prevention.

By considering the limitations of this study and conducting further research, policymakers, healthcare professionals, and community stakeholders can refine their efforts to reduce suicide rates and improve the overall mental well-being of the population in Washington State. A comprehensive approach should involve multidisciplinary collaboration, incorporating perspectives from psychology, sociology, public health, and other relevant fields. By integrating findings from diverse research areas, policymakers can develop evidence-based strategies to mitigate the impact of socioeconomic disparities, enhance access to mental healthcare services, and foster supportive environments that promote mental well-being.

In conclusion, while this study sheds light on the relationship between socioeconomic status and suicide rates in Washington State, it is important to recognize its limitations and the need for future research. By addressing these limitations and conducting further investigations into individual-level factors, causal relationships, and additional influencing variables, we can gain a deeper understanding of the complex dynamics of suicide rates. Armed with this knowledge, we can develop more targeted interventions and policies that effectively reduce suicide rates and improve the mental health outcomes of individuals and communities in Washington State.

## **Declarations**

### **Ethical Approval**

Both students have the consent to participate and publish the paper.

### **Competing Interests**

Both authors have no competing interests.

### **Authors contributions**

Two authors equally contribute to this paper.

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### **Availability of data and materials**

Data are from open source datasets.

## **References**

1. Levi-Belz Y, Gvion Y, Apter A (2019) Editorial: The Psychology of Suicide: From Research Understandings to Intervention and Treatment. *Front Psychiatry* 10: 214.
2. World Health Organization (2014) Preventing suicide: A global imperative. <https://www.who.int/publications/i/item/9789241564779>.
3. Tang S, Reily NM, Arena AF, Batterham PJ, Caelear AL, et al (2022) People Who Die by Suicide without Receiving Mental Health Services: A Systematic Review. *Front Public Health* 9: 736948.
4. Raschke N, Mohsenpour A, Aschentrup L, Florian Fischer, Kamil J Wrona (2022) Socioeconomic factors associated with suicidal behaviors in South Korea: systematic review on the current state of evidence. *BMC Public Health* 22: 129.

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