

Innovative Analysis of Social Determinants to Enhance Suicide Prevention for Black Youth

Zhaoyi Sun¹, Song Wang², Ying Ding, PhD², Yongkang Zhang, PhD¹,
Jyotishman Pathak, PhD¹, Yifan Peng, PhD^{1,*}, Yunyu Xiao, PhD^{1,*}

¹ Weill Cornell Medicine, New York, NY; ² The University of Texas at Austin, Austin, TX;

Introduction

The increasing rates of suicide mortality and suicidal ideations and behaviors among Black youth in the United States (US) have become a pressing concern in recent years [1]. Between 2001 and 2015, Black children under the age of 13 were twice as likely to die by suicide, compared to their White counterparts [2]. Furthermore, suicide mortality rates among Black youth have risen more rapidly than those in any other racial or ethnic groups [3,4]. However, there remains a significant knowledge gap in understanding culturally tailored suicide prevention strategies for this population, particularly regarding unique social risk factors specific to Black youth. Specifically, a detailed understanding of social risk factors unique to Black youth and their differentiation from risk factors for other racial and ethnic groups is limited [4]. This knowledge gap is critical, as research has indicated that Black youth face greater exposure to adverse childhood experiences (ACEs), which are linked to higher risks of suicidal ideation and attempts [5,6].

Social determinants of health (SDoH), such as income, education, race, social and physical environments, contribute substantially to health outcomes, healthcare equity, and disparities [7]. Social factors alone are estimated to contribute to 30-55% of health outcomes, while modifiable behavior and community exposures contribute to 70-90% of chronic diseases and 60% of preventable deaths in the US. For Black youth, the transition to young adulthood is a critical life stage with cultural expectations that may correlate with increased risks of suicide and suicidal behaviors [8]. These challenges may be correlated with heightened risks of suicide and suicidal behaviors [9]. Consequently, discerning these differences is an essential prerequisite for identifying underlying mechanisms that could inform the creation of efficacious and culturally adapted suicide prevention strategies tailored to Black youth.

To fill this gap, our study analyzed 17 crises and 52 circumstances associated with Black youth (age 10-24) suicide from 2014-2019, utilizing data from the National Violent Death Reporting System (NVDRS) dataset. Our primary objective was to identify the unique suicide-related risks faced by Black youth.

Methods

The NVDRS combines information about "who, when, where, and how" of suicide data, offering insights into the underlying reasons for suicide. It is the sole state-based violent death reporting system in the US, providing information and context regarding the circumstances, locations, and methods of violent deaths, as well as the affected demographics [10]. This study included 157,224 U.S. suicide decedents in NVDRS from 2014 to 2019. Specifically, our focus was on the "Black youth" cohort which, for the purposes of this study, encompasses individuals identifying as "Black or African American" and are aged between 10 to 24 years. We used the latest NVDRS restricted-access database, which includes 50 U.S. states, Puerto Rico, and the District of Columbia (Table 1). This study is approved by the NVDRS Restricted Access Database (RAD) Proposal.

Characteristic	No	(%)
Total	157224	
Age		
Youth (10-24)	21743	(13.8)
non-youth (≥ 25)	135481	(86.2)
Race		
Black	10333	(6.5)
non-Black	146891	(93.5)
Black youth	2622	(1.7)

Table 1. Statistics of NVDRS.

We used logistic regression to analyze the association between race (Black and non-Black) and age (youth and non-youth) and the prevalence of the 17 crises and 52 circumstances of suicide. Youth were defined as individuals aged 10-24. Crises are defined as the circumstances that occurred within two weeks before the suicide death. Circumstances are defined as the precipitating events contributing to the infliction of each fatal injury incident [15]. Race and age were used as predictors and compared with the reference group (e.g., Black versus others, youth versus others, and Black youth versus others). Odds ratios larger than 1 indicated that the comparison groups had higher rates of antecedent compared to the reference group. $p < 0.05$ is considered significant. When comparing rates, 95% confidence intervals (CI) were calculated.

Results

Multiple social factors such as school crises (e.g., poor grades and bullying, OR = 1.7, 95% CI = 1.3-2.3), criminal activities (e.g., robbery or drug trafficking, OR = 1.4, 95% CI = 1.2-1.5), and intimate partner problems (e.g., argument or conflict, OR = 1.1, 95% CI = 1.1-1.2) were found to be associated with Black suicide. For circumstances, the top 3 antecedents with greater odds of Black decedents were substance abuse by parents or caregivers (OR = 5.3, 95% CI = 1.4-20.1), in-progress crime (e.g., when law enforcement cornered a victim after he assaulted a store owner, OR = 3.0, 95% CI = 2.6-3.4), and interpersonal violence (OR = 1.9, 95% CI = 1.7-2.2). In the youth population, Black youth had greater odds of criminal crises (OR = 1.4, 95% CI = 1.2-1.8) and circumstances including in-progress crimes (OR = 3.4, 95% CI = 2.5-4.8), interpersonal violence (OR = 1.7, 95% CI = 1.3-2.3), and recent legal problems (OR = 1.2, 95% CI = 1.0-1.4). Specific antecedents such as job problems, financial problems, and the death of a friend or family member were more prevalent among the younger Black population.

For youth suicide in general, social factors included school crises (OR = 50.0, 95% CI = 38.3-65.3), relationship problems (OR = 2.7, 95% CI = 2.3-3.2), and other non-standard NVDRS crises (OR = 1.3, 95% CI = 1.2-1.3). Antecedents with greater odds were prior Child Protective Services (CPS) reports (OR = 87.3, 95% CI = 11.5-663.9), school-related problems (OR = 55.9, 95% CI = 48.7-64.0), and household substance abuse (OR = 28.1, 95% CI = 6.1-129.8). In the Black population, youth had greater odds of abuse by a caregiver, a history of abuse as a child, mental health crises, job crises, and the presence of suicide notes.

Discussion and Conclusions

This study uncovers a significant disparity in crises and circumstances associated with Black, youth, and Black youth suicides, such as school problems, relationship problems, and household and child abuse. Future research should focus on the specific needs of Black youth to inform the development of targeted suicide prevention strategies. This study highlights the potential of natural language processing (NLP) to extract insights from the NVDRS's free text by the medical and legal examiners, which could unveil additional unique social risks not documented in standardized coding mechanisms.

Acknowledgments. This work is supported by the National Library of Medicine under Award No. 4R00LM013001, National Science Foundation under grant number 2145640, and Amazon Research Award.

Reference

- 1 CDC. Facts about suicide. Facts about suicide. 2022. <https://www.cdc.gov/suicide/facts/index.html> (accessed 21 Oct 2022).
- 2 Bridge JA, Horowitz LM, Fontanella CA, *et al.* Age-Related Racial Disparity in Suicide Rates Among US Youths From 2001 Through 2015. *JAMA Pediatr* 2018;**172**:697–9. doi:10.1001/jamapediatrics.2018.0399
- 3 Lindsey MA, Sheftall AH, Xiao Y, *et al.* Trends of suicidal behaviors among high school students in the United States: 1991–2017. *Pediatrics* Published Online First: 2019.
- 4 Xiao Y, Cerel J, Mann JJ. Temporal Trends in Suicidal Ideation and Attempts Among US Adolescents by Sex and Race/Ethnicity, 1991-2019. *JAMA Netw Open* 2021;**4**:e2113513. doi:10.1001/jamanetworkopen.2021.13513
- 5 Areba EM, Taliaferro LA, Forster M, *et al.* Adverse childhood experiences and suicidality: school connectedness as a protective factor for ethnic minority adolescents. *Child Youth Serv Rev* 2021;**120**:105637.
- 6 Brockie TN, Dana-Sacco G, Wallen GR, *et al.* The Relationship of Adverse Childhood Experiences to PTSD, Depression, Poly-Drug Use and Suicide Attempt in Reservation-Based Native American Adolescents and Young Adults. *Am J Community Psychol* 2015;**55**:411–21. doi:10.1007/s10464-015-9721-3
- 7 Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Rep* 2014;**129 Suppl 2**:19–31. doi:10.1177/00333549141291S206
- 8 Patton GC, Sawyer SM, Santelli JS, *et al.* Our future: a Lancet commission on adolescent health and wellbeing. *Lancet* 2016;**387**:2423–78. doi:10.1016/S0140-6736(16)00579-1
- 9 Furlong A. *Youth Studies: An Introduction*. London, England: : Routledge 2012. doi:10.4324/9780203862094
- 10 Wilson RF, Liu G, Lyons BH, *et al.* Surveillance for Violent Deaths - National Violent Death Reporting System, 42 States, the District of Columbia, and Puerto Rico, 2019. *MMWR Surveill Summ* 2022;**71**:1–40. doi:10.15585/mmwr.ss7106a1