



The Changing Characteristics of African-American Adolescent Suicides, 2001–2017

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Abstract

African-American (AA) adolescents (13–19 years of age) have disproportionately higher rates of suicide. In this study, to explore the nature of suicidal deaths and suicide attempts in African-American adolescents, we utilized the Youth Risk Behavior Surveys (YRBS) and the Web-Based Injury Statistics Query and Reporting System (WISQARS) database from years 2001 to 2017. The rate of AA male suicides increased by 60% and for AA females increased by 182% from 2001 to 2017. Suicides were the second leading cause of death for AA adolescents. Additionally, in 2017 alone, 68,528 AA males and 94,760 AA females made suicide attempts serious enough that they had to be treated by health professionals. Males were most likely to use firearms (52%) or to hang/suffocate themselves (34%) to commit suicide. Females used hanging/suffocation (56%) or firearms (21%) to commit suicides. The ten states with the greatest number of AA adolescent suicides (2015–2017) were: Georgia, Texas, Florida, North Carolina, Ohio, Illinois, Michigan, Pennsylvania, New York, and Missouri. There is an urgent need to further explore the changing nature and epidemiology of AA adolescent suicides and to study for whom and under what circumstances interventions can reduce suicides and suicidal behaviors in AA adolescents.

Keywords Suicide · Violence · African-American · Injury · Firearms

Introduction

Historically African American youths had suicide rates lower than white youths [1]. However, between 1980 and 1995 the suicide rate for African American youths (10–19 years of age) more than doubled (from 2.1/100,000 to 4.5/100,000 population) [2]. The suicide rate increased more (233%) for youths aged 10–14 than it did for those 15–19 years (126%). By 1995 suicide was the third leading cause of death for African American adolescents 15–19 years of age [2]. The methods used to commit suicide were predominantly firearms (66%) and suffocation/hanging (18%). Firearms were responsible for 96% of the increase in African American youth suicides between 1980 and 1995. In addition, a study of African American adolescents (13–17 years old) from the 2001–2003 National Survey of American Life (NSAL)

projected the risk by 17 years of age for suicide ideation was 10.8% and 4.5% for suicide attempts [3]. Female adolescents reported substantially higher rates than did the males for both suicidal ideation and attempts.

A more recent study of child (5–11 years of age) suicide from 1993–1997 time frame to 2008–2012 found the African American child suicide rate had increased 118% (1.36/million to 2.54 million) [4]. For all children, regardless of race/ethnicity, the leading methods of suicide were suffocation/hanging (78%) and firearms (18%). The increased suicide rate for African American children was primarily due to an increase in suffocation/hanging by boys. In a follow-up study, the same authors reported for youth ages 5–12 years, from 2001 through 2015 African American children had a suicide rate approximately two times higher than white children [1]. The authors also found that for adolescents 13–17 years old that African American adolescents had a suicide rate 57% lower than white adolescents. It is common for research on suicides to report comparisons between whites and African Americans [5–8]. However, some have suggested using whites as a reference group, as if they are the “gold standard” to which everyone else should be compared, is a subtle

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form of racism [9]. It may be that because suicide rates are lower for African American adolescents and adults compared to whites that this has contributed to fewer research studies addressing the etiology and prevention of suicides by African Americans.

The purpose of this study is to describe African American adolescents' changing suicide characteristics. Suicide is now the second leading cause of death for African American adolescents [10]. Suicide in these adolescents is a public health issue that urgently needs more attention before it becomes the leading cause of death for these youths.

Methods

Participants

Suicide-related risk behaviors were assessed using data from the 2001–2017 Youth Risk Behavior Surveys (YRBS) [11–19]. These years were selected because of their large African American student sample sizes that were obtained by the Centers for Disease Control and Prevention (CDC). More specifically, African American adolescent sample sizes were as follows: 2001 ($n=1768$), 2003 ($n=3590$), 2005 ($n=3347$), 2007 ($n=3132$), 2009 ($n=3086$), 2011 ($n=3048$), 2013 ($n=3229$), 2015 ($n=1944$), and 2017 ($n=3053$).

In addition, to assess changes in the numbers and rates of African American adolescent suicides we used the CDC's Web-Based Injury Statistics Query and Reporting Systems (WISQARS) database for the time period 2001–2017 [10]. Data for adolescents ages 13–19 years and who identified as African American/Black (AA) were included for this analysis.

Procedures

The YRBS data on health risk behaviors are collected biannually using a national representative sampling of students in grades 9–12 in public and private schools. The biannually participation in the YRBS is voluntary and anonymous. The student responses are collected based on local school preferences for potential permission procedures (either active or passive permission). Student questionnaires are self-administered during regular class periods and are supervised by trained data collectors. Students indicate their responses directly on computer-scannable questionnaire booklets or answer sheets. Psychometric properties (e.g., validity and reliability) of the questionnaires, sampling, methods, and research design have been extensively described by the CDC and others [20–22].

YRBS Measures

The YRBS assesses numerous health-related risk behaviors but only 8 items were selected for this analysis. The health-related risk behaviors selected are those that have been associated with weapon carrying and/or suicide-related risk behaviors based on published evidence. The responses to each of the items were dichotomized as “yes” versus “no” or “0” versus “1 or more times.” The specific items included were as follows: “During the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?”, “During the past 12 months, how many times has someone threatened or injured you with a weapon such as a gun, knife, or club on school property?”, “During the past 30 days, on how many days did you carry a gun?”, “During the past 12 months, did you ever feel so sad or hopeless almost every day for 2 weeks or more in a row that you stopped doing some casual activities?”, “During the past 12 months, did you ever seriously consider attempting suicide?”, “During the past 12 months, did you make a plan about how you would attempt suicide?”, “During the past 12 months, how many times did you actually attempt suicide?”, “During the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?”

Data Analysis

We use descriptive statistics, a method of data analysis that describes data or minimizes the data in a way such that patterns may be seen over time. Descriptive statistics are the basis for quantitative analysis of data. Furthermore, we use practical significance rather than statistical significance to interpret the importance of the data. Practical significance interprets the results as to their usefulness in the real world. By using practical significance, we reduced the chances of Type II errors because of the small sample sizes in WISQARS (i.e., low statistical power). To determine the importance of the magnitude of changes over time we have set practical significance at 25% change or greater over the 17 years (2001–2017) were we examined.

Results

Suicide-Related Risk Behaviors

An examination of the 8 risk behaviors for adolescent AA males found that all 8 behaviors had reduced prevalences from approximately 11% to almost 34% less frequent (Table 1). Especially noteworthy was that these males were

Table 1 Percentage of African American adolescents with suicide-related risk behaviors, 2001–2017

Item (response)	2001		2003		2005		2007		2009	
	M	F	M	F	M	F	M	F	M	F
Boyfriend/girlfriend ever hit, slap, or physically hurt you (yes)	10.7	11.7	13.7	14.0	11.8	12.0	15.2	13.2	13.8	14.8
Someone threatened or injured you with a weapon on school property (one or more times)	11.9	6.7	14.3	7.5	10.2	6.1	11.2	8.1	11.2	7.4
How many days did you carry a gun (one or more times)	12.2	1.1	10.6	1.4	9.4	0.9	11.2	1.3	13.2	1.8
Felt so sad or hopeless almost every day for 2 weeks or more in a row (yes)	20.9	36.3	21.7	30.8	19.5	36.9	24.0	34.5	17.9	37.5
Ever seriously consider attempting suicide (yes)	9.2	17.2	10.3	14.7	7.0	17.1	8.5	18.0	7.8	18.1
Made a plan about how you would attempt suicide (yes)	7.5	13.0	8.4	12.4	5.5	13.5	7.1	12.0	6.2	13.3
How many times did you actually attempt suicide (one or more times)	7.5	9.8	7.7	9.0	5.2	9.8	5.5	9.9	5.4	10.4
Suicide attempt resulted in an injury, poisoning, overdose, that had to be treated (yes)	3.6	3.1	5.2	2.2	1.4	2.6	2.5	2.1	2.5	2.5
Item (response)	2011		2013		2015		2017		% Change in 2001–2017	
	M	F	M	F	M	F	M	F	M	F
Boyfriend/girlfriend ever hit, slap, or physically hurt you (yes)	12.4	11.8	12.3	8.2	7.1	11.7	12.4	11.8	–33.6	12.0
Someone threatened or injured you with a weapon on school property (one or more times)	11.2	6.6	10.1	6.8	10.0	5.5	11.2	6.6	–16	–17.9
How many days did you carry a gun (one or more times)	10.3	1.7	9.8	1.1	9.8	3.0	10.3	1.7	–19.7	72.7
Felt so sad or hopeless almost every day for 2 weeks or more in a row (yes)	18.0	31.4	18.8	35.8	17.3	40.7	18.0	31.4	–17.2	12.1
Ever seriously consider attempting suicide (yes)	9.0	17.4	10.2	18.6	6.6	22.4	9.0	17.4	–28.3	30.2
Made a plan about how you would attempt suicide (yes)	8.4	13.9	7.7	13.1	10.6	17.3	6.5	18.9	–13.3	45.4
How many times did you actually attempt suicide (one or more times)	7.7	8.8	6.8	10.7	7.2	10.2	6.7	12.5	–10.7	27.6
Suicide attempt resulted in an injury, poisoning, overdose, that had to be treated (yes)	2.4	2.4	2.2	3.2	4.0	3.6	2.8	4.0	–22.2	29

almost 20% less likely to have recently carried a gun and were 28% less likely to ever seriously consider attempting suicide. However, when examining the YRBS risk behaviors for 2017 for AA male adolescents and using the 2017 WISQARS data that indicates there were 2,447,424 males 13–19 years of age, it indicates there were large numbers of males who were likely involved in suicide-related behaviors. If the YRBS data (Table 1) for 2017 applies to this population it would mean there were 159,083 males who made a suicide plan, 163,977 actually attempted suicide, and 68,528 made a suicide attempt that was serious enough that it had to be treated by a doctor or nurse. In contrast, adolescent AA females reported increases in 7 of the 8 risk behaviors. The most seriously related suicide behaviors increased significantly: seriously considered attempting suicide (30%), made a suicide plan (45%), more attempted suicide (28%), and a suicide attempt resulted in an attempt that had to be treated (29%). The 2017 WISQARS data indicated there were 2,368,995 AA female adolescents 13–19 years of age. Assuming the YRBS data (Table 1) applies to this population in 2017 it would mean that there were 447,740 females who made a suicide plan, 296,124 had attempted suicide, and 94,760 made a suicide attempt that was serious enough that it had to be treated by a doctor or nurse.

Changing Suicide Rates

Both the new number of AA adolescent suicides and the rates per 100,000 have changed substantially (Table 2). From 2001 through 2017 there were 1375 male suicides and 377 female suicides. The rate of male suicides increased by 60% and the rate of female suicides increased 182%. In 2001 AA adolescent males had a suicide rate 5.6 times the rate of AA adolescent females and by 2017 the rate difference of males had decreased to 4 times the rate of females. In 2017, AA adolescent suicides ($n=303$) made up 9.8% of all AA suicides ($n=3062$). Additionally, the number of suicide

attempts by AA adolescents in 2017 that resulted in injury serious enough that they had to be treated was 163,288 cases and there were 303 adolescent suicides, then this indicates there were 539 serious attempts for every completed suicide.

The new number of AA adolescent suicides and the rates of suicides vary by state. The new number of suicides in a state is a function of the number of AA adolescents in the state multiplied by the rate of suicide per 100,000 population of AA adolescents (Table 3). Thus, a compilation of AA adolescent suicides from 2015 through 2017 (because data for individual years were too small to allow meaningful comparisons) indicate that the top 10 states with the most suicides were not always the states with the highest rates (Table 3).

Methods Used to Commit Suicide

An aggregation of methods of suicides by AA adolescents by gender for the years 2015 through 2017 found that males were most likely to use a firearm (52%) or to hang/suffocate themselves (34%) to commit suicide (Fig. 1). Whereas, females were most likely to commit suicide by hanging/suffocation (56%) or to shoot themselves (21%), and a significant portion (15%) of the adolescent females also used poisoning to commit suicide.

Discussion

Our analysis of national data (YRBS and WISQARS) regarding 8 suicide-related behaviors and suicide mortality found that all the suicide-related behaviors for AA males had reduced prevalence's. However, serious suicide attempts increased from 2001 to 2017 to over 68,000 in 2017 and 224 males died from their attempts (60% increased rate over 2001). This represented a 306 to 1 ratio of serious attempts

Table 2 African American adolescent suicides, 2001–2017

Year	Males rate (N)	Females rate (N)
2017	9.15 (224)	3.33 (79)
2015	7.17 (176)	2.40 (57)
2013	5.92 (148)	2.07 (50)
2011	5.74 (147)	1.78 (44)
2009	5.62 (148)	1.53 (39)
2007	5.22 (187)	1.22 (31)
2005	5.26 (133)	1.39 (34)
2003	5.50 (132)	0.72 (17)
2001	5.71 (130)	1.18 (26)

Per 100,000

Source WISQARS

Table 3 Ten states with greatest number of African American adolescent suicides, 2015–2017

Rank	State	N	Rate per 100,000
1	Georgia	64	5.79
2	Texas	57	4.86
3	Florida	44	3.85
4	North Carolina	40	5.42
5	Ohio	39	7.38
6	Illinois	36	5.7
7	Michigan	33	6.81
8	Pennsylvania	30	5.70
9	New York	29	2.71
10	Missouri	28	11.17

Source WISQARS

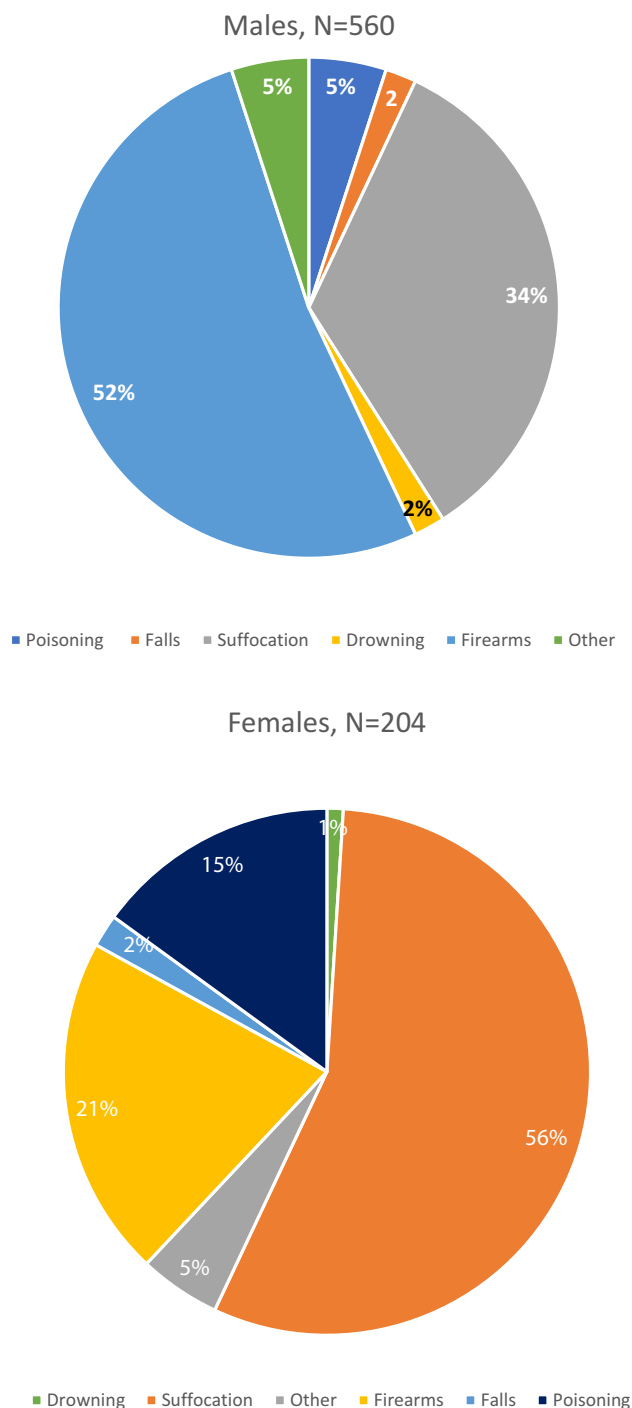


Fig. 1 Methods used by African American adolescents to commit suicide 2015–2017

to suicide deaths for adolescent males. In contrast, AA adolescent females had noteworthy increases in 7 of the 8 risk-related behaviors and not surprisingly a 182% increase in the rate of suicides from 2001 to 2017. The number of serious attempts in 2017 (almost 95,000) to suicides (79) indicates an attempt rate of 1200 to 1 suicides for females. Both the

male and female serious attempt rates for AA adolescents are considerably higher per suicide than reported for the suicidal population in general (200 to 1) [23].

A study of 1170 AA and Caribbean Black adolescents who attempted suicides, found that they explained their behaviors as follows: “My attempt was a cry for help. I did not intend to die.” (45%); “I made a serious attempt to kill myself and it was only luck that I did not succeed.” (33%); “I tried to kill myself, but knew that the method was not foolproof.” (22%) [1]. In other words, two-thirds of the adolescents did not intend to die. However, AA adolescents who die by suicide usually use the most lethal forms of attempting to kill themselves, firearms and suffocation/hanging [24, 25]. The case fatality rate for firearm attempts approaches 90% and is about 60% for suffocating/hanging [25, 26]. A nationally representative survey of American adults found that 32% of AA households reported a gun in their home [27]. A more recent study of firearm ownership found that AA families with young children (< 6 years) were less likely (6%) to report owning firearms and if they did own firearms they were handguns [28]. Household gun ownership indicates that higher levels of firearm ownership are associated with increased rates of youth suicides [29–31]. In general, two-thirds of adolescents who commit suicide with a firearm usually obtain the gun from their home or from relatives (e.g., uncles, aunts, grandparents, siblings) [32]. Unfortunately, only 14% of AA adults perceive having a firearm in the home increases the risk of suicides [33].

Preventing suicide in adolescents requires an understanding of both the risk factors for suicide and the protective factors that reduce the risk of committing suicide. There are numerous articles which have enumerated the suicide risk factors for adolescents [34–37]. The vast majority of this research is based primarily on white adolescents and it is uncertain whether these risk factors and protective factors can be extrapolated to AA adolescents. Thus, we will enumerate only risk factors that have been found to be associated with suicide-related behaviors in AAs. The most important risk factor for death by suicide is having previously made a suicide attempt and suicide attempts are greater among AA adolescents than other racial groups [38]. Being involved in violence, availability of firearms, male sex, depressed, involvement in delinquent behaviors, alcohol and drug abuse, those with fewer than two supporting adults, negative family interactions, racial microaggressions (stigmatizing and discriminating environments), lack of social embeddedness (social isolation), intimate partner violence (for women), low religious and spiritual well-being, multiple adverse childhood experiences (ACEs), statewide job losses, from middle income families, having mood or anxiety disorders, belief that having a mental illness is a sign of weakness (unwilling to seek help), hopelessness/despair, live in urban areas, and geographic location (South and Midwest)

[39–47]. These risk factors are present in many adolescents who will never attempt suicide. In fact, a recent systematic review of prediction models for suicide attempts and deaths found the accuracy of predicting future suicide events to be near zero [48]. The authors went on to state, “Furthermore, 99 of every 100 individuals predicted to die by suicide will not. They will be subjected to a risk classification that may be stigmatizing and to interventions of questionable efficacy and appropriateness” [48].

In contrast, protective factors help reduce the chances that adolescents will make suicide plans and attempt suicide. The most serious risk, firearms in the home, must be the greatest focus for intervention. Firearms must be kept locked, unloaded and the ammunition needs to be stored locked away from the firearm. Unfortunately, the main reason for owning a handgun is protection. Thus, it is common for adults to store their guns unlocked and loaded near their bed (e.g., nightstand or closet shelf). This is disconcerting since research has shown that 75% of inner city primary grade elementary school students know where their parents keep their handguns and children as young as 2 years of age have the tensile strength to pull the trigger of handguns [49, 50]. Child access prevention (CAP) laws allow prosecutors to bring charges against gun owners that store guns inappropriately and end up in the hands of youths. These laws have been found helpful for reducing suicides and unintentional shootings [51]. The ability to control the second leading form of suicide in this population, hanging/suffocation, is more problematic since there are so many objects that can be used to hang one’s self.

A second form of protection against suicides in adolescents is having ready access to mental health care. AA adolescents are at higher risk than the general population to encounter serious forms of violence (e.g., fights with injuries, aggravated assaults, and homicides) [52]. It is known that being chronically stressed in individuals with a biological predisposition to a mental illness can expedite the development of the mental illness (especially major depression) [53]. Yet, AA youths (3–17 years) have been reported by parents/caregivers to have a lower prevalence than adolescents in general of leading mental health issues (4.2% for depression, 4.5% for anxiety, and 10.7% for behavioral/conduct problems) [54]. Additionally, AA adolescents are less likely than the general adolescent population to receive mental health services for mood (e.g., depression) and anxiety disorders [55]. Even when economically disadvantaged AA youths (5–17 years old) are covered with Medicaid insurance they often do not receive adequate mental health care. A study examining major depression in these youths found that 42.3% received minimally adequate care and 20.2% received no treatment for their depression [56]. Of those youths who will ultimately develop major depression 50% will develop the condition by the age of 13 years [57]. Furthermore, the

mental health problems most associated with attempted suicide in AA adolescents are mood disorders (eq., dysthymia, major depression) and anxiety disorders [24]. Schools are the leading provider of mental health services for youth [58]. Thus, there needs to be a greater emphasis on urban public schools providing adequate screening, treatment and referral services for adolescents with mental health disorders.

There are numerous other forms of potential interventions that might reduce African American adolescent suicides. We use the word “might” because of the lack of research evidence on interventions specific to the AA adolescent population. We encourage those interested in suicide prevention interventions to explore the following citations [59–68]. Additionally, the 10 states with the greatest number of AA adolescent suicides would seem to be the states that could best assess the effectiveness of interventions targeting this population. There is an urgent need to study for whom and under what circumstances interventions have an impact on reducing suicide-related behaviors.

Finally, the limitations of this study need to be explored. First, the YRBS data is representative of only youths who attended schools in the years we examined. Second, the data are cross-sectional and therefore no cause and effect relationships can be drawn. Third, the extent of underreporting or over reporting of sensitive items cannot be determined. However, as noted previously, the survey questions have been shown to have good test–retest reliability. Fourth, the YRBS data available lacks some key variables (e.g., socioeconomic status, urban vs. rural, and protective factors for suicide-related behaviors). Despite the aforementioned limitations and the potential misclassification of some adolescent deaths in the WISQARS database there are a number of strengths to the current study. Our study includes the largest sample of AA adolescents to date that has studied their suicide behaviors. Second, we are the first study to explore the descriptive actions of AA adolescent suicides for over a decade. We believe these strengths outweigh the previously noted limitations of this study.

Compliance with Ethical standards

Conflict of interest The authors have no conflicts of interest to declare.

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