



Suicide Attempts and Course of Suicidal Ideation among Puerto Rican Early Adolescents

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Abstract

Suicidal behavior increases substantially during early adolescence, a critical understudied developmental period. This study reports on the prevalence of suicidal ideation, suicide attempts, and course of suicidal ideation among Puerto Rican early adolescents, a high-risk group for suicidal behavior in adulthood. Gender differences and the prospective association of psychiatric disorders with course of suicidal ideation are examined. Participants were 1228 Puerto Rican adolescents (ages 10–13 at wave 1; 48% female) and parents, selected through probability-based sampling, assessed yearly across three waves. Adolescents and parents reported via Diagnostic Interview Schedule for Children-IV about 12-month suicide attempts and suicidal ideation (further categorized as never present, onset, recurrence, and remission), mood and anxiety disorders; parents reported on disruptive disorders. Over the three waves, 9.5% early adolescents thought about suicide and 2.1% attempted suicide. In adjusted multinomial regression models, compared to those with never present suicidal ideation, female gender was related to onset of suicidal ideation (OR = 2.60; 95% CI, 1.22–5.55). Disruptive disorders were related to onset (OR = 5.80; 95% CI, 2.06–16.32) and recurrence of suicidal ideation (OR = 5.07, 95% CI, 1.14–22.47), mood disorders were related to remission (OR = 14.42, 95% CI, 3.90–53.23), and anxiety disorders to onset of suicidal ideation (OR = 3.68, 95% CI, 1.75–7.73). Our findings inform strategies tailored for early adolescents. To address onset of suicidal ideation, prevention should focus on girls and those with anxiety or disruptive disorders. When ideation is recurrent, interventions oriented to reduce disruptive behavior and its consequences may help achieve remission.

Keywords Early adolescence · Suicidal ideation · Suicide attempts · Longitudinal studies · Developmental psychopathology

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Early adolescent suicide is on the rise in the US. From 1999 to 2014, the largest increase in rates of suicide deaths was among 10–14-year-olds (200% for girls, 37% for boys) (Curtin et al. 2016). Suicidal ideation, the earliest stage of suicidal behavior, which frequently precedes a suicide attempt and suicide death, increases during early adolescence (Borges et al. 2008; Kessler et al. 1999; Nock et al. 2013). Gender differences in suicide risk also emerge at this point, such that by middle/late adolescence, girls report more suicidal ideation and suicide attempts than boys, and boys are more likely to die by suicide than girls (Boeninger et al. 2010; Evans et al. 2005). Thus, early adolescence stands out as a critical period to implement strategies that prevent suicidal ideation from emerging, and among those who are already thinking about suicide, from recurring over time (Glenn and Nock 2013; Wyman 2014).

There are also racial/ethnic differences in suicide prevalence among adolescents. From 2003 until 2015, the Youth Risk Behavior Surveillance (YRBS) reports have found that Hispanic adolescents, particularly Hispanic girls, endorse

higher 12-month prevalence of suicidal behavior than do white or black adolescents (CDC 2003, 2015). In the 2017 YRBS, 16.4% of Hispanic adolescents seriously considered attempting suicide and 8.2% attempted suicide in the previous year (CDC 2017). Thus, the preventive efforts are especially important among high-risk racial/ethnic groups, such as Puerto Rican adults. Compared to adults from other Latino subgroups and white adults, Puerto Rican adults living in the mainland report the highest prevalence of suicidal behavior, as well as depression and substance use disorders (Alegria et al. 2007; Baca-Garcia et al. 2011; Velez and Ungemack 1995). The elevated suicide risk among Puerto Rican adults could also be attributed to the cultural stress resulting from the conflicted historical relationship between Puerto Rico and the US. This relationship may raise certain expectations that lead to a ‘frustrated status’ experience, in which Puerto Rican adults expect a favorable socioeconomic status or integration but do not achieve them (Lewis-Fernández et al. 2016).

There are substantial gaps in our understanding of the course—onset, recurrence, and remission—and determinants of suicidal ideation in early adolescence. Retrospective studies with older samples indicate that suicidal ideation sharply increases after age 10, and once suicidal ideation is present, the high-risk period for recurrence or transition into a suicide attempt is within one year (Kessler et al. 1999; Nock et al. 2013). Given that the temporal resolution of these retrospective reports is limited, prospective studies are needed to more accurately examine the course of suicidal ideation (Glenn and Nock 2013). Only one prospective study has reported on the prevalence of recurrent suicidal ideation among early adolescents over a two-year period (2.3%) (Vander Stoep et al. 2011), but none has informed about prevalence of either onset or remission of suicidal ideation. Furthermore, Latino youth have not been included in these studies in sufficient numbers to draw conclusions about suicidal behavior applicable to this high-risk group.

One of the most well-established determinants of suicidal behavior across racial/ethnic groups is the presence of psychiatric disorders (Borges et al. 2008; Gould et al. 1998; Joe et al. 2009; Jones et al. 2008). Between 50%–70% of adolescents with suicidal ideation have at least one concurrent psychiatric disorder (Bridge et al. 2006; Foley et al. 2006; Gould et al. 1998; Joe et al. 2009). The few prospective studies focused on suicide risk factor in early adolescence have not included psychiatric disorders as a predictor (Adrian et al. 2016; Musci et al. 2015; Park 2013; Whalen et al. 2015). In relation to the courses of suicidal ideation in early adolescence, only one study has examined the association between psychiatric *symptoms* and recurrent suicidal ideation and revealed that depressive symptoms, and comorbid depressive and conduct symptoms predicted recurrence of suicidal ideation (Vander Stoep et al. 2011). However, how various psychiatric *disorders* predict onset, recurrence, and remission of suicidal ideation in early adolescence remains unknown.

Growing evidence indicates that the diagnostic profile linked to suicidal behavior may differ depending on the developmental period (Ben-Yehuda et al. 2012; Brent et al. 1999; Gould et al. 1998; Peyre et al. 2017; Sheftall et al. 2016). Specifically, while disruptive behavior disorders show the strongest association with suicidal ideation in childhood (Ben-Yehuda et al. 2012; Gould et al. 1998; Whalen et al. 2015), in adolescence, mood disorders emerge as the main risk factor (Nock et al. 2013; Peyre et al. 2017; Ten Have et al. 2012). In the absence of a development framework to interpret these findings (Miller and Prinstein 2019; Pelkonen et al. 2011), these studies argue that this difference is due to the low prevalence of depressive disorders among children.

From a developmental perspective, disruptive behavior disorders and some anxiety disorders (i.e., separation anxiety disorders, specific phobias) appear early in development and tend to be of greater chronicity (Copeland et al. 2014; Loeber et al. 2009; Merikangas et al. 2010). Building on the diathesis-stress model, the presence of a disruptive or anxiety disorder along with the underlying high levels of impulsivity, aggressiveness, irritability, fear, and worry associated with these disorders may lead to the development of maladaptive responses to stress. In early adolescence, this vulnerability might be exacerbated by the strain of pubertal changes, including increased stress response or sensitivity to social stimuli (Miller and Prinstein 2019; Somerville 2013). In the absence of appropriate emotion regulation skills, proximal risk factors such as conflict with parents around independence or identity, greater exposure to social and academic stress, or the long-term consequences of those disorders (e.g., school refusal or suspension) may contribute to the rise in suicidal ideation among vulnerable early adolescents. Additional culture-related experiences, including racial/ethnic discrimination or acculturation stress could also be additional sources of stress faced by Latino youth (Goldston et al. 2008; Zayas et al. 2005). In contrast, although depressive disorders are already observed in children (Luby et al. 2003), the increase in frequency of these disorders coincides with the consolidation of the cognitive vulnerability to depression that takes place around early-to-middle adolescence (Cicchetti and Toth 1998; Hyde et al. 2008; Mezulis et al. 2006). These cognitive processes, such as hopelessness or rumination, have been associated with suicidal ideation in adolescence (Horwitz et al. 2017; Miranda and Nolen-Hoeksema 2007).

A prospective examination of the association between the psychiatric disorders and the courses of suicidal ideation among early adolescents at high risk for future suicidal behavior will inform first-hand which psychiatric disorders should be targeted to prevent suicidal ideation from emerging or recurring over time. Furthermore, in the absence of a model for understating suicidal behavior in children and early adolescents, largely in part to the overall dearth of research, our

study will provide information that could inform the conceptualization of a much-needed developmental model.

The present study addresses this gap in knowledge using longitudinal data from the Boricua Youth Study (BYS), a large representative sample of Puerto Rican youth living in the South Bronx and in Puerto Rico. First, we describe the prevalence of suicidal ideation and suicide attempts by age and gender among early adolescents. Then, we examine the association of gender and mood, anxiety, and disruptive behavior disorders with any suicidal ideation and any suicide attempts, aggregated across three yearly assessment waves. Finally, we define four courses of suicidal ideation—never present (never), new onset (onset), recurrence, and remission—across the study period and examine how gender and psychiatric disorders predict those courses. We hypothesized that onset of suicidal ideation would be more prevalent than recurrence and remission in early adolescence, and significantly higher among girls than boys. Given the young age of our sample in the first assessment (ages 10–13), we also anticipated that anxiety disorders and disruptive behavior disorders, in particular, would have a stronger association with the onset and recurrence of suicidal ideation than would mood disorders, due to the low prevalence of these and reduced cognitive vulnerability to depression observed in this age group (Hyde et al. 2008).

Methods

Sample

The BYS is a longitudinal study of Puerto Rican youth and their parents recruited through multistage probability sampling of households in the South Bronx, New York City ($N = 1138$), and the Standard Metropolitan Area of San Juan and Caguas, Puerto Rico ($N = 1353$). Samples were weighted to represent the populations of Puerto Rican children at each site. A household was eligible if, at the time of enumeration, a child aged 5–13 years and their parent/caretaker in the selected household self-identified as being of Puerto Rican background. Up to three eligible children per household were selected. Participants were assessed annually three times (2000–2004), with a retention rate of over 85% at wave 3. Details on study design are described elsewhere (Bird et al. 2006).

The present analyses included 1228 participants aged 10 to 13 at wave 1 (48.4% females, 47% living in the South Bronx) and their parents. Of those, 1036 early adolescents participated in at least two of the three waves, which allowed classification of the adolescents into one of the suicidal ideation courses. The excluded early adolescents ($N = 192$) were significantly younger and living in the South Bronx. They did not differ in gender, psychiatric disorders or past-year suicidal

ideation and suicide attempts from the 1036 early adolescents who participated in at least two waves.

Procedure

Written informed assent and consent were obtained from all adolescents and their parents, respectively. The BYS team maintained a frequent contact with the study participants throughout the three years of data collection to improve retention. Parents and adolescents were compensated for their participation. The study was approved by the Institutional Review Boards of the New York State Psychiatric Institute and the University of Puerto Rico Medical School.

Measures

Suicidal Ideation and Suicide Attempts At each wave, adolescents and parents were asked about 12-month suicidal ideation (*serious thoughts about killing yourself*), and lifetime and 12-month suicide attempts (*tried to kill yourself*), with questions from the Mood Disorders Module of the Diagnostic Interview Schedule for Children Version-IV (DISC-IV; *DSM-IV version*; Shaffer et al. 2000). The DISC-IV is a structured instrument that ascertains DSM-IV diagnostic criteria (American Psychiatric Association, 1994). The computerized version of the DISC-IV (C-DISC-4.0) was administered by trained lay interviewers. The C-DISC-4.0 is available in English and in Spanish, and provides SAS scoring algorithms to generate diagnoses based on the DSM-IV. Suicidal ideation and suicide attempts were considered present if endorsed by either adolescents or parents. Their agreement on the presence of suicide ideation ($\kappa = 0.16$, $p < 0.0001$; Cronbach alpha = 0.28) and suicide attempts ($\kappa = 0.22$, $p < 0.0001$; Cronbach alpha = 0.41) across waves was low, as previously reported in other studies (Foley et al. 2006; Jones et al. 2019). The percentage of parents who did not report suicidal ideation or an attempt when the adolescent did (79.9% and 82.7%, respectively) was higher than the percentage of parents who reported suicidal ideation or an attempt when youth did not (20.1% and 17.3%, respectively). Combining parent and adolescent interview reports, as has been done in prior epidemiological studies (Gould et al. 1998; Foley et al. 2006), may help to capture suicidal thoughts or behaviors undisclosed by the early adolescents (Bird et al. 1992; Hughes and Gullone 2010). Early adolescents were classified into four courses according to presence/absence of suicidal ideation at each wave: never present, onset (no suicidal ideation at wave 1 and any suicidal ideation at follow up), recurrence (suicidal ideation at wave 1 and follow up), and remission (suicidal ideation at wave 1 and no suicidal ideation at follow up) (Table 1). The low prevalence of suicide attempts precluded the same classification and subsequent analysis.

Table 1 Classification and frequency of suicidal ideation among early adolescents over three study waves ($N = 1036$)

	Wave 1	Follow up (Waves 2 or 3)	N (%)
Never present	Absent	Absent	930 (89.8)
Onset	Absent	Present	44 (4.2)
Recurrence	Present	Present	24 (2.3)
Remission	Present	Absent	38 (3.7)

Psychiatric Disorders Twelve-month psychiatric disorders were assessed with the DISC-IV. A symptom was considered present if either adolescents or parents endorsed it, except for attention-deficit/hyperactivity disorder, oppositional defiant disorder, and conduct disorder, for which parents were considered the optimal informants (Bird et al. 1992). C-DISC-4.0 SAS algorithms were used to combine parent and adolescent reports. Ten disorders were categorized into three groups: mood disorders (major depression and dysthymia), anxiety disorders (generalized anxiety, separation anxiety, panic, social phobia, and posttraumatic stress disorders), and disruptive disorders (attention-deficit/hyperactivity, oppositional defiant, and conduct disorders). The test-retest reliability and validity of the DISC have been tested in both the English (Schwab-Stone et al. 1996; Shaffer et al. 2000) and the Spanish versions (Bravo et al. 2001; Rubio-Stipec et al. 1994). For the English version, the test-retest reliability ranged between 0.48–0.86 for the combined report on several 12-month mood, anxiety, and disruptive disorders assessed with the C-DISC-4.0 (Shaffer et al. 2000). The concurrent validity for those disorders was moderate to very good ($\kappa = 0.37$ – 0.80) for the combined report on the DISC-2.3. (Schwab-Stone et al. 1996). Comparable results have been found for the Spanish version of the DISC (Bravo et al. 2001; Ribera et al. 1996; Rubio-Stipec et al. 1994). There is also evidence that the DISC is a valid instrument to evaluate children and adolescent suicidal behavior (King et al. 1997; Miranda et al. 2014; Shaffer et al. 2004) and has been used extensively to assess suicidal ideation and suicide attempts in clinical and community samples (Asarnow et al. 2015; Gould et al. 1998; King et al. 2014).

Demographics At wave 1, gender, age, and site (the South Bronx vs. Puerto Rico) of the adolescent were recorded.

Statistical Analyses

Prevalence of suicidal ideation and suicide attempts, aggregated across the three waves, were plotted by age and gender. Rao-Scott Chi-squared test determined whether the prevalence varied across ages (Thomas and Decady 2004). The same statistic was used to examine whether occurrence of any suicidal ideation and any suicide attempts across the three waves varied by gender, and mood, anxiety, and disruptive

disorders. Besides describing 12-month prevalence at specific ages, association analyses were conducted aggregating suicidal ideation and suicide attempts, separately, across three waves (i.e., 12-month suicidal behavior at any wave), which allowed for a higher number of events (any suicidal ideation and any suicide attempts), improving the stability of the associations examined. Multinomial logistic regression analyses examined the association between gender and 12-month psychiatric disorders at wave 1, with onset, recurrence, and remission of suicidal ideation (with never suicidal ideation as the reference category). First, we tested the association between the different courses of suicidal ideation with gender (Model 1), and each psychiatric disorder separately (Model 2). Then, the psychiatric disorders were entered simultaneously into the model (Model 3). Finally, the model was adjusted for gender (Model 4). To test the generalizability of the findings across sites, we examined interactions between site and psychiatric disorders in Model 4. Models were adjusted by age, site, and propensity scores. Propensity scores (including maternal education, maternal age, single-parent family status, and income measured at wave 1) were used to take into account differences between participants living in the South Bronx and those in Puerto Rico. To take into account information about the influence of suicide attempts on the courses of suicidal ideation, Model 4 was further adjusted for lifetime suicide attempts at wave 1. Findings largely remained the same but wide confidence intervals (CI) of the odds ratios (ORs) for lifetime suicide attempts (e.g., 5.11–135.17) suggest these analyses are unstable and should be interpreted cautiously, and as such are not presented here (available upon request). Additionally, we conducted similar multinomial logistic regression models but using recurrence of suicidal ideation as the reference category. Listwise deletion was used to handle missing data. Analyses were performed in SAS 9.4, using the PROC SURVEY to account for the clustered sampling design and included population weights.

Results

Over the three waves ($N = 1228$), 9.5% of early adolescents reported any suicidal ideation and 2.1% reported any suicide attempt. Among early adolescents who participate in at least two waves ($N = 1036$), 10.2% reported suicidal ideation, of those, 4.2% experienced onset, 2.3% recurrence, and 3.7% remission of suicidal ideation (Table 1).

The distribution of 12-month prevalence of suicidal ideation and suicide attempts by age and gender is displayed in Fig. 1 ($N = 1228$). Girls' prevalence of suicidal ideation did not significantly differ across ages (Rao-Scott $X^2 = 5.98$, $p = 0.309$). For boys, the prevalence of suicidal ideation was the highest at age 11 (6.3%) and decreased to the lowest prevalence at age 15 (1.5%), but the overall age differences were not

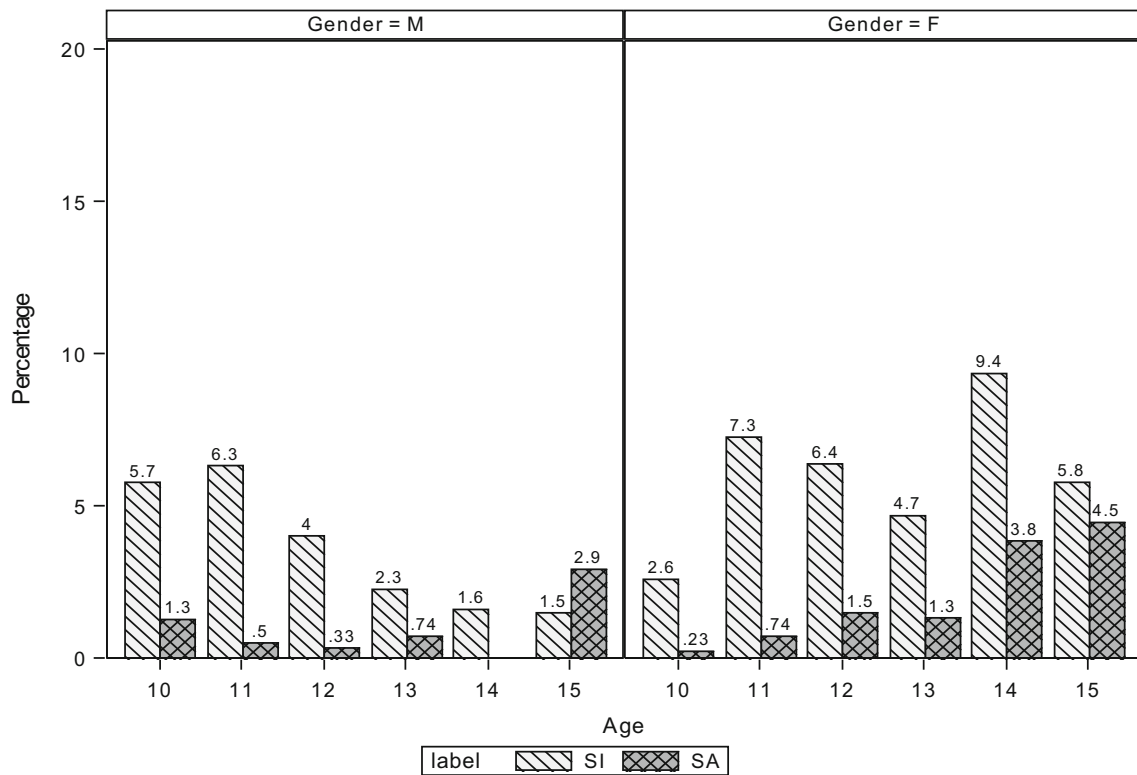


Fig. 1 Age distribution of 12-month suicidal ideation (SI) and suicide attempts (SA) prevalence among boys and girls across waves. Each subject contributed up to three time points. Row percentages within each age group are provided. M = Male, F = Female ($N = 1228$)

significant (Rao-Scott $X^2 = 10.81$, $p = 0.055$). For suicide attempts, the highest 12-month prevalence was at age 15 for both girls (4.5%) and boys (2.9%). Prevalence of suicide attempts was significantly higher among older than younger girls (Rao-Scott $X^2 = 11.34$, $p = 0.045$). For boys, given the 0% rate at age 14, statistical comparison of suicide attempt prevalence by age was not conducted.

Across the three waves, girls reported significantly higher prevalence of any suicidal ideation and any suicide attempt than boys (Table 2). When the courses of suicidal ideation were examined (Table 3), onset of suicidal ideation was the only course with significant gender differences in the partially (Model 1) and fully (Model 4) adjusted models, with girls showing higher odds than did boys (OR = 2.6; 95% CI, 1.22–5.55). Neither recurrence nor remission of suicidal ideation differed by gender.

At wave 1, 5.1%, 14.5%, and 10.3% of the early adolescents met criteria for mood, anxiety, and disruptive disorders, respectively. Over the three waves, only mood and anxiety disorders were related to any suicide attempt (Table 2). All three disorder groups were related to any suicidal ideation (Table 2); however, variation emerged in how each psychiatric disorder related to the courses of suicidal ideation (Table 3). In relation to onset, when examined separately (Model 2), disruptive and anxiety disorders were associated with increased odds of onset of suicidal ideation (compared to never suicidal ideation). These associations remained significant after

adjusting for the other disorder groups (Model 3) and gender (Model 4). Specifically, early adolescents with a disruptive or an anxiety disorder had 5.8 and 3.7 higher odds of onset of suicidal ideation than those without a disruptive or an anxiety disorder, respectively. Mood disorders were not associated with onset of suicidal ideation.

In relation to recurrence, the three disorder groups were initially associated with this course of suicidal ideation (Model 2). However, when examined simultaneously (Model 3), only disruptive disorders remained associated with increased odds of recurrence of suicidal ideation, and this association remained significant (OR = 5.07, 95% CI, 1.14–22.47) when the model was adjusted for gender (Model 4).

Mood and disruptive disorders were both associated with remission of suicidal ideation in Model 2, but only the association with mood disorders remained significant in the fully adjusted model (Model 4). Specifically, early adolescents with a mood disorder had 14.4 higher odds of remission of suicidal ideation than those without a mood disorder. The association between disruptive disorders and remission of suicidal ideation was no longer significant when the other two disorder groups were entered in the model (Model 3). Anxiety disorders were not associated with remission of suicidal ideation.

When we examined interactions between site and psychiatric disorders in Model 4, results indicated that the prospective associations of psychiatric disorders with the courses of suicidal ideation did not differ by site (Type III p -values:

Table 2 Distribution of any suicidal ideation and any suicide attempts (waves 1, 2, 3) by gender and psychiatric disorders at wave 1

	Waves 1, 2, 3					Waves 1, 2, 3				
	Never SI (<i>N</i> = 930) % (SE)	Any SI (<i>N</i> = 106) % (SE)	<i>X</i> ²	<i>df</i>	<i>p</i>	Never SA (<i>N</i> = 1007) % (SE)	Any SA (<i>N</i> = 24) % (SE)	<i>X</i> ²	<i>df</i>	<i>p</i>
Boys	91.2 (1.1)	8.8 (1.1)	6.52	1	0.01	98.1 (0.8)	1.9 (0.8)	4.24	1	0.04
Girls	84.8 (2.2)	15.2 (2.2)				95.0 (1.2)	5.0 (1.2)			
12-month psychiatric disorders										
No disruptive disorders	90.3 (1.5)	9.7 (1.5)	25.95	1	< 0.001	96.9 (0.7)	3.1 (0.7)	1.84	1	0.17
Disruptive disorders	65.8 (5.6)	34.2 (5.6)				93.4 (3.2)	6.6 (3.2)			
No mood disorders	89.5 (1.4)	10.5 (1.4)	20.14	1	< 0.001	97.1 (0.7)	2.9 (0.7)	6.00	1	0.01
Mood disorders	62.6 (8.3)	37.4 (8.3)				88.4 (6.2)	11.6 (6.2)			
No anxiety disorders	90.7 (1.3)	9.3 (1.3)	25.52	1	< 0.001	97.4 (0.7)	2.6 (0.7)	6.92	1	0.008
Anxiety disorders	71.6 (4.9)	28.4 (4.9)				91.4 (3.2)	8.6 (3.2)			

Row percent; Rao-Scott Chi-Squared statistics reported; *SI* suicidal ideation, *SA* suicide attempts, *df* degrees of freedom, *SE* standard error

Site**Mood*: $p = 0.615$; Site**Anxiety*: $p = 0.329$; Site**Disruptive*: $p = 0.511$).

Additionally, we ran Models 1 to 4 using recurrence of suicidal ideation as the reference category (Table 4). None of the psychiatric disorders distinguished onset and remission of suicidal ideation from recurrence.

Discussion

This is the first study to examine gender variations and the prospective association of psychiatric disorders with suicide attempts and suicidal ideation over the course of three years in a sample of early Puerto Rican adolescents, a high-risk group for suicidal behavior and other mental health disorders in adulthood (Alegria et al. 2007; Baca-Garcia et al. 2011). Across the three waves, 9.5% and 2.1% of early adolescents reported any suicidal ideation and any suicide attempt, respectively. Compared to boys, girls had significantly higher prevalence of any suicidal ideation and any suicide attempt, and were more likely to start thinking about suicide. Over the course of three waves, any suicide attempt was related to mood and anxiety disorders but not to disruptive disorders, and any suicidal ideation was related to the three disorder groups. When taking into account the role of gender and other psychiatric disorders, disruptive disorders were associated with onset and recurrence of suicidal ideation, while mood disorders were only related to remission of suicidal ideation, and anxiety disorders only to onset of suicidal ideation.

Considering the prevalence of any suicidal ideation and any suicide attempt over the three waves, our findings align with the existing literature of early adolescents, which report a 6-month prevalence of 7.2–7.6% for suicidal ideation and 1.5–2.2% for suicide attempts (Breton et al. 2002; Gould

et al. 1998; Steinhausen et al. 2006). The comparability of rates in our sample compared to those from other race/ethnic backgrounds suggests that an elevated prevalence of suicidal behavior among Puerto Rican adults may emerge later in adolescence or adulthood. Further longitudinal, prospective research of Puerto Rican adolescent samples is warranted in order to ascertain the developmental points at which rates of suicidal ideation and attempts increase compared to other populations.

The prevalence of suicidal ideation differed by age and gender. Among girls, the prevalence of suicidal ideation was similar across ages but was higher at ages 11 (7.3%) and 14 (9.4%), whereas among boys, although the prevalence of suicidal ideation was higher among younger boys (6.3%) than among older boys (1.5%), the age differences were not significant. Differences in suicide attempts by age were significant among girls (with older girls reporting more suicide attempts than younger ones). The highest prevalence of suicide attempts was at age 15 for boys (2.9%) and girls (4.5%). In addition, girls were more likely to start thinking about suicide than were boys over the study period. Other longitudinal studies with early adolescents found similar patterns in early adolescence for suicidal ideation, with girls' prevalence fluctuating and boys' prevalence decreasing or remaining stable (Adrian et al. 2016; Kerr et al. 2008; Park 2013). No studies have reported on prevalence of suicide attempts by age at comparable ages. Overall, our findings concur with retrospective studies showing that, suicidal ideation and suicide attempts start increasing in early adolescence, especially among girls (Boeninger et al. 2010).

Our findings on how psychiatric disorders were involved in risk for suicidal ideation and suicide attempts among early adolescents point towards the existence of age-specific risk factors and, as hypothesized, align more with what is observed

Table 3 Association of gender and psychiatric disorders with onset, recurrence, and remission of suicidal ideation (N = 1036)

	Onset of suicidal ideation ^a				Recurrence of suicidal ideation ^a				Remission of suicidal ideation ^a			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Girls	OR (95% CI) 2.25 (1.13–4.49)	OR (95% CI) ...	OR (95% CI) ...	OR (95% CI) 2.60 (1.22–5.55)	OR (95% CI) 1.62 (0.54–4.85)	OR (95% CI) ...	OR (95% CI) ...	OR (95% CI) 1.80 (0.54–6.04)	OR (95% CI) 1.51 (0.68–3.35)	OR (95% CI) ...	OR (95% CI) ...	OR (95% CI) 1.84 (0.77–4.43)
Disruptive disorders	...	6.23 (2.49–15.71)	5.01 (1.82–13.83)	5.80 (2.06–16.32)	...	7.95 (2.42–26.15)	4.95 (1.14–21.46)	5.07 (1.14–22.47)	...	3.69 (1.26–10.79)	1.52 (0.43–5.34)	1.55 (0.43–5.60)
Mood disorders	...	1.80 (0.35–9.26)	0.63 (0.11–3.60)	0.65 (0.11–4.02)	...	9.53 (2.01–45.26)	3.43 (0.50–23.72)	3.44 (0.49–23.95)	...	14.72 (5.72–37.94)	13.80 (3.82–49.87)	14.42 (3.90–53.23)
Anxiety disorders	...	4.66 (2.39–9.07)	3.72 (1.70–8.10)	3.68 (1.75–7.73)	...	5.57 (1.63–19.01)	3.38 (0.77–14.82)	3.48 (0.82–14.82)	...	2.02 (0.74–5.50)	1.14 (0.37–3.56)	1.17 (0.39–3.55)

^a Reference category: Never suicidal ideation

Psychiatric disorders measured at Wave 1. Significant results are bolded. OR Odds Ratio, CI Confidence Interval

Model 1: gender adjusting for site, age, and propensity scores. Model 2: each psychiatric disorder adjusting for gender, site, age, and propensity scores at wave 1. Model 3: all psychiatric disorders, site, age, and propensity scores at wave 1. Model 4: gender, all psychiatric disorders, site, age, and propensity scores at wave 1

among younger children than among older adolescents and adults. Similar to Gould et al. (1998) study, with 7–12-year-olds, disruptive disorders were related to suicidal ideation but not to suicide attempts, which were related to mood and anxiety disorders. Studies with older adolescents and adults point towards a different profile, where mood disorders are associated with suicidal ideation, and disorders characterized by anxiety and aggressive-impulsiveness are more relevant for suicide attempts (Glenn and Nock 2013; Nock et al. 2010).

Novel information emerged when psychiatric disorders were examined in relation to the course of suicidal ideation: onset of suicidal ideation (4.2%) was the most prevalent course in this sample, followed by remission (3.7%) and recurrence (2.3%). As expected, in line with studies of children (Ben-Yehuda et al. 2012; Gould et al. 1998; Whalen et al. 2015), disruptive disorders played a significant role in suicide risk at this age. Initially associated with the three courses, they were the strongest independent predictors of onset and recurrence of suicidal ideation in the fully adjusted model. Disruptive behavior disorders are characterized by high levels of impulsivity and aggression. Developmentally, impulsivity and aggression are elevated in childhood and decrease in late adolescence with the maturation of neurological systems implicated in emotional regulation (Bridge et al. 2006; Steinberg et al. 2008). This study provides further evidence that heightened levels of these traits place children as well as early adolescents at particular risk for suicidal ideation beyond the presence of mood and anxiety symptoms (Gould et al. 1998; Whalen et al. 2015). It has been suggested that among impulsive youth, suicidal ideation may be a “way out” from emotional distress in the absence of more adaptive strategies and a lack of self-regulation to handle distress (Lennings 1994). Moreover, the negative long-term consequences linked to these disorders, such as problems with the law, school suspension, parent-child conflict, or early onset of alcohol use (Nock et al. 2007; Rowe et al. 2010), could also be implicated in the recurrence of suicidal ideation over time and should be properly managed at the family, school, and clinical level.

As expected, anxiety disorders emerged as an independent predictor of onset of suicidal ideation, together with gender and disruptive disorders. This finding replicates retrospective studies that showed an association between lifetime anxiety disorders and onset of suicidal ideation adjusting for other psychiatric disorders, but does so using prospective data (Borges et al. 2008; Nock et al. 2013; Ten Have et al. 2012). Similar to mood disorders, anxiety disorders also predicted recurrence of suicidal ideation, but contrary to our hypothesis, this association was accounted by the presence of other psychiatric disorders. Copeland et al. (2014) found that the prevalence of anxiety disorders is elevated in childhood, decreases around the ages of 11–12 and increases again in young adulthood. This decrease in early adolescence combined with the high comorbidity of anxiety disorders with mood and

Table 4 Association of gender and psychiatric disorders with onset and remission of suicidal ideation with recurrence of suicidal ideation as the reference category (N = 1036)

	Onset of suicidal ideation ^a				Remission of suicidal ideation ^a			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Girls	1.39 (0.36–5.36)	1.44 (0.34–6.20)	0.93 (0.24–3.64)	1.02 (0.22–4.86)
Disruptive disorders	...	0.78 (0.19–3.28)	1.01 (0.20–5.14)	1.15 (0.21–6.12)	...	0.46 (0.10–2.11)	0.31 (0.05–1.85)	0.31 (0.05–1.95)
Mood disorders	...	0.19 (0.02–1.54)	0.18 (0.02–1.84)	0.19 (0.02–1.95)	...	1.55 (0.25–9.57)	4.02 (0.36–45.35)	4.19 (0.37–48.10)
Anxiety disorders	...	0.84 (0.20–3.47)	1.10 (0.22–5.57)	1.06 (0.21–5.32)	...	0.36 (0.06–2.09)	0.34 (0.05–2.56)	0.34 (0.04–2.56)

^a Reference category: Recurrence of suicidal ideation

Psychiatric disorders measured at Wave 1. Significant results are bolded. OR = Odds Ratio, CI = Confidence Interval

Model 1: gender adjusting for site, age, and propensity scores. Model 2: each psychiatric disorder adjusting for gender, site, age, and propensity scores at wave 1. Model 3: all psychiatric disorders, site, age, and propensity scores at wave 1. Model 4: gender, all psychiatric disorders, site, age, and propensity scores at wave 1

disruptive disorders in adolescence (Copeland et al. 2014; Merikangas et al. 2010) could explain the lack of association between anxiety disorders and recurrence of suicidal ideation in the final model. Our findings help to clarify the understudied role of anxiety disorders in youth suicide risk (Hill et al. 2011).

Mood disorders were associated with both recurrence and remission of suicidal ideation but when the other disorders were taken into account, only the association with remission remained significant. This finding may be explained by the low prevalence, episodic character, and long relapse intervals (i.e., 3–5 years) of depressive episodes at this young age (Kovacs 1996; Kovacs et al. 2016). Indeed, in our sample, only 29% of the early adolescents with wave-1 mood disorders met criteria for a mood disorder in subsequent waves (versus 60% who reported a disruptive disorder again, reflecting its persistent character). The episodic character of mood disorders may be then predicting the remission of suicidal ideation in subsequent waves. We found that mood disorders were not associated with onset of suicidal ideation. This finding could be a function of the younger age and the corresponding low rates of mood disorders in our sample. It is possible that the influence of mood disorders on the onset and recurrence of suicidal ideation emerges as adolescents age, linked to the consolidation of the cognitive vulnerability to depression.

Future studies should attempt to elucidate how different types of disruptive, mood, and anxiety disorders predict each course of suicidal ideation and expand the study of their prospective association with suicidal behavior to late adolescence to clarify at what point the role of each disorder changes. Moreover, given that none of the psychiatric disorders distinguished recurrence from onset or remission of suicidal

ideation, studies are needed to identify proximal risk factors, such as family conflict or problems with the law, which may lead to a specific course of suicidal ideation among vulnerable early adolescents.

Besides psychiatric disorders, there are other factors relevant to Puerto Ricans in early adolescence that deserve attention. Early adolescence is characterized by the search for individual and sexual identity, which among Latino youth can be especially challenging, as they have to integrate the contradicting values between Latino and American culture (i.e., *collectivisms* versus *individualism*), while frequently facing experiences of racial/ethnic discrimination and acculturative stress (Cervantes et al. 2014). Identity development can be especially difficult within Latino families in the US where early adolescents usually are more acculturated than their parents. Studies containing mostly Puerto Rican girls suggest that this acculturation gap may generate a conflict between the girls' need of sexual autonomy and individualism with the parents' profound consideration for values of *familism*, *machismo*, and *respeto* (Baumann et al. 2010; Gulbas and Zayas 2014; Zayas et al. 2005). Similarly, Latino early adolescents experiencing same-sex attraction may anticipate or experience the disapproval from their families and community, who may hold more conservative-traditional values. This intergenerational tension could be a critical trigger for suicidal ideation in early adolescence. Furthermore, risk factors that have been associated with suicidal behavior among Puerto Rican adults could also increase the suicide risk among early adolescents, such as poverty (Ungemack and Guarnaccia 1998) or *ataque the nervios* (Guarnaccia et al. 2003), which is a culture-specific syndrome highly prevalent among Puerto Rican women. This syndrome has been associated with different psychiatric disorders among Puerto Rican children and

adolescents as well (Lopez et al. 2009), but its association with suicidal behavior has not been empirically tested.

The few prior studies on suicidal behavior with Puerto Rican adolescents have been conducted in Puerto Rico (Estrada et al. 2018). The data available for Hispanic adolescents living in Puerto Rico indicates that 15.9% of them had serious suicidal thoughts and 14.1% attempted suicide in the previous year (CDC 2017). In the current study, we did not find differences between adolescents from the South Bronx and adolescents from Puerto Rico in the associations between the psychiatric disorders and the courses of suicidal ideation. This suggests that our findings are generalizable and informative of prevention strategies across sites.

Our study is subject to limitations. Occurrence of suicidal ideation and suicide attempts may have been underreported because of the assessment format (interview vs. self-report). Lifetime suicidal ideation was not assessed, limiting the conclusions about first-onset of suicidal ideation. Given that the sample's age range coincides with the period when suicidal ideation emerges, our onset cases likely overlap highly with first-onset cases. Lack of power precluded the examination of course of suicide attempts and may have hampered the detection of detect site differences. Finally, the generalizability of these findings to early adolescents from other Latino subgroups is unclear. Examining the extent to which determinants of suicidal ideation in a high-risk group are generalizable to other groups will inform how best to expand public health efforts.

Conclusions

Our findings suggest that prevention and intervention strategies that target suicidal ideation in early adolescence among high-risk youth are necessary to prevent subsequent suicide attempts. In the US, Minority youth do not readily access psychiatric services and may be more likely to seek care via emergency department or pediatric visits (Merikangas et al. 2011). Screening for suicidal ideation, along with psychiatric disorders, in non-psychiatric settings will allow pediatricians to ensure that youth at risk for suicidal ideation and suicide attempt receive the appropriate interventions. Similarly, screening in non-clinical settings, such as schools and juvenile justice agencies, where youth with high prevalence of disruptive as well as other psychiatric disorders are likely to be found, is crucial to identify high-risk youth, facilitate their referral for specialized services, and prevent escalation of suicidal ideation. In addition, since universal screening can be hard to implement and requires careful consideration about timing of implementation and management of positive results (Shepardson and Funderburk 2014), our findings allow for more specific actions to be taken when a clinician is treating an early adolescent whose psychiatric diagnosis is therefore known. Specifically, among early adolescents

who have already reported suicidal ideation, addressing disruptive and mood symptoms (mostly expressed as emotion dysregulation and impulsive aggression) (Cicchetti and Toth 1998; Dodge and Pettit 2003) may reduce suicidal ideation. Our findings also highlight that among early adolescents, special attention should be paid to not only those with mood disorders, but also to those with disruptive and anxiety disorders, especially among high-risk groups for suicidal behavior such as Puerto Ricans. As such, the implementation of effective interventions that target impulsivity and anxiety, such as those based on emotional regulation (Sukhodolsky et al. 2016), emerge as a promising clinical strategy to prevent onset of suicidal ideation in early adolescence. Longitudinal research focused on early adolescence from different racial/ethnic groups is required to continue elucidating the risk factors driving the dramatic increase in suicidal behavior that occurs at this developmental period. Factors such as parent-child conflict around sexual identity and independence, experiences of racial/ethnic discrimination, or the *ataque de nervios* would be especially relevant study targets among Puerto Rican early adolescents.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval The study was approved by the Institutional Review Boards of the New York State Psychiatric Institute and the University of Puerto Rico Medical School. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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