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ORIGINAL PAPER

Suicides Among Non-Elderly Adult Hispanics, 2010–2020

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Abstract
Most research on suicides focuses on youth or the elderly and dominant groups of a population. The purpose of this study was to assess suicide trends for non-elderly adult Hispanics (age 20–64 years) over the past decade (2010–2020). Data from the Web-Based Injury Statistics Query and Reporting System (WISQARS) were analyzed for the study period. Suicides for Hispanics in 2010 were the 7th leading cause of death and became the 5th leading cause of death by 2020. During the decade of analyses, suicide rates increased 35.7% for males and 40.6% for females. Non-elderly Hispanic males were most likely to die by hanging/suffocation (2010 = 42%, 2020 = 41%), or firearms (2010 = 39%, 2020 = 42%). Whereas, Hispanic adult females were most likely to use hanging/suffocation (2010 = 36%, 2020 = 43%) or poisoning (2010 = 27%, 2020 = 19%) for completed suicides. In 2020, the top three states for non-elderly Hispanic adult suicides (per 100,000 population) were Colorado (25.52), New Mexico (23.99), and Utah (21.73). The Hispanic population continues to grow, but also faces chronicity of prejudice, underemployment, lack of healthcare access, multiple stressors, and rising levels of suicide. The reduction of adult Hispanic suicides would require additional resources, interventions, and research to understand prevention and risk factors.

Keywords Hispanic · Suicide · Mortality · Firearms · Self-Harm · Epidemiology

Suicidal antecedents (e.g., intentions, planning, and attempts) and suicides are major public health problems in the United States (U.S.). In 2019, suicide was the 10th leading cause of death in the U.S [1]. The medical costs of suicide in 2019 were slightly over $250 million [2]. Non-medical costs of suicides are much greater, approximately $70 billion, including pain and suffering for family members and friends and the loss to society of potential contributions by the deceased, just to name a few additional costs. Suicide burden and epidemiology studies in the U.S. have focused mostly on youths or the elderly and certain racial or ethnic groups [3–7].

Hispanics were among the largest ethnic/racial minority group in the U.S. in 2019, and by 2045, Hispanics are projected to be 25% of the U.S. population [3, 5, 8, 9]. In 2010, non-elderly (20–64 years of age) adult Hispanics were 15.5% of the U.S. population and in 2019, the proportion increased to 18.3% of the nonelderly adult population. The majority (65%) of Hispanic nonelderly adults are native-born Americans, and 35% are foreign-born (of which 13% are naturalized citizens, 22% are not citizens) [8, 9]. Insurance coverage of nonelderly Hispanic adults is 74.5%. In other words, slightly more than 1 in 4 nonelderly Hispanic adults are without health insurance, a major impediment to accessing healthcare [10, 11]. In 2019, almost 5% of Hispanics did not speak English, the majority (56%) of whom were without health insurance. Also, almost 2 in 5 Hispanic adults have a high school degree or less. Non-elderly Hispanic adults are over-represented in the population in poverty by 40% compared to their population proportion in the U.S. This number represents 13% for Hispanics 18 to 64 years old in 2019 [8–11]. These sociodemographic characteristics/disadvantages have often been associated with suicidal antecedents among Hispanics [3, 5].

There are a few recent national assessments of Hispanic adult suicides in the U.S. The first of these studies used the National Epidemiologic Survey on Alcohol and Related Conditions (2004/2005–2012/2013) to assess national trends in suicide attempts among adults [12]. They found that Hispanics were 29% less likely than non-Hispanic

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whites to attempt suicide and the portion of adult suicide attempters that were Hispanic did not significantly change between 2004/05 and 2012/13 (14.5% vs. 13.7%, respectively). The other four studies related to Hispanic suicide behaviors used the National Survey on Drug Use and Health (NSDUH). The first study used the NSDUH 2008–2011 and found Hispanics aged 26–49 years old were 30% less likely than non-Hispanic whites to report past-year suicide ideation, and those aged 50 and older were 40% less likely to report suicidal ideation than their age-matched non-Hispanic peers [13]. The second study using the NSDUH (2008–2012) found that among Hispanics 18 years and older who reported suicidal ideation, almost 1 in 5 (18%) reported attempting suicide in the past year [14]. If the Hispanic suicide attempters also had a suicide plan, they were 60% more likely than comparable non-Hispanic Whites to have attempted suicide in the past 12 months. The fourth study in this series used the NSDUH (2008–2012) to examine suicide case fatality rates [15]. Hispanic adults 45 years or older had a case fatality rate of 2.7 for men and 0.4 for women. For non-Hispanic Whites, comparable rates were 7.6 and 1.8, respectively. This would indicate that most suicide attempters do not die from a suicide attempt. The last of this group of studies used NSDUH (2015–2018) to assess change in suicidal ideation in various segments of the U.S. population aged 18 to 50 years [16]. Suicidal ideation was found to have increased 20% between 2015 and 2018 for Hispanics but did not significantly change for non-Hispanic Whites. Suicide attempts did not significantly change for Hispanics or non-Hispanic Whites [16].

In addition to the studies that have assessed suicide-related behaviors in Hispanics compared to other population subgroups, studies have also explored the risk factors associated with Hispanic suicides (e.g., access to mental healthcare) [17–20]. However, none of the previously reviewed studies have specifically examined the epidemiology of completed suicides in adult Hispanics. Thus, the purpose of this study was to update the non-elderly adult Hispanic suicide trends. Also, we explored the suicide data by gender and methods of suicide. Finally, we identified ten states that had the greatest number of non-elderly Hispanic suicides.

Methods

Data for non-elderly adult Hispanics where suicide was the cause of death from January 1st, 2010 to December 31, 2020, was obtained from the Web-based Injury Statistics Query and Reporting System (WISQARS) [2, 21]. WISQARS uses fatal injury data from the National Vital Statistics System (NVSS) that has classified causes of death according to the International Statistical Classification of Deaths and Related Health Problems, 10th Revision [22]. The study population of non-elderly Hispanics was defined as ages 20 through 64 years. This age was selected, in part, because they represent the prime age of working adults and the dominant population of Hispanics. Also, in addition to likely having experiences with severe deprivation and discrimination, this is an age window when chronic diseases emerge due to harmful behaviors and environmental insults, and genetic variations emerge more prominently. [17–20]. For those without or minimal health insurance, the manifestations of these threats are potential stressors that can lead to accelerated decline in mental and physical health (i.e., weathering hypothesis) [23]. Not much is known about the epidemiology of suicides for this age group of Hispanics. Death rates were extracted by: gender for each year of the study period, by state and region for the year 2020 to rank mortality rates by location, and by the method of suicide for 2010 and 2020 to assess trends in the method of suicide over the years. Descriptive statistics (e.g., frequency and percentages) were used to represent most findings. To assess suicide rate change over time, a Pearson product moment correlation coefficient with a priori alpha ($p < 0.01$) was calculated. Finally, rate differences were computed between 2010 and 2020, and the suicide rates (per 100,000) were compared by using age-adjusting (with the year 2000 used as the standardized year for age-adjusted rates) [3, 7, 21].

Results

In 2010, suicide was the 7th leading cause of death for non-elderly Hispanic adults. However, by 2020 suicide had become the 5th leading cause of death for this group. The medical costs for suicides for the U.S. population 20 through 64 years of age were $181,872,000 in 2020. The total number of suicides in 2020 for those ages 20 through 64 years was 34,023 of which 3681 (11%) were Hispanics. Assuming that the medical costs for suicides are the same for Hispanics and non-Hispanics 20–64 years old, the medical costs for Hispanic suicides would be $20,005,920.

From 2010 to 2020, 31,174 Hispanic non-elderly adults died by suicide (25,236 males and 5,938 females; Table 1). The overall suicide rate from 2010 to 2020, increased significantly ($r = 0.96$, $p < 0.001$). .From 2010 to 2020, the male suicide rate increased 35.7% (12.2/100,000 to 16.56/100,000, respectively) and the female rate increased 40.6% (2.66/100,000 to 3.74/100,000, respectively). In 2020, males were 4.6 times as likely as females to commit suicide. The proportion of Hispanic suicides that were males remained nearly constant from 2010 to 2020 (82.5–82.2%, respectively). The total number of Hispanic suicides in this age group (20 through 64 years of age) increased by 71.7%

Table 1 Hispanic Non-Elderly Adult Suicides, 2010–2020 (Ages 20–64 years)

Year	Total (n)	Male(n)	Female(n)	Rate/ 100,000
2020	3,681	3,025	656	10.29
2019	3,575	2,844	731	10.15
2018	3,483	2,812	671	10.06
2017	3,136	2,559	577	9.23
2016	3,005	2,441	564	9.03
2015	2,681	2,113	568	8.24
2014	2,615	2,094	521	8.22
2013	2,334	1,878	456	7.51
2012	2,309	1,874	435	7.60
2011	2,212	1,826	386	7.46
2010	2,143	1,770	373	7.46
Total	31,174	25,236	5,938	

Source: WISQARS, CDC [2, 21]

Table 2 States and Regions with The Highest Number of Hispanic Non-Elderly Adult Suicides (2020)

Rank	State	Number of Suicides	Rate/ 100,000
1	Texas	805	11.97
2	California	780	8.41
3	Florida	311	8.80
4	Colorado	189	25.52
5	Arizona	180	13.20
6	New York	148	6.58
7	New Mexico	142	23.99
8	Washington	84	14.60
9	Illinois	84	6.45
10	Utah	57	21.73
Rank	**Region**	**Number of Suicides**	**Rate/ 100,000**
1	West	1,592	11.38
2	South	1,436	10.54
3	Northeast	330	6.61
4	Midwest	323	10.19

Source: WISQARS, CDC [2, 21]

while the size of this segment of the population increased by 24.5%.

An analysis of the geographic distribution of Hispanic nonelderly suicides found that 13 states did not report such deaths in 2020. However, the 10 states with the greatest number of suicides for this population in 2020 are found in Table 2. WISQARS divides the U.S. into four regions and the suicides by region for nonelderly Hispanics in 2020 were: West (n = 1,592), South (n = 1,436), Northeast (n = 300), and Midwest (n = 323). The greatest number of deaths by state and region are due to having the largest number of Hispanic nonelderly adults (aged 20 through 64 years). However, if states were ranked by fatality rates per 100,000, for 2020, the top 5 states would be Colorado (25.52), New Mexico (23.99), Utah (21.73), Kansas (20.36), and Idaho (19.04).

Table 3 Methods Used for Hispanic Non-Elderly Adult Suicides (2010 and 2020)

Method	2010 n(%)	2020 n(%)
Total		
Hanging/Suffocation	884(41)	1525(41)
Firearms	768(36)	1425(39)
Poisoning	267(12)	329(9)
Falls	72(3)	124(3)
Other	152(8)	278(8)
Males		
Hanging/Suffocation	750(42)	1,242(41)
Firearms	689(39)	1,260(42)
Poisoning	165(9)	203(7)
Falls	51(3)	90(3)
Cut/stab	39(2)	96(3)
Other	76(4)	134(4)
Females		
Hanging/Suffocation	134(36)	283(43)
Poisoning	102(27)	126(19)
Firearm	79(21)	165(25)
Falls	21(6)	34(5)
Other	37(10)	48(8)

Source: WISQARS, CDC [2, 21]

The methods used by Hispanic nonelderly adults for suicide are identified by gender and year in Table 3. Hispanic males were most likely to die by hanging/suffocation (2010 = 42%, 2020 = 41%), or firearms (2010 = 39%, 2020 = 42%); firearms became the leading cause by the year 2020. Hispanic nonelderly adult females were most likely to use hanging/suffocation (2010 = 36%, 2020 = 43%) or poisoning (2010 = 27%, 2020 = 19%), but firearms from 2010 (21%) to 2020(25%) as a cause of suicide more than doubled in frequency and became the 2nd leading method of suicide in female non-elderly Hispanic adults (Table 3).

Discussion

Suicide has emerged as a leading cause of death in non-elderly Hispanic adults with rapid increases across all U.S. regions and among both males and females. Based on our analysis, by the year 2020, more than 300 Hispanic non-elderly adults were committing suicide each month. There could be many factors that negatively impact Hispanics' mental health and increase the risk for suicidal thoughts and behaviors (STBs). However, it is important to note that there is a paucity of research on the overall health, STBs, and suicide prevention interventions for Hispanics [3, 5, 18, 19, 24]. Despite the limitations of existing research, certain factors linked with STBs across the lifespan warrant attention not only to reduce STBs among Hispanics, but also for the improvement of the overall health and wellbeing of

Hispanics (e.g., prejudice, mental health issues, sociocultural factors, and access to firearms).

The first group of risk factors for suicide among Hispanic adults can be broadly categorized as experiences of prejudice and discrimination. Since Hispanics are ethnicity and not a race, in theory they cannot experience racism. Severe ethnocentrism can be manifested as stereotypes, prejudices, discrimination, and inaccurate beliefs and can be operational at the interpersonal, institutional, and societal levels [25]. Severe ethnocentrism has likely been exacerbated by the recent political and social climate surrounding the immigration of Hispanics (e.g., labeling as rapists or criminals, police violence, etc.). Research using the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) collected in 2004 and 2013 found significant increases over this time frame for experiencing discrimination by Hispanics. Those who had less than high school education, had household incomes less than $35,000, resided in the Midwest, were immigrants, and those age 65 or older had the greatest increases in discrimination experiences (singular or recurrent) [26]. Furthermore, the NESARC data also found that those who had experienced recurrent discrimination were more likely to have behavioral and mental health problems. There was also a dose-response relationship where discrimination in a greater number of areas of life increased the likelihood of behavioral and mental disorders (e.g., anxiety, mood disorders, or substance use problems) [26]. The FBI reported between 2016 and 2018, hate crimes against Hispanics increased by 39% [27]. Furthermore, according to BOJ statistics, Hispanics were overrepresented (25%) among hate crime victims between 2004 and 2015 [28]. Implicit and explicit prejudices (e.g., discrimination and bullying) have been independently related to both poor mental health and STBs among Hispanics across the lifespan [5, 18, 29]. Policies to prevent prejudice and discrimination in organizations such as schools, colleges, worksites, and healthcare systems should be developed, implemented, or further strengthened to help Hispanic individuals and population subgroups.

The second group of risk factors related to STBs in Hispanics is mental health problems. A few major national studies have assessed the mental health of adult Hispanics. The National Comorbidity Study- Replicated found the lifetime prevalence for Hispanic immigrants was 23% for anxiety disorders and 13% for mood disorders (e.g., depression) [30]. In contrast, U.S.-born Hispanics had higher rates, 29% for anxiety disorders and 21% for mood disorders. The National Latino and Asian American Study included a nationally representative sample of Hispanics that examined the prevalence of depression, anxiety, and substance use disorders [31]. Lifetime psychiatric disorders prevalence was 28% for males and 30% for females. U.S.-born Hispanics were significantly more likely than immigrants (37% vs. 24%, respectively) to have a lifetime psychiatric disorder. In addition, psychiatric disorders were more common in Hispanic adults who were U.S. born, English language proficient, and third-generation Hispanics [31]. The third major study combined the data from the previous two studies with the National Survey of American Life and the National Comorbidity Survey Re-Interview [32, 33]. The results of this study indicated that Hispanic adults had a slightly lower lifetime prevalence of mental disorders than whites (39% vs. 46%, respectively) [34]. Again, the results found that immigrant Hispanics had lower mental health problems than Hispanics born in the U.S. The risk for self-harm is not that more Hispanics suffer from mental health problems than the general population of Whites. Rather, it has been shown that Hispanics are significantly less likely than whites to receive treatment in the past year for their mental health issues and these differences are seen across the lifespan [3, 5, 20, 35]. There are many factors associated with lower utilization of mental health services in Hispanics. For example, a study of Hispanic immigrants residing in the mid-southern U.S. found the primary barriers to mental health services were: cost (59%), lack of health insurance (35%), and language (31%) [36]. Also, frequently, there is a lower quality of care for Hispanics and a shortage of qualified professionals where Hispanic adults often seek assistance from primary care physicians for mental health issues (who may not be well trained in the area of mental health and suicide prevention) [30, 31, 36–41]. In response to the question "if someone you know was suicidal, what would you do first?", a sample of Hispanic adults were most likely to recommend a psychiatrist (54%), talk to the family (63%), or contact a suicide hotline (50%) [38]. Also, two-thirds (65%) preferred to communicate in Spanish. However, nationally, less than a tenth of psychologists or psychiatrists are either Hispanic or can provide services in Spanish [38–41]. Mental health problems are important antecedents for suicide in the general U.S. population. Overall, 50% of suicide decedents in the US are diagnosed with a mental health problem (with depression, anxiety, and substance use being the most common problems) [42]. Policies to expand healthcare coverage, employment benefits, and wages may have several direct or indirect effects on reducing STBs among Hispanics through the improvement of mental health and wellbeing [20, 30, 36, 37, 50]. Efforts to enhance the recruitment and retention of Hispanics in mental health professions are also warranted to help deal with mental health and suicidal crises in Hispanics [36–41].

The third group of risk factors for suicide among Hispanic adults is an amalgamation of many sociodemographic and cultural determinants resulting in poor mental health or independently increasing the risk for STBs [17–19, 30, 32,

36, 43, 44]. As noted earlier, Hispanics have much lower incomes and educational attainments than several other racial/ethnic groups. Such deprivation is associated with lower access to mental healthcare services and a higher risk of STBs. Also, one cannot underestimate the issues of immigration. Immigration policies and related problems have been shown to both directly (e.g., fear) and indirectly (e.g., not seeking mental healthcare) impact the mental health of Hispanics. For example, a recent population-based study found that the implementation of anti-immigration policies and the resulting increase in arrest rates worsened the mental health of Hispanic adults [44]. Unfortunately, many Hispanic immigrants have faced kidnapping, rape, murder, and unforgiving deserts that have taken the lives of many at a younger age and these adverse experiences may continue to pose lifelong risks for poor mental health and STBs [45]. Cultural issues have also been discussed with STBs and the mental health of adult Hispanics. For example, a major impediment in seeking mental health services among Hispanics is the existence of prejudicial beliefs regarding mental illnesses or seeking treatment for these disorders [54]. Studies have shown that compared to other groups, Hispanics are more likely to have negative beliefs about mental illnesses, conceal such illnesses, perceive public stigma towards those with mental illness, depend on religious/faith leaders/healers to deal with mental health issues, and attribute lack of faith as a greater risk factor for suicide than depression [46–48]. Acculturation has also been researched in the context of mental health and STBs among Hispanics. Second-generation Hispanics or those who migrated to the U.S. when they were younger than 13 years of age may adopt greater American cultural attributes (e.g., using more English language instead of Spanish, children replace respecting and pleasing their parents, lower religiosity, family not consulted before making important decisions, cultural differences resulting in lack of social support, reduced ethnic integration, community disorganization, familism replaced with American attributes of individualism, and greater acculturative stress and conflict, etc.). The acculturation-related changes have been credited with a higher risk for poorer mental health and STBs among Hispanics [17–19, 30, 43]. These findings speak to a need for Hispanic community-based suicide prevention programs that are multidimensional, incorporate traditional values and beliefs, and are appropriate for the unique sociodemographic subgroups of Hispanics [43, 49, 50].

The final risk factor for non-elderly Hispanic adult suicides that warrants special attention is access to firearms. It is estimated that more than 4,000 Hispanics die due to firearms every year with more than a third of these deaths being suicides [51, 52]. Our analysis shows that over the past decade, among Hispanic adults, firearms have surpassed all other means of suicide in males, and among females, they are now the second most common cause of suicidal deaths. This may reflect the growing trend of suicides with firearms across all racial and age groups [4–7, 42, 52, 53]. Firearm access and ownership among Hispanics has also been increasing. In 2017, it was estimated that nearly a fifth of the Hispanic adults owned a firearm or lived with someone who had one; this number increased to nearly a fourth reporting firearm ownership in the home by 2021 [54, 55]. Another recent study during the COVID-19 pandemic found that firearm purchase was significantly higher among those who were males, middle-aged, from the South or the West U.S., and Hispanics (all the risk factors identified in this paper associated with suicides) [56]. The reasons cited for firearm ownership are self-defense, fear of victimization, and crime, but Hispanic communities may need greater awareness about the higher risk of household members' suicide and homicide in the presence of firearms. Interventions to increase safer storage of firearms and removal of firearms from high-risk individuals (e.g., Extreme Risk Protection Orders) may help reduce suicides in this population [4, 7, 49–51, 53].

STBs have almost consistently increased across all age groups of Hispanics in the past decade [3, 5, 16, 52]. The non-elderly adult Hispanics include both immigrants and U.S.-born individuals, but many are confronted with adversities and risk factors for STBs as noted above. Often, these risk factors present as an agglomeration of determinants for STBs among individuals. Unfortunately, in a comprehensive review of the literature, we could not find a scalable evidence-based intervention for suicide prevention for Hispanic adults. While this is true for many other minority groups, a unique challenge for developing suicide prevention interventions among Hispanics would be the development of interventions using the Spanish language (given the large proportion of Hispanics who do not speak English or have limited literacy). Given the risk factors and epidemiology of STBs among Hispanics, challenges with developing interventions, and based on published research and the views of Hispanic community leaders, a few key considerations need attention while exploring and developing potential interventions. Suicide prevention interventions among Hispanics should be multipronged and multimodal; take a life course approach with sustainable and tailor-made strategies for various age groups; explore family-based activities to address multiple risk behaviors; focus on promoting social connections and cultural enrichment; address/ manage mental health issues in affordable and culturally competent ways; be sensitive to issues of religion, immigration, and discrimination; increase suicide-related health literacy; focus on firearm safety and means restriction for high-risk groups; and ensure that language or cultural traits are not

barriers to the utilization of these interventions and activities that promote health, connectedness, and resilience [3, 5, 17–19, 43, 49–52].

The results of our analysis have potential limitations. First, WISQARS collects ethnicity data as Hispanic or non-Hispanic. Hispanics are not a monolithic group, there are key differences among Mexicans, Puerto Ricans, South Americans, and others [8, 9, 21]. More granular assessments can help design evidence-based prevention strategies and this was not possible with the WISQARS data. Second, our analysis is primarily descriptive using a cross-sectional design, limiting the ability to comment on causal factors associated with suicides. Third, WISQARS does not have key sociodemographic information such as marital status, education, income, immigration status, birth country, and others that could provide an opportunity for a more nuanced analysis [3, 4, 21, 53]. Finally, a group of scholars has suggested that the recorded levels of Hispanic suicides may be lower than reality due to possible misclassification by approximately 17% [3, 57]. If so, this would be a major threat to the internal validity of our findings. Despite these limitations, our study is one of the largest analyses of suicide rates in non-elderly Hispanic adults that was conducted to understand the suicide rate trends, suicide methods, and region and gender-based differences in suicides among this population.

Conclusions

More than 31,000 non-elderly Hispanic adults have died of suicide within the past decade with nearly 10 dying of suicide every day by the year 2020. Our findings of non-elderly Hispanic adult suicide epidemiology, males more likely to die by suicide, hanging/suffocation being the leading method of suicides, and a pronounced increase from 2010 to 2020 in their suicides, indicate the major contribution of this group to the growing national burden of suicides. Research on STBs, suicide risk factors, and prevention is grossly inadequate across all population groups. Among Hispanics, the added challenges for suicide prevention research and interventions are factors such as language, culture, nativity, immigration status, religion, and traditions. Given the large proportion of adults in the overall Hispanic population, the unique challenges and life stressors faced by this group, and their changing epidemiology of suicides indicate further research is needed to understand risk factors and prevention strategies. Also, given the results of our study, public health practitioners and policymakers should help develop and implement policies to curtail the rising tide of suicides among this population.

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