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Has Adolescent Suicidality Decreased in the United States? Data From Two National Samples of Adolescents Interviewed in 1995 and 2005

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Abstract

We compared the prevalence and correlates of adolescent suicidal ideation and attempts in two nationally representative probability samples of adolescents interviewed in 1995 (National Survey of Adolescents; $N = 4,023$) and 2005 (National Survey of Adolescents-Replication; $N = 3,614$). Participants in both samples completed a telephone survey that assessed major depressive episode (MDE), post-traumatic stress disorder, suicidal ideation and attempts, violence exposure, and substance use. Results demonstrated that the lifetime prevalence of suicidal ideation among adolescents was lower in 2005 than 1995, whereas the prevalence of suicide attempts remained stable. MDE was the strongest predictor of suicidality in both samples. In addition, several demographic, substance use, and violence exposure variables were significantly associated with increased risk of suicidal ideation and attempts in both samples, with female gender, nonexperimental drug use, and direct violence exposure being consistent risk factors in both samples.

Suicide is the third leading cause of death for youth and young adults aged 10 to 24 years (Anderson & Smith, 2005; Centers for Disease Control and Prevention [CDC], 2007a). Several studies have offered valuable insight into the prevalence and risk factors associated with suicidal ideation and attempts. The CDC's Youth Risk Behavior Surveillance recently found that 14.5% of high school students had seriously contemplated suicide in the past 12 months from the time of the survey, whereas 6.9% of the students from this nationally representative sample had attempted suicide (Eaton et al., 2008). Waldrop et al. (2007) reported that 23.3% of participants in the 1995 National Survey of Adolescents (NSA) met criteria for suicidal ideation, which was broadly defined in their study to include thoughts about hurting oneself and persistent thoughts about death. Three percent of adolescents in this nationally representative sample reported a suicide attempt (Waldrop et al., 2007). A recent study with a nationally representative Canadian sample found that 8.4% of girls and 4.6% of boys aged 12 to 13 years reported suicidal ideation and 5.9% of girls and 2.4% of boys reported making at least one suicide attempt (Afifi, Cox, & Katz, 2007). Few studies have examined changes in the prevalence and correlates of suicidality over time. Such research is critical to identification of population trends over time and can inform public policy decisions and resource allocation for prevention.

RISK AND PROTECTIVE FACTORS FOR SUICIDAL IDEATION AND ATTEMPTS

It is important to identify populations at risk of experiencing suicidal ideation and attempts so that researchers, clinicians, and other youth-serving professionals know where to focus their efforts relative to assessment and intervention. A significant body of research has explored risk factors for adolescent suicidal ideation and/or attempts. Female gender has been consistently identified as a risk factor for suicidal ideation and attempts (Adcock, Nagy, & Simpson, 1991; Sourander, Helstela, Haavisto, & Bergroth, 2001; Waldrop et al., 2007; Wunderlich, Bronisch, Wittchen, & Carter, 2001). However, the prevalence of suicide deaths is significantly higher among male adolescents (Lubel, Kegler, Crosby, & Karch, 2007), suggesting that boys who attempt suicide are more likely than girls to complete. Socioeconomic disadvantage also is associated with increased risk of suicide attempt (Beautrais, Joyce, & Moulder, 1996). In addition, Caucasian and Hispanic high schoolers appear to have higher risk for suicidal ideation and attempts than African American adolescents (Blum et al., 2000), with Hispanic girls at higher risk for suicidal ideation and attempts than Caucasian girls (CDC, 2007b).

In addition to demographic risk factors, mood disorder diagnoses have consistently emerged as risk factors for suicidality among adolescents. In particular, major depressive disorder has been linked to suicide completion (Rao, Weissman, Martin, & Hammond, 1993) and attempts (Glowinski et al., 2001). Similarly, the presence of depressive symptoms in the absence of diagnosis is related to increased risk for suicidal ideation and attempts among adolescents (Esposito & Clum, 2002; Sourander et al., 2001). Although suicidality is most often associated with affective disorders, anxiety disorders have also been identified as risk factors for suicidal ideation and attempts (Beautrais et al., 1996). In particular, research has shown that, after controlling for major depressive disorder, adolescents with post-traumatic stress disorder (PTSD) were at greater risk for experiencing suicidal ideation (Mazza, 2000) and attempts (Wunderlich, Bronisch, & Wittchen, 1998) than those without PTSD.

Other risk factors associated with suicidal ideation and attempts include substance use/abuse (Gould, Greenberg, Velting, & Shaffer, 1998), preteen and adolescent alcohol use (Adcock et al., 1991; Hallfors et al., 2004; Swahn & Bossarte, 2007), marijuana and other illicit drug use (Borowsky, Ireland, & Resnick, 2001; King et al., 2001), carrying a gun to school (Borowsky et al., 2001), fighting (King et al., 2001), smoking cigarettes (Hallfors et al.,

2004; King et al., 2001), and sexual activity (Hallfors et al., 2004; King et al., 2001). In addition, exposure to specific types of traumatic and stressful life events may increase risk for suicidal ideation and attempts. Generally, experience of stressful life events (King et al., 2001) and exposure to violence (Borowsky et al., 2001) have been identified as risk factors, as have experiences such as preadolescent and lifetime history of abuse (Salzinger, Rosario, Feldman, & Ng-Mak, 2007), childhood sexual abuse (J. Brown, Cohen, Johnson, & Smailes, 1999), sexual and physical assault (Waldrop et al., 2007), and exposure to community violence (Vermeiren, Ruchkin, Leckman, Deboutte, & Schwab-Stone, 2002). Furthermore, social and personality variables such as low social competence (Sourander et al., 2001), interpersonal difficulties (Johnson et al., 2002), and low self-esteem (Lewinsohn, Rohde, & Seeley, 1994) have also been associated with greater risk for suicidal ideation and/or attempts.

SUICIDE TRENDS

A recent study compared the prevalence of suicidal ideation, plans, and attempts from 1990–1992 to 2001–2003 in a nationally representative sample of *adults* (Kessler, Berglund, Borges, Nock, & Wang, 2005). No significant differences were found between the past 12-month prevalence estimates in the early 1990s and the estimates of the early 2000s, with estimates of 2.8% versus 3.3% reported for ideation, 0.7% versus 1.0% for plans, 0.3% versus 0.2% for gestures, and 0.4% versus 0.6% for attempts. These findings suggest that reports of suicidal thoughts and actions over the past decade have remained relatively stable for the U.S. adult population.

Trends in suicidal ideation and attempts for *adolescents* across the decade are unclear because large-scale population-based studies have not been conducted in this area. Notably, however, significant changes have been documented in the numbers of adolescent suicide *deaths*. The CDC reported that rates of suicide deaths declined from 1990 to 2003 for individuals aged 10 to 24 years, which was followed by a significant increase in suicides from 2003 to 2004. The largest increases occurred for girls (see Figure 1). Specifically, whereas the lowest rates of suicide deaths during this 15-year period occurred between 1999 and 2003, rates for girls increased in 2004 to levels that had not been observed since 1995 (Lubell et al., 2007). Whereas significantly less change was observed for boys (Figure 1), a 75.9% increase from 2003 to 2004 was found for girls aged 10 to 14, and a 32.3% increase was found for girls aged 15 to 19 years old (Lubell et al., 2007). Although the 2005 suicide death data recently released indicates that this sharp increase was followed by a slight decline (Karch, Lubell, Friday, Patel, & Williams, 2008), suicide deaths among girls still remained higher in 2005 than 2003. The CDC has called for further examination of these trends in national samples.

Given the strong association between suicidal ideation and suicide attempts (Kessler, Borges, & Walters, 1999; Lewinsohn, Rohde, & Seeley, 1996), increases in prevalence of suicide deaths in the adolescent population in recent years suggests that similar trends may be present for suicidal ideation and attempts, particularly among girls and younger adolescents. Studies using a representative U.S. adolescent sample have yet to examine whether the prevalence of suicidal ideation and attempts have also increased in recent years as compared to the 1990s. However, some European studies have examined this trend. For example, a study examining a Norwegian national sample found no differences in suicide attempts between 1992 and 2002 for boys, but a significant increase was observed for girls (10.6% vs. 13.6%; Rossow, Groholt, & Wichstrom, 2004). Still, there may be differences in suicidality between European and U.S. samples. Thus, research is needed with a U.S. adolescent sample.

CURRENT STUDY

Several variables that have been linked to suicidality, such as alcohol and drug use, have declined among adolescents over the past decade (Johnston, O'Malley, Bachman, & Schulenberg, 2007). In addition, suicide and depression prevention efforts have increased over the past decade. Furthermore, both psychosocial and pharmacological treatments for depression have improved and have demonstrated an impact on decreasing suicide rates (Olfson, Shaffer, Marcus, & Greenberg, 2003), as well as ideation and attempts (G. K. Brown et al., 2005; Valuck, Libby, Sills, Geise, & Allen, 2004). Given these current findings, we reasoned that the prevalence of suicidal ideation and attempts may have changed over the past decade among adolescents and that the ways in which potential risk factors relate to suicidality may have changed as well.

Using nationally representative samples of adolescents aged 12 to 17 years recruited and interviewed in 1995 (NSA) and 2005 (NSA-Replication, or NSA-R), our primary aim was to compare the prevalence estimates of suicidal ideation and attempts in these samples. Whereas the Waldrop et al. (2007) study used some of these data (i.e., data from the 1995 NSA) to examine the prevalence and correlates of suicidal ideation and attempts, the current study examines population changes over time and uses a more standard operationalization of suicidal ideation. Guided by previous work, we also aimed to examine potential risk and protective factors for suicidal ideation/attempts with both the 1995 and 2005 samples to evaluate whether risk factors associated with suicidality differ between these two samples. A comparison of risk factors may allow for a greater understanding of the relevant risks for the current U.S. adolescent population that may (a) assist in identifying potentially modifiable factors and (b) relate to changes in prevalence over time (Lubel et al., 2007).

METHOD

Overview

The 1995 NSA and the 2005 NSA-R are two epidemiologic studies of youth aged 12 to 17 years ($N = 4,023$ in the 1995 NSA; $N = 3,614$ in the 2005 NSA-R). Primary goals of the NSA and NSA-R were to (a) identify the population prevalence of major life stressors, such as physical assault, sexual assault, dating violence, and witnessed violence in the home, school, and community; (b) identify the population prevalence of specific mental health disorders known to be associated with exposure to traumatic events; and (c) examine risk factors associated with violence exposure and mental health outcomes. A fourth major goal of the NSA-R was to facilitate comparisons that identify potential population changes over the past decade among U.S. adolescents.

Participants

NSA—The 1995 NSA included a sample of 4,023 youth aged 12 to 17 years. Sample selection procedures produced a representative sample of adolescents based on U.S. Bureau of the Census (1988) estimates of the 1995 adolescent population. Of the 4,023 participants, 3,161 comprised a national probability sample, and the remaining 862 comprised a probability oversample selected from households in areas designated as central cities by the U.S. Bureau of the Census. Parental permission was obtained to interview a randomly selected adolescent.

NSA-R—The 2005 NSA included a sample of 3,614 youth aged 12 to 17 years. The full sample included a national household probability sample as well as an oversample of urban-dwelling adolescents. Parental permission was obtained to interview a randomly selected adolescent. Parent and adolescent interviews were completed for 3,614 cases. This included

2,459 adolescents in the national cross section and an oversample of 1,155 urban-dwelling adolescents.

Weighting procedures common to both samples—The 1995 and 2005 samples were each weighted to maximize representativeness of the samples to the U.S. adolescent populations in each survey year. Because adolescents were oversampled in urban areas, a weight was created to restore the urban cases back to their true proportion of the urban/suburban/rural variable, based on 1995 and 2005 U.S. census estimates. Next, weights were created to adjust the weight of each case based on age and gender. We generated sample frequencies by age cohort and gender and compared this distribution to the U.S. Census estimates. Weightings were assigned to each Gender $\times$ Age cell within the sample. This procedure resulted in weighted sample distributions that closely approximated U.S. census estimates for 1995 and 2005, respectively.

Measures

Demographic variables—Age was categorized as 12-to 14-year-olds (“younger adolescents”) and 15- to 17-year-olds (“older adolescents”). Family annual income was also obtained and divided into nine categories (category 1 = \$0–5,000, category 9 $\geq$ \$100,000). Racial/ethnic group was assessed using standard questions employed by the U.S. Bureau of the Census. For risk-factor analyses, five dummy-coded variables refer to each of the following participant groups: African American, non-Hispanic; Native American, non-Hispanic; Asian American, non-Hispanic; Hispanic; and Other. Caucasian, non-Hispanic participants served as the reference group.

PTSD—Lifetime PTSD was assessed using the PTSD module of the NSA survey (Kilpatrick, Resnick, Saunders, & Best, 1989), a structured diagnostic interview that assessed each *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [DSM-IV]; American Psychiatric Association, 1994) symptom with a yes/no response. Research on this measure has provided support for concurrent validity and several forms of reliability (e.g., temporal stability, internal consistency, diagnostic reliability; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993; Ruggiero, Rheingold, Resnick, Kilpatrick, & Galea, 2006). The measure was validated against the PTSD module of the Structured Clinical Interview for the DSM administered by mental health professionals (Kilpatrick et al., 1998). The interrater kappa coefficient was 0.85 for the diagnosis of PTSD, and comparisons between the NWS-PTSD module and Structured Clinical Interview for DSM Disorders yielded a kappa coefficient of 0.77.

Major depressive episode (MDE)—Lifetime MDE was assessed using the Depression Module of the NSA survey, a structured interview that targets MDE criteria using a yes/no response format for each DSM-IV symptom. Psychometric data support the internal consistency (Cronbach’s $\alpha = .85$; Kilpatrick et al., 2003) and convergent validity (Boscarino, Galea, & Adams, 2004) of the Depression module. Boscarino et al. compared the depression module against the Depression scale of the Brief Symptom Inventory–18, yielding a sensitivity of 73% and specificity of 87% in the detection of MDE as classified by our instrument. MDE identified by this measure is also associated with lower reported work quality (Boscarino et al., 2004) and mental health treatment seeking after controlling key variables and assault history variables (Lewis et al., 2005).

Suicidal ideation and attempt—Lifetime history of suicidal ideation and suicide attempt was assessed as part of the diagnostic assessment for MDE. Participants were asked the yes/no questions “Have you ever felt so low you thought about committing suicide?”

and “Have you ever attempted suicide?” The MDE diagnostic assessment is described in the previous section.

Direct violence exposure—Participants were assessed for experiencing a number of potentially traumatic events. Participants were classified as having experienced direct violence if they endorsed experiencing sexual assault and/or physical assault/abuse. *Sexual assault* was defined as forced (a) vaginal or anal penetration by an object, finger, or penis; (b) oral sex; (c) touching of the respondent’s breasts or genitalia; or (d) respondents’ touching of another person’s genitalia. *Physical assault* was defined as having been (a) attacked or threatened with a gun, knife, or some other weapon; (b) attacked by another person with perceived intent to kill or seriously injure; (c) beaten and injured (i.e., “hurt pretty badly”) by another person; (d) spanked so forcefully that the respondent sustained welts or bruises, or required medical care; or (e) cut, burned, or tied up by a caregiver as a punitive consequence.

Indirect violence exposure—Participants were assessed to determine whether they had ever witnessed community or parental violence. Witnessed violence included having personally observed someone (a) shoot someone with a gun; (b) cut or stab someone with a knife; (c) threaten someone with a gun, a knife, or other weapon; (d) mug or rob someone; or (e) rape or sexually assault someone.

Lifetime alcohol abuse—Alcohol abuse was assessed by asking participants a series of closed-ended questions related to their alcohol use in the form of a structured clinical interview. The structured clinical interview questions were directly linked to the *DSM-IV* criteria for substance abuse. A detailed description of the diagnostic interview can be found in previous reports using the measure (e.g., Kilpatrick et al., 2000).

Lifetime non-experimental drug use—To determine lifetime use of illicit drugs, adolescents were asked a series of questions that assessed whether the youth had ever ingested marijuana or hard drugs, including cocaine, heroin, LSD, or other hallucinogens (i.e., peyote, psilocybin, or mushrooms), or inhalants (i.e., glue nitrous oxide, amyl nitrate, paint, or gasoline). Lifetime non-experimental drug use was assessed by determining whether the respondent has used a particular substance on four or more occasions during their lifetime. This frequency of usage approximates that considered significant by the Diagnostic Interview Schedule for Children (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) and is consistent with definitions of nonexperimental drug use in our previous research with adolescents (Kilpatrick et al., 2000).

Procedure

Procedures for both the NSA 1995 and NSA 2005 were similar. A highly structured telephone interview was designed to collect information across several domains, including demographic variables, traumatic event history, witnessed violence, and mental health history. Participants were selected using a multistage, stratified, random-digit dial procedure within each region of the country. The interview was administered by trained interviewers employed by Shulman, Ronca, and Bucuvalas, Inc., a survey research firm with significant experience managing survey studies. A computer-assisted telephone interview system aided this process by prompting interviewers with each question consecutively on a computer screen, and supervisors conducted random checks of data entry accuracy and interviewers’ adherence to assessment procedures.

Interviews began with parental consent and a brief parent interview consisting primarily of demographic questions, several of which were later corroborated by the adolescent. The

majority of the interview was conducted with the adolescent. The data used in this study were obtained directly from the adolescent interview with the exception of family income, which was reported by the parent. See Kilpatrick et al. (2000), Kilpatrick et al. (2003), and Wolitzky-Taylor et al. (2008) for more details about the samples and procedures for the NSA and NSA-R, respectively.

Statistical Analysis

Prevalence data are reported first. Cases were dummy-coded for NSA group (i.e., 1 = NSA, 2 = NSA-R), and chi-square tests were used to compare prevalence estimates between the 1995 and 2005 samples. Next, risk factor analyses were conducted using logistic regression. 1 Logistic regressions were conducted separately for each sample to assess whether different risk factors emerged in the two samples. All logistic regression analyses were conducted in SUDAAN to retain the sample weighting. For each set of regression models (i.e., suicidal ideation in 1995 and 2005; suicide attempt in 1995 and 2005), odds ratios for each predictor in 1995 were directly compared to odds ratios for the same predictor in 2005 (e.g., lifetime MDE in 1995 odds ratio [OR] vs. lifetime MDE in 2005 OR). A z score was calculated by comparing the ORs and their 95% confidence intervals. A z score greater than or equal to 1.96 indicated a statistically significant difference in ORs between the samples.

RESULTS

Table 1 shows the correlation (phi-coefficient) between suicidal ideation and suicide attempts for each gender/age group in both the NSA and NSA-R. All correlations were statistically significant, with a small correlation for 12- to 14-year-old boys in 1995, large correlations for 15- to 17-year-old girls in both samples, and moderate correlations for all other groups. The correlation between suicidal ideation and attempt was significantly lower in 1995 than 2005 for 12- to 14-year-old boys ($\Psi = .26$ for 1995, $\Psi = .47$ for 2005, $z = -5.39$, $p < .001$). No other significant differences between 1995 and 2005 correlations were observed.

Prevalence of Suicidal Ideation and Attempts in 1995 Compared to 2005

The prevalence of suicidal ideation significantly declined from 12.7% in 1995 to 10.9% in 2005, $\chi^2(1, N = 7,625) = 6.11$, $p = .05$. Overall, girls reported more suicidal ideation compared to boys. The decrease in prevalence from 1995 to 2005 was significant for boys (9.4% to 7.6%, a 19.1% decline), $\chi^2(1, N = 3,909) = 4.00$, $p = .05$, but not statistically significant for girls (16.2% to 14.3%, an 11.7% decline), $\chi^2(1, N = 3,718) = 2.55$, $p = .11$. When considering each gender broken down into younger (ages 12–14) and older (ages 15–17) adolescents (see Figure 2), prevalence of suicidal ideation was highest for older adolescent girls, with a nonstatistically significant 14% decline observed within this group from 1995 to 2005 (22.3% to 19.2%), $\chi^2(1, N = 1,826) = 2.65$, $p = .10$. Older adolescent boys reported the second highest prevalence of suicidal ideation, with a nonsignificant 6% decline within this group from 1995 to 2005 (12.0% to 11.3%), $\chi^2(1, N = 1,941) = 0.26$, $p = .61$. Next, the prevalence for younger adolescent girls was 10.4% in 1995 and 9.6% in 2005, a nonsignificant 8% decline between the time periods, $\chi^2(1, N = 1,879) = 0.34$, $p = .56$. Finally, younger adolescent boys showed a significant 44% decrease in suicidal ideation from 1995 (6.8%) to 2005 (3.8%), $\chi^2(1, N = 1,964) = 8.73$, $p < .01$.

The prevalence estimates for suicide attempts remained stable from 1995 (3.0%) to 2005 (3.0%). This prevalence estimate was comparable over time for boys (1.0% to 1.5%) and girls (5.2% to 4.5%) with no significant differences between 1995 and 2005 estimates.

¹The term “risk factor” is used throughout as a general term to describe risk factors or correlates.

When considering each of the four age/gender subgroups (i.e., 12- to 14-year-old boys, 12- to 14-year-old girls, 15- to 17-year-old boys, 15- to 17-year-old girls), no significant differences between 1995 and 2005 emerged in prevalence of suicide attempts for any of the subgroups (all $ps > .10$). Prevalence estimates for younger boys were 0.48% and 0.87% for 1995 and 2005, respectively; 2.7% in 1995 and 2.0% in 2005 for younger girls; 1.6% in 1995 and 2.0% in 2005 for older adolescent boys; and 7.7% in 1995 and 7.1% in 2005 for older girls.

Risk Factors Associated with Suicidal Ideation

The following variables were entered for each logistic regression analysis: gender, age, race/ethnicity, family income, lifetime alcohol abuse diagnosis, lifetime nonexperimental drug use, direct violence exposure, indirect violence exposure, PTSD diagnosis, and MDE diagnosis. Correlations among the variables for each sample are presented in Tables 2 (NSA) and 3 (NSA-R). Risk factor data for suicidal ideation are presented in Table 4 for the NSA sample and Table 5 for the NSA-R sample. A direct comparison of the ORs revealed only one significant difference between the NSA and NSA-R predictors, with Asian American adolescents more likely to report suicidal ideation in the 1995 sample as compared to the 2005 sample ($z = 2.12, p < .05$), $OR_{1995} = 1.88$ vs. $OR_{2005} = 0.40$). However, it should be noted that Asian American race was not significantly associated with suicidal ideation in either of the two samples. No other significant differences between the NSA and NSA-R were observed, suggesting that the remainder of the variables in the 1995 sample predictor set were not significantly different from the 2005 sample predictor set in strength of association with the dependent variable.

Risk Factors Associated with Suicide Attempt

An identical predictor set was used to identify variables associated with increased risk of *attempting* suicide. Risk factor data for suicide attempts are presented in Table 6 for the NSA sample and Table 7 for the NSA-R sample. A direct comparison of ORs was conducted. However, no significant differences were observed between the ORs of the 1995 sample and that of the 2005 sample (all z scores < 1.96), suggesting that despite predictive differences (with respect to statistical significance) within the respective predictor sets, none of the predictor variables differed in predictive strength between the samples.

DISCUSSION

We compared prevalence estimates of adolescent suicidal ideation and attempts in 1995 to those in 2005 using two nationally representative samples of adolescents in the United States. A secondary aim of the study was to examine whether risk factors for suicidality in 1995 differed from risk factors for adolescent suicidality in 2005. Given changes over time in rates of adolescent suicide deaths, including a recent increase between 2003 and 2004 (Lubell et al., 2007), research examining trends in suicidal thoughts and behaviors is critical.

Prevalence of Suicidal Ideation and Attempts

Despite the increase in suicide deaths in 2004 after a decade of decline (Lubell et al., 2007), the overall prevalence of suicide deaths in 2004 was still somewhat lower than that of the mid-1990s. Consistent with this finding, the prevalence of suicidal ideation in the current study declined from 1995 to 2005. The prevalence estimates of suicidal ideation were 12.7% in 1995 and 10.9% in 2005, equating to 2,888,234 adolescents in 1995 and 2,750,724 adolescents in 2005, based on U.S. Census Report data. Consistent with previous literature, suicidal ideation was more common among girls than boys (e.g., Wunderlich et al., 2001). Prevalence estimates for suicide attempts were consistent between 1995 (3.0%, equating to

682,260 adolescents) and 2005 (3.0%, equating to 757,080 adolescents). The consistency between 1995 and 2005 in suicide attempts was observed for boys and girls.

The overall decline in suicidal ideation is encouraging and may be due in part to societal changes. For example, researchers have documented a meaningful decline in criminal victimization and drug use among adolescents over the past decade (Catalano, 2005; Johnston et al., 2007). Thus, it is not unexpected that a reduction in suicidal ideation would coincide with these changes. Indeed, drug use and violent victimization were significantly associated with increased risk of suicidal ideation in both samples (NSA and NSA-R). The causal implications and temporal sequencing of these changes are unknown and worthy of further investigation. In addition, it is plausible that these findings may suggest that prevention efforts over the past decade have had some success in addressing adolescent problems such as depression and substance use, which may relate to risk of suicide. Indeed, preventive interventions have demonstrated efficacy during the past decade (Stice, Burton, Bearman, & Rohde, 2007; Chou et al., 1998; Shochet et al., 2001; Merry, McDowell, Wild, Bir & Cunliffe, 2004; Griffin, Botvin, Nichols, & Doyle, 2003). In addition, a number of primary suicide prevention programs have demonstrated efficacy in the past decade, including school-based screening measures to identify adolescents at risk for suicide (see Shaffer & Craft, 1999, for reviews) and life-skills training programs to reduce risk in high school students (e.g., Eggert, Thompson, Herting, & Nicholas, 1995). However, because most of these prevention protocols have not had significant penetration at the population level, it is unlikely that the success of these approaches accounts for the findings observed in this study. Finally, it is possible that improvements in the treatment of depression and better use of public awareness campaigns that may have increased access to appropriate care have led to decreases in suicidal ideation among adolescents. Indeed, a growing number of psychosocial and pharmacological interventions have demonstrated their efficacy for the treatment of major depressive disorder in adolescents (David-Ferdon & Kaslow, 2008; Tsapakis, Soldani, Tondo, & Baldessarini, 2008). Although this may be a contributing factor, it is unlikely that this would account for the degree of change observed in this study.

Despite the encouraging finding that suicidal ideation declined overall, closer inspection of the data revealed that the decline in suicidal ideation was only statistically significant among younger adolescent boys. This group had nearly a 50% decrease in prevalence of suicidal ideation. It is unclear why the most dramatic decline would be observed in this group. Perhaps drug- and suicide-prevention programs have had a more meaningful impact on young adolescent boys as compared to other adolescent groups who may be more heavily influenced by peers. Of interest, the correlation between suicidal ideation and suicide attempts was significantly higher in 2005 for this age/gender subgroup compared to 1995. Taken together, these findings suggest that although a lower percentage of 12- to 14-year-old boys report suicidal ideation in the more recent sample, more of those who did reported ideation also reported having attempted suicide. This finding has important clinical implications, suggesting that 12- to 14-year-old boys who endorse suicidal ideation should be considered to be at greater risk for attempt and increased efforts should be made to recognize and monitor suicidal thoughts. Our observations have been that it is common in practice for clinicians to assess suicidality and minimize reports of suicidal ideation when they are not accompanied by reports of a suicide plan or attempt. These data suggest, however, that the correspondence between ideation and likelihood of an attempt may be increasing among young adolescents over time. As such, clinicians should carefully consider incorporating the use of formal monitoring and assessment procedures into their plans of care when suicidal ideation is present even in the absence of an attempt. It remains unclear why the most notable changes between the two samples were observed for this group. Research should examine more carefully why different patterns seem to be emerging for adolescents based on age and gender.

Of interest, although suicidal ideation significantly declined, suicide attempts remained stable, suggesting that public health interventions that target adolescents already experiencing suicidal ideation have not yet had a dramatic impact at the population level. Some secondary prevention efforts such as educational programs for natural community helpers (i.e., teachers, counselors, and coaches) to identify, manage, and refer suicidal adolescents and/or adolescents at risk for suicidal behavior (Macksey-Amiti, Fendrich, Libby, Goldenberg & Grossman, 1996) and telephone counseling programs for suicidal adolescents (King, Nurcombe, Bickman, Hides, & Reid, 2003) have demonstrated efficacy. However, more research is needed in this area to address the ongoing problem of adolescent suicide attempts. Still, one promising finding is the decline in suicide deaths over the decade despite an apparent consistency in numbers of suicide attempts, suggesting that fewer adolescent suicide attempts are resulting in suicide deaths. The CDC report on suicide trends from 1990 to 2004 indicated that suicide deaths by poisoning and firearms declined over the decade, particularly for girls, whereas death by hanging/suffocation increased (Lubel et al., 2007). Because firearms are considered the most lethal means of suicide (Shenassa, Catlin, & Buka, 2003), one possible interpretation is that adolescents are attempting suicide with less lethal means, which may result in fewer attempts resulting in deaths. However, suffocation is considered more lethal than poisoning (Shenassa et al., 2003). Thus, this possibility does not fully explain this pattern. More research is needed to explain why fewer adolescent suicide attempts are resulting in deaths.

Risk Factors for Suicidal Ideation and Attempts

In addition to the prevalence estimates, the current study identified several risk factors for both suicidal ideation and suicide attempts. The majority of the risk factors that emerged were consistent with previous research, such as female gender, drug use, direct violence exposure, and depressive symptoms (e.g., J. Brown et al., 1999; King et al., 1991; Salzinger et al., 2007). Not surprisingly, a diagnosis of MDE was the strongest predictor of suicidal ideation and attempts in both samples. In addition, those who had diagnoses of PTSD were also at significantly greater risk for suicidal ideation and attempts, adding to the body of literature demonstrating that suicidality is not a problem limited to mood disorders (e.g., Sareen et al., 2005). In particular, this finding is consistent with previous literature linking PTSD symptoms to suicidality after controlling for diagnoses of mood disorders (Marshall et al., 2001).

Our findings suggest that the majority of risk factors identified in 1995 continue to be associated with increased risk of suicidality in 2005. In particular, these findings indicate that exposure to direct violence has posed a consistent and marked risk for suicidal behavior across the decade. Girls also consistently appear to be disproportionately at risk for experiencing suicidal ideation and attempting suicide. In fact, when considering boys and girls separately, the prevalence of suicidal ideation did not significantly decline across the decade for girls. Targeted prevention efforts continue to be a high priority for adolescent girls and adolescents who have experienced direct violence. In addition, nonexperimental drug use was also consistently associated with greater risk of suicidal ideation and attempts in both samples, suggesting that efforts to address suicidality among adolescent drug users are warranted. Of interest, alcohol abuse was associated with greater risk of suicidal ideation and attempts in the 1995 sample but was not associated with increased risk after controlling for other predictors in the 2005 sample. Previous research has demonstrated that alcohol use is associated with suicidal behavior (e.g., Swahn & Bossarte, 2007). However, the current findings are consistent with previous literature demonstrating that the impact of drug use on suicidal behavior is greater than that of alcohol use, and that the relation between alcohol use and suicidal behavior may have been stronger in the 1990s compared to the 2000s (Rossow et al., 2005).

In addition to the emergence of variables consistently associated with greater risk of suicidal thoughts and behaviors, several variables were not associated with increased risk. Neither ethnic/racial group nor income level was associated with suicidal ideation or attempts. This suggests that adolescent suicidality is a problem that spans across a diverse adolescent population. This finding differs from some studies reporting higher prevalence of suicidal ideation and attempts for Hispanic girls as compared to Caucasian girls (CDC, 2007b). However, studies reporting differences among racial/ethnic groups often compare prevalence estimates without controlling for other demographic and risk variables, whereas the current study included racial/ethnic status as a predictor in a multivariable model. Perhaps these racial/ethnic differences are less pronounced when controlling for other demographic and risk variables that are more strongly related to suicidality.

Limitations

These results should be considered within the context of several limitations of our research methods. First, as is common to most epidemiological studies of adolescents, we were limited to only interviewing adolescents with a consenting adult available. Second, our use of a cross-sectional design within each sample hinders the types of hypotheses that can be tested. Future longitudinal research could expand on the risk factor analyses by examining whether the experience of specific events at Time 1 predicts suicidality at Time 2. Third, retrospective recall regarding past histories of symptoms, behaviors, and exposure to stressful and potentially traumatic events is a limitation common to most studies employing interview methods. Fourth, the use of single-item measures for our dependent variables somewhat limits our ability to draw conclusions. Finally, our methodology does not allow us to gather information about suicide deaths. Thus, we can only make somewhat speculative inferences about potential changes in completion of suicides relative to attempts by comparing the current suicide attempt trends to the suicide completion trends reported by the CDC. Overall, the current findings suggest that adolescent suicidality is still a significant public health issue to address and that risk factors for suicidal ideation and attempts are largely consistent from 1995 to 2005.

Implications for Research, Policy, and Practice

Several directions for future research emerged from this study, as did implications for policy and clinical practice. First, these findings suggest that much more work needs to be done in the area of prevention efforts for adolescents, particularly older adolescents and girls. Policy should be geared toward funding novel approaches to reduce risk of suicide and reduce prevalence of suicidal ideation and attempts at the population level. Second, the current findings highlight the importance of more thoroughly examining the functional relations among violence exposure, drug use, and suicidality. Research should continue to develop and evaluate screening measures and teacher/counselor protocols for identifying and referring students at risk for suicidality. Adolescents identified as having experienced violence or engaged in significant use of drugs should be provided education and recommendations for coping with potential symptoms of depression, PTSD, and substance use and identify and address other potential suicidality risks. In addition, the finding that the relation between suicidal ideation and attempt among 12- to 14-year-old boys was significantly larger in 2005 compared to 1995 suggests that clinicians should be particularly attuned to this increased risk when assessing 12- to 14-year-old boys.

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FIGURE 1.
 Suicide deaths in girls from 1992 to 2004 and suicide deaths in boys from 1992 to 2004.
Note: Data taken from the Centers for Disease Control National Vital Statistics System.

FIGURE 2.
Prevalence estimates of suicidal ideation from 1995 to 2005 for each gender/age subgroup.

TABLE 1

Correlations Between Suicidal Ideation and Attempts by Age/Gender Subgroup for NSA and NSA-R

Group	NSA	NSA-R
12- to 14-year-old boys	.26***	.47***
15- to 17-year-old boys	.34***	.41***
12- to 14-year-old girls	.49***	.44***
15- to 17-year-old girls	.54***	.57***

Note: Correlation coefficient used was phi, obtained by calculating χ^2 . NSA = National Survey of Adolescents; NSA-R = National Survey of Adolescents–Replication.

 $p < .001$.

TABLE 2

Correlations Among Study Variables (NSA)

	SA	Age	Gend	Af-Am	His	NA	AsAm	Oth	Drug	AlcAb	Dir V	Ind V	PTSD	MDE
SI	.46***	.13***	.10***	*.01	*.01	.02	.01	*.02	.23***	.14***	.24***	.14***	.29***	.43***
SA	—	.09***	.12***	-.02	-.00	.01	-.02	.00	.21***	.13***	.17***	.12***	.24***	.29***
Age	—	—	-.00	.00	.01	-.01	-.02	-.00	.23***	.17***	.11***	.15***	.09***	.15***
Gend	—	—	—	.01	.01	.01	.01	-.02	.00	-.03*	-.02	-.09***	.07***	.12***
Af-Am	—	—	—	—	—	—	—	—	-.05***	-.04***	.12***	.15***	.05**	-.03
His	—	—	—	—	—	—	—	—	.03	.00	.02	.06***	.04*	.01
NA	—	—	—	—	—	—	—	—	.04**	-.01	.06***	.06***	-.01	.05**
AsAm	—	—	—	—	—	—	—	—	-.00	-.01	-.02	-.03	-.00	.01
Oth	—	—	—	—	—	—	—	—	-.01	-.01	.01	.01	-.02	-.01
Drug	—	—	—	—	—	—	—	—	—	.24***	.22***	.23***	.17***	.22***
AlcAb	—	—	—	—	—	—	—	—	—	—	.14***	.13***	.08***	.10***
Dir V	—	—	—	—	—	—	—	—	—	—	—	.36***	.26***	.27***
Ind V	—	—	—	—	—	—	—	—	—	—	—	—	.22***	.22***
PTSD	—	—	—	—	—	—	—	—	—	—	—	—	—	.12***

Note: NSA = National Survey of Adolescents; SA = suicide attempt; SI = suicidal ideation; Gend = gender; Af-Am = African American; His = Hispanic; NA = Native American; AsAm = Asian American; Oth = Other race; Drug = lifetime nonexperimental drug use; AlcAb = lifetime alcohol abuse Dir V = direct violence; Ind V = indirect violence; PTSD = lifetime posttraumatic stress disorder; MDE = lifetime major depressive episode.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

TABLE 3

Correlations Among Study Variables (NSA-R)

	SA	Age	Gend	Af-Am	His	NA	AsAm	Drug	AlcAb	Dir V	Ind V	PTSD	MDE
SI	.50***	.14***	.11***	-.01	-.01	.00	-.03	.20***	.15***	.25***	.16***	.32***	.38***
SA	—	.09***	.09***	-.01	-.02	.02	.00	.19***	.14***	.19***	.11***	.20***	.26***
Age	—	—	-.01	-.01	-.02	-.03	-.02	.22***	.18***	.14***	.17***	.10***	.13***
Gend	—	—	—	.02	.01	.01	-.03	.00	.01	-.01	-.03*	.09***	.15***
Af-Am	—	—	—	—	—	—	—	-.05***	-.05***	.07***	.10***	.00	-.02
His	—	—	—	—	—	—	—	.01	.03	.03	.03	-.00	.02
NA	—	—	—	—	—	—	—	.04*	.03	.05**	.04*	.01	.04*
AsAm	—	—	—	—	—	—	—	-.01	-.02	-.02	-.03	.00	-.01
Drug	—	—	—	—	—	—	—	—	.45***	.25***	.24***	.16***	.18***
AlcAb	—	—	—	—	—	—	—	—	—	.22***	.18***	.14***	.14***
Dir V	—	—	—	—	—	—	—	—	—	—	.34***	.26***	.25***
Ind V	—	—	—	—	—	—	—	—	—	—	—	.19***	.18***
PTSD	—	—	—	—	—	—	—	—	—	—	—	—	.50***

Note: NSA-R = National Survey of Adolescents–Replication; SA = suicide attempt; SI = suicidal ideation; Gend = gender; Af-Am = African American; His = Hispanic; NA = Native American; AsAm = Asian American; Oth = Other race; Drug = lifetime nonexperimental drug use; AlcAb = lifetime alcohol abuse; Dir V = direct violence; Ind V = indirect violence; PTSD = lifetime posttraumatic stress disorder; MDE = lifetime major depressive episode.

*
p < .05.

**
p < .01.

p < .001.

TABLE 4

Risk Factors for Suicidal Ideation in the 1995 NSA

Variable	β	SE	Wald	95.0% CI for OR		
				OR	Lower	Upper
Gender	.42	.14	9.11**	1.53	1.16	2.01
Age	.38	.14	7.46**	1.46	1.11	1.91
Income	.08	.21	.33	1.09	.31	3.78
Alcohol Abuse	.62	.29	4.57*	1.87	1.05	3.31
Drug Use	.70	.19	12.99***	2.01	1.37	2.93
African-American	-.04	.22	.03	.96	.73	1.30
Hispanic	-.32	.23	1.89	.73	.46	1.15
Native American	-.09	.34	.06	.92	.47	1.79
Asian American	.63	.41	2.40	1.88	.85	4.18
Other Race	-.50	.50	1.01	.60	.23	1.62
Direct Violence	.81	.14	31.77***	2.24	1.69	2.97
Indirect violence	-.03	.15	.03	.97	.73	1.30
PTSD	.60	.20	9.07**	1.82	1.23	2.70
MDE	1.91	.15	157.80***	6.77	5.02	9.13

Note: All $df = 1$; Other race only collected in 1995. NSA = National Survey of Adolescents; CI = confidence interval; OR = odds ratio; PTSD = lifetime posttraumatic stress disorder; MDE = major depressive episode.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

TABLE 5

Risk Factors for Suicidal Ideation in 2005 NSA-R

Variable	β	SE	Wald	OR	95.0% CI for OR	
					Lower	Upper
Gender	.60	.15	15.38***	1.83	1.35	2.47
Age	.57	.16	12.49***	1.76	1.29	2.41
Income	.03	.49	.91	1.03	.40	2.69
Alcohol abuse	-.24	.26	.87	1.27	.77	2.11
Drug use	.72	.21	12.19***	2.06	1.37	3.08
African-American	-.11	.23	.24	.89	.57	1.40
Hispanic	-.09	.23	.15	.92	.59	1.43
Native-American	-.60	.46	1.71	.55	.22	1.35
Asian-American	-.92	.60	2.36	.40	.12	1.29
Direct violence	.85	.17	25.26***	2.34	1.68	3.25
Indirect violence	.26	.17	2.48	1.30	.94	1.80
PTSD	.81	.25	10.89***	2.25	1.39	3.65
MDE	1.38	.20	45.94***	3.98	2.67	5.93

Note: All $df = 1$; Other race only collected in 1995. NSA-R = National Survey of Adolescents-Replication; CI = confidence interval; OR = odds ratio; PTSD = lifetime posttraumatic stress disorder; MDE = major depressive episode.

 $p < .001$.

TABLE 6

Risk Factors for Suicide Attempts in the 1995 NSA

Variable	β	SE	Wald	OR	95.0% CI for OR	
					Lower	Upper
Gender	1.43	.28	25.97***	4.18	2.41	7.26
Age	.33	.26	1.58	1.38	.83	2.30
Income	-.33	.52	1.38	.72	.26	2.01
Alcohol abuse	.70	.37	3.70 [†]	2.02	.99	4.13
Drug use	1.14	.28	16.88***	3.14	1.82	5.42
African-American	-.04	.42	.01	.96	.42	2.19
Hispanic	-.40	.35	1.30	.67	.33	1.34
Native-American	-.10	.59	.03	.90	.29	2.85
Asian-American	—	—	—	—	—	—
Other Race	.24	.60	.16	1.27	.39	4.11
Direct violence	.77	.25	9.31**	2.15	1.31	3.52
Indirect violence	.38	.28	1.77	1.46	.84	2.53
PTSD	.77	.27	8.47**	2.17	1.29	3.66
MDE	1.99	.29	47.46***	7.31	4.15	12.87

Note: All $df = 1$; Other race only collected in 1995. No Asian Americans attempted suicide in the 1995 sample. NSA = National Survey of Adolescents; CI = confidence interval; OR = odds ratio; PTSD = lifetime posttraumatic stress disorder; MDE = major depressive episode.

[†] $p = .05$.

** $p < .01$.

*** $p < .001$.

TABLE 7

Risk Factors for Suicide Attempt in the 2005 NSA-R

Variable	β	SE	Wald	95.0% CI for OR		
				OR	Lower	Upper
Gender	1.07	.31	12.32***	2.93	1.61	5.34
Age	.82	.33	6.32**	2.27	1.20	4.31
Income	-.21	.72	1.16	.81	.20	3.34
Alcohol Abuse	.05	.40	.02	1.05	.48	2.30
Drug Use	1.24	.33	14.12***	3.47	2.04	6.63
African American	-.29	.38	.58	.75	.36	1.57
Hispanic	-.34	.40	.71	.71	.32	1.57
Native American	-.68	.78	.77	.51	.11	2.32
Asian American	-.32	1.09	.08	.73	.09	6.19
Direct Violence	1.34	.32	17.67***	3.81	2.04	7.10
Indirect Violence	.21	.31	.46	1.23	.68	2.25
PTSD	.43	.35	1.51	1.54	.77	3.08
MDE	1.13	.32	12.65***	3.09	1.66	5.77

Note: All $df = 1$; Other race only collected in 1995; NSA-R = National Survey of Adolescents-Replication; CI = confidence interval; OR = odds ratio; PTSD = lifetime posttraumatic stress disorder; MDE = major depressive episode.

**
 $p < .01$.

 $p < .001$.