



# Suicidality and its relationships with individual, family, peer, and psychopathology factors among adolescents with attention-deficit/hyperactivity disorder



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## ABSTRACT

The aim of this study was to examine the prevalence rates of suicidal intent and its correlates among adolescents diagnosed with ADHD in Taiwan. A total of 287 adolescents aged 11–18 years and diagnosed with ADHD participated in this study. Their suicidal ideation and suicide attempts were assessed. Logistic regression analysis was used to examine the associations of suicide with individual, family, peer, ADHD, and psychopathology factors. A total of 12.2% of the participants reported suicidal ideation or a suicide attempt. A logistic regression analysis model showed that adolescents who were older, were bullying perpetrators, and reported high depression level were more likely to have suicidal intent. These three factors were also significantly correlated with suicidal ideation; however, only having high depression level was significantly correlated with suicidal attempts. The results of this study showed that a high proportion of adolescents with ADHD reported suicidal ideation or a suicide attempt. Multiple factors were significantly associated with suicidal intent among adolescents with ADHD. Clinicians, educational professionals, and parents of adolescents with ADHD should monitor the possibility of suicide in adolescents with ADHD who exhibit the correlates of suicidal intent identified in this study.

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This study was the first to examine individual, peer, and family impacts on the association between ADHD and suicidal intent in adolescents.

## 1. Introduction

Suicide is a major public health problem worldwide, especially among adolescents (Bridge, Goldstein, & Brent, 2006). In Taiwan, suicide is the third leading cause of death, after traffic accidents and malignancy, among people aged 15–24 years

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(Ministry of Health and Welfare, 2008). A previous study estimated that the lifetime prevalence of suicidal intent in adolescents was 12% for suicidal ideation, with approximately one-third of adolescents with suicidal ideation developing a plan for suicide (Nock et al., 2013). Approximately 70–91% of adolescents with suicidal behaviors have preexisting mental disorders, such as anxiety disorders, depressive disorders, substance disorders, and disruptive behavior disorders (Hauser, Galling, & Correll, 2013; Nock et al., 2013). Thus, the possibility of suicide should be closely monitored in adolescents with mental disorders.

Attention deficit/hyperactivity disorder (ADHD) is the most prevalent neuropsychiatric disorder affecting 4–10% of the school-aged population (Skounti, Philalithis, & Galanakis, 2007). An increasing number of recent studies have discussed the association between ADHD and suicide (Balazs, Miklosi, Kereszteny, Dallos, & Gadoros, 2014; Impey & Heun, 2012; Ljung, Chen, Lichtenstein, & Larsson, 2014). Rates of ADHD in people who have completed suicide vary from 4% to 25.9%, which is frequently higher than the estimated prevalence of suicide (5.29%) worldwide (Impey & Heun, 2012). One study reported a fourfold higher likelihood of having ADHD for people who had attempted suicide and inflicted self-harm (Lam, 2005). Another study reported a relative risk of 2.91 for ADHD among those who had suicidal intent in comparison with the general population (James, Lai, & Dahl, 2004).

Until now, the possible etiologies accounting for the relationship between ADHD and suicidality are still controversial. Surveying the risk factors of suicidality in adolescents with ADHD can serve as the basis for developing prevention and intervention programs for this population. Studies have demonstrated that core ADHD symptoms (Taylor, Boden, & Rucklidge, 2014) and shared genetic factors (Ljung et al., 2014) increased the risk of suicide. Psychiatric comorbidity, especially depressive disorder, dysthymic disorder, and substance use disorders have been also proposed as increasing the risk of suicide in people with ADHD (Balazs et al., 2014; Taylor et al., 2014). Other risk factors proposed have included coping styles (Taylor et al., 2014) and medications, such as atomoxetine and methylphenidate (Bushe & Savill, 2013).

Thus far, no studies have examined the roles of peer and family impacts on suicidal intent among adolescents with ADHD. Adolescent development is the result of multi-systematic interactions (Lerner & Castellino, 2002); thus, the association between suicidal intent and peer and family factors in adolescents with ADHD requires further examination. Adolescents who have dysfunctional family or poor peer relationships are likely to have suicidal ideation (Lee, Namkoong, Choi, & Park, 2014). Compared with those without ADHD, adolescents with ADHD had more parent–adolescent conflict (Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001). Research has also suggested that bullying perpetrations and victimization are indicators of an increased risk for suicide ideation and self-injurious behaviors (Geel, Vedder, & Tanilon, 2014; Winsper, Lereya, Zanarini, & Wolke, 2012). However, no study has examined the association between bullying involvement and suicide in adolescents with ADHD. These concerns warrant further study of the psychosocial factors of suicidality among adolescents with ADHD to form the basis of prevention and intervention.

Reinforcement sensitivity is another factor of which the association with suicidal intent in adolescents with ADHD requires examination. According to Gray's reinforcement sensitivity theory (Gray & McNaughton, 2003), the behavioral inhibition system (BIS) represents sensitivity to punishment, and the behavioral approach system (BAS) represents sensitivity to reward (Corr, 2004). Through a review study, Tripp and Wickens (2012) found that ADHD has an effect on reinforcement evaluated according to cognitive task performance and psychophysiological responsiveness. However, further research is necessary to determine whether sensitivity to reward and punishment are significant correlates of suicidal intent in adolescents with ADHD.

The aim of this study was to examine the prevalence rates of suicidal intent and its correlations with individual (demographic characteristics, reinforcement sensitivity, and self-esteem), family (parental occupational, socioeconomic status, and satisfaction with family relationships), peer (bullying involvement), ADHD characteristics (symptom severities, subtypes, and medication), and psychiatric comorbidity (depression, anxiety, Internet addiction, oppositional defiant disorder/conduct disorder, autism spectrum disorder, and tic disorders) among adolescents diagnosed with ADHD. We hypothesized that there are individual, family, peer, ADHD characteristic, and psychiatric comorbidity correlates with suicidality among adolescents diagnosed with ADHD.

## 2. Methods

### 2.1. Participants

The participants were recruited from the child and adolescent psychiatric outpatient clinics of two medical centers in Kaohsiung, Taiwan. Adolescents aged 11–18 years and diagnosed with ADHD were consecutively invited to participate in this study between November 2012 and November 2013. Four child psychiatrists conducted diagnostic interviews with adolescents and their parents to make the diagnosis of ADHD according to the diagnostic criteria in the *Diagnostic and Statistical Manual of Mental Disorders-IV Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000). The parents provided adolescents' past history and current ADHD symptoms rated on the abridged Chinese version of the Swanson, Nolan, and Pelham Version IV Scale (SNAP-IV-Chinese; Gau et al., 2008; Swanson et al., 2001). The adolescents' behaviors were also observed in the consulting room. Teachers' reports for adolescents' current ADHD symptoms on the SNAP-IV-Chinese were also collected to clarify the diagnosis. Adolescents who exhibited intellectual disability (full-scale intelligence quotient determined by the Wechsler Intelligence Scale for Children, Fourth Edition, Chinese version below 70), schizophrenia, bipolar disorder, difficulty in communicating, or any cognitive deficits that prevented the children and

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