

Psychiatry

## Predictors of Suicide Behavior in Adolescents with Depression

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DOI: <https://doi.org/10.15354/si.23.re406>

Funding: No funding source declared.

COI: The authors declare no competing interest.

The prevalence of teenage suicide has been progressively rising in recent years, posing a significant public health concern that jeopardizes the physical and psychological well-being of adolescents, and potentially their survival. Adolescents who experience depression are at an elevated risk for suicidal behavior. The present study provides a comprehensive overview of the distinct psychological, familial, and socio-environmental factors that contribute to suicidal tendencies among adolescents diagnosed with depression. The aim of this research is to establish a sound empirical foundation for the development of effective strategies to prevent adolescent suicide behavior.

**Keywords:** Depression; Suicide; Mental Health; Adolescents; Predictors

Science Insights, 2023 May 30; Vol. 42, No. 5, pp.935-942.

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**S**UICIDAL behavior pertains to the deliberate and voluntary actions of individuals who employ various methods to terminate their own lives. Accordingly, in the year of 2019, the worldwide age-standardized suicide rate was recorded at 9 per 100,000 individuals, resulting in the unfortunate demise of over 700,000 individuals due to suicide (1). The phenomenon of suicide typically initiates during the period of adolescence and experiences a swift escalation, culminating in a zenith between the ages of 15 and 24. As per the 2020 report by the World Health Organization (WHO), suicide ranks as the third most prevalent cause of mortality in the age group of 15-19 years (2). The frequency of adolescent suicide has increased in recent years. The act of suicide poses a grave threat to the well-being and vitality of individuals and can result in significant harm to families and communities at large. As a result, it has emerged as a pressing public health concern on a global

scale. A categorization of suicide behavior was suggested that based on the objective consequences and actions of the subject, as well as the intensity of the suicide target's willingness to die, as thus, suicide includes five distinct categories: suicide ideation, suicide plan, suicide preparation, suicide attempt, and suicide death (3).

The gravest outcome of depressive disorder is suicide, with a lifetime probability of 2%-12% of patients with depressive disorder experiencing suicide or death, which is 20 times higher than the general population (4). This underscores the severity of the condition. According to a meta-analysis conducted on psychiatric patients in their adolescent years, the mental disorder that exhibited the strongest correlation with suicide attempts was depressive disorder (5). An online survey conducted in South Korea found that there exists a positive correlation between the prevalence of suicidal behavior and the

severity of depression among adolescents aged 12-18 years (6). During adolescence, individuals undergo a crucial period of accelerated physical and cognitive growth, rendering them particularly vulnerable to the impact of social and psychological stimuli. This paper presents a comprehensive review of the current research on the social and psychological factors that influence suicidal behavior in adolescents who suffer from depression.

## Personal Psychological Factors

### Resilience

The concept of psychological resilience pertains to the ability of an individual to surmount challenges in the face of unfavorable circumstances, activate their inherent capabilities, consolidate both internal and external resources, and ultimately attain a favorable outcome (7). The current body of literature concerning the portrayal or measurement of psychological resilience primarily focuses on individual personality traits or skills, while failing to sufficiently recognize the interactive interplay between individuals and difficult situations. Research has indicated that resilience has the potential to enhance an individual's ability to manage negative emotions when confronted with challenging circumstances (8). Moreover, it can serve as an intrinsic protective mechanism to regulate suicidal ideation and depression (9). Adolescents with suicidal ideation exhibited lower scores in both the overall psychological resilience score and the scores of the four dimensions, namely, ability, tolerance of negative emotions, acceptance of change, and control, as compared to those without suicidal ideation (10). A longitudinal study examined the four dimensions of resilience, namely problem-solving and cognitive maturity, hope and optimism, empathy and interpersonal communication, and emotional regulation, and found that there exists a protective effect on the emergence of suicide plans among junior high school students when considering the relationship between problem-solving and cognitive maturity (11). Previous studies on individuals diagnosed with depressive disorders have demonstrated that resilience can effectively facilitate emotional expression and prevent suicidal tendencies (12, 13). Adolescents from both clinical and non-clinical backgrounds were followed up and found that the Adolescent Resilience Scale total score was a significant predictor of suicidal behavior, with personal ability and family cohesion being the primary predictors (14). Despite variations in measurement techniques and assessment criteria for resilience across studies, some emphasize the role of both internal and external protective factors, while others prioritize individual internal attributes. Nevertheless, the majority of research posits that resilience constitutes a protective factor against adolescent suicide.

### Personality

Personality traits are a fundamental factor that influences suicidal behavior. These traits include impulsivity, paranoia, aggression, and extroversion. Among these traits, impulsiveness has been found to have a more substantial impact on suicidal behavior. Impulsivity is a significant predictor of suicidal behavior among adolescents (15). Individuals exhibiting elevated levels of impulsivity tend to exhibit a deficit in their capacity for

executive control (16). Individuals experiencing unexpected external stimuli often struggle to regulate their emotions and behaviors, potentially resulting in suicidal tendencies (17). Adolescents who exhibited suicidal tendencies had higher scores in impulsiveness, motor impulsivity, and unplanned impulsiveness compared to those who did not exhibit suicidal tendencies (18). Additionally, adolescents who had attempted suicide also displayed elevated scores in these areas. The individual is typified by prompt responses, a disregard for forethought in behavior, and a keen desire to expeditiously fulfill desires. Furthermore, certain research endeavors propose that impulsivity serves as a mediator or moderator in the association between various factors and suicidal tendencies (19). Individuals with more severe depressive symptoms and higher levels of impulsivity are more likely to engage in suicidal behavior (20). Patients diagnosed with depressive disorders who attempted suicide exhibited high impulsivity (21). Furthermore, the relationship between early traumatic experiences and suicidal behavior was partially mediated by impulsivity (22). Nevertheless, divergent findings have been reported by certain scholarly investigations. Khemakhem and colleagues discovered that adolescents diagnosed with depressive disorders exhibited greater levels of attention impulsivity, motor impulsivity, and unplanned impulsivity in comparison to their healthy counterparts (23). Therefore, a correlation could be established between impulsivity and other determinants of suicide, particularly in depressed adolescents. However, the interplay between variables becomes more intricate in this population, necessitating further investigation to ascertain whether impulsivity constitutes an autonomous determinant of suicide.

### Cognitive Function

Cognition pertains to the cognitive processes involved in the acquisition, utilization, and retention of information, encompassing functions such as memory, attention, executive function, sensory motor, and social cognition (24). Studies indicate a potential correlation between cognitive impairment, specifically in memory, execution, attention, and movement, and suicidal behavior in individuals with depressive disorders. The cognitive processing bias of overgeneralization of autobiographical memory is detrimental, and that it only impacts suicidal ideation in individuals with depressive disorders, rather than in those who are healthy (25). The presence of negative emotional states, exposure to suicide-related information, activation of suicidal schemas, and heightened suicidal probability are significant factors. After employed the Brief Cognitive Assessment Tool for Schizophrenia (B-CATS) to evaluate the cognitive capabilities of individuals diagnosed with depressive disorder, a negative correlation between the severity of suicidal ideation and executive function, motor speed function, and cognitive comprehensive score (26). The cognitive function mechanism of suicidal behavior among severely depressed high school, and the cognitive function was evaluated through implementation of the Wisconsin Card Sorting Test (WCST), and found that the executive function impairment may be associated with suicidal behavior induced by depression (27). Simultaneously, studies have indicated that cognitive factors could potentially serve as autonomous risk factors for suicide. Individuals who attempted suicide and had depressive disorders exhibited inferior performance in

attention, memory, and working memory domains compared to those without suicidal behavior (28). This difference was also observed in individuals with the mildest form of depression, indicating that cognitive impairment may serve as a distinctive feature of suicidal behavior that is not dependent on depressive symptoms. However, further research is required to determine which cognitive factors play a more significant role in this association.

## Life Events

Adverse life occurrences refer to a collection of both internal and external stimuli that individuals encounter within their work, academic, familial, interpersonal, and social support systems. Duprey et al. discovered that non-clinical adolescents who experience suicidal ideation in high school tend to have encountered a range of stressful life events, including changes, substance abuse, sexuality, responsibility, loss, and legal conflict (29). Stressful life events, such as parental death, witnessing violence, suffering serious injury, being expelled from school, being injured in a fight, contracting a sexually transmitted disease, and losing a relationship, were found to heighten suicidal tendencies in adolescents (30, 31). This was attributed, in part, to increased psychological distress and a diminished perception of social support. A positive correlation exists between the level of recent negative life events, such as interpersonal relationship issues, academic pressure, punishment, loss of loved ones and property, health problems, and adjustment difficulties, and the incidence of suicidal ideation and suicide attempts among middle school students (32). The study further suggested that the risk of suicidal ideation and suicide attempts is significantly higher when individuals are exposed to both childhood abuse and recent life events, as opposed to exposure to either factor alone. Studies have elucidated the mechanism by which life events contribute to suicidal tendencies among adolescents with depressive disorders. Individuals in the adolescent stage who suffer from depressive disorders tend to exhibit emotional sensitivity and fragility (33). They often encounter challenges in expressing their emotional experiences and inner feelings, and when adverse life events transpire, they exhibit a deficiency. Adolescents diagnosed with depressive disorder who possess a support system that adeptly manages stress are at an increased likelihood of harboring suicidal ideation (34). Furthermore, the frequency of negative life events encountered by these individuals is positively correlated with the intensity of their suicidal ideation. Drawing from the aforementioned findings, the majority of research has determined that adverse life events are associated with increased risk of suicide among adolescents. However, the categorization of life events lacks complete consistency, thereby necessitating further investigation into the specific life events that exert a greater impact on suicidal behavior.

## Family Factors

### Childhood Abuse

The term “childhood maltreatment” encompasses verbal or physical actions that have the potential to cause harm to individuals by their caregivers prior to reaching adulthood. Such actions may include emotional abuse, physical abuse, sexual

abuse, emotional neglect, and physical neglect. In general, the various types of abuse exert an influence on suicidal behavior among adolescents, albeit to differing extents. Different types of childhood abuse significantly influenced the suicidal ideation and suicide attempts of junior high school students (35). Specifically, emotional neglect and emotional abuse had a more pronounced effect on suicidal ideation, while sexual abuse and physical neglect had a greater impact on suicide attempts. Childhood neglect had a significant impact on suicidal ideation in adolescents, regardless of other types of abuse (36). Furthermore, the findings indicated that depressive symptoms played a mediating role in the relationship between childhood neglect and suicidal ideation. The research posits that unfulfilled childhood needs may result in psychological impairments, hinder the capacity to form close relationships and receive emotional assistance from others, and limit the ability to cope with adversity and obstacles during adolescence, thereby increasing the likelihood of suicidal ideation. Childhood experiences of sexual and physical abuse by parents were found to elevate the likelihood of suicide in individuals with depressive disorders, which posits that this may be attributed to the impact of early life stressors on the development of the physiological stress response system, leading to heightened stress levels, reduced efficacy of antidepressant treatment, and lower subjective quality of life, all of which contribute to an increased risk of suicide (37). A positive correlation was found between the childhood abuse and suicidal ideation and suicide risk among adolescents with depression, indicating that emotional abuse, sexual abuse, and physical neglect were found to be particularly significant in this regard (38). Subsequent research is required to ascertain the effects of diverse forms of maltreatment on suicide and its underlying mechanisms in the forthcoming times.

### Family Support

Family support is a form of social support that encompasses both psychological and material resources. This type of support typically includes various forms of assistance, such as instrumental, emotional, informational, and evaluative support. Family support, depressive symptoms, and suicidal behavior are closely related, and different studies have different conclusions on the relationship between the three. Among non-clinical adolescents, suicidal ideation is influenced by social support, including family support, through the mechanism of depressive symptoms (39). Social support completely mediates the relationship between depressive symptoms and suicidal ideation. Rubio and colleagues noted that the association between suicidal ideation and depressive symptoms in adolescents was moderated by family support (40). Scardera et al. demonstrated that family support exhibited a negative correlation with suicidal ideation in young patients diagnosed with depressive disorders, after controlling for depressive symptoms (41). Macalli et al. conducted a study on adolescents who presented with clinical psychobehavioral issues, and the study revealed that low perceived parental support was a significant predictor of suicide attempts, even after accounting for a depressive disorder diagnosis (42). Additionally, studies found that family environment characterized by low warmth and high conflict may influence adolescents’ perception of parental support (43, 44).

## Family Function

Family function denotes a sequence of duties that a household is required to fulfill to satisfy the physical, psychological, and cognitive requirements of its members. Adams and coworkers discovered a correlation between suicidal behavior and adolescent family function, with depressive symptoms serving as the mediating factors between the two (45). The decline in emotions such as empathy, compassion, and affection can result in suicidal tendencies. The concept of family function encompasses various dimensions. The emotional factor was one of seven components of family function, which also included communication, role, emotional response, emotional involvement, behavior control, and problem solving (46). Emotional intervention and behavioral control of family function may be significant factors influencing suicidal behavior in patients with depression, as the scores of these factors were lower in individuals with suicidal behavior compared to those without (47). Studies demonstrated that the emotional response factor score was significantly higher in the group of children and adolescents with depression and suicide attempts compared to the group with depression but without suicide attempts (48, 49). In instances where children and adolescents with depression are faced with adverse life events, they may encounter challenges in accessing adequate support from their family members, thereby increasing their likelihood of resorting to suicide as a means of coping with their circumstances. The aforementioned studies indicate that the suicide behavior of adolescents with depression is influenced by family functions. However, further investigation is required to determine which specific functions hold greater significance.

## School and Social Factors

The influence of peer interactions on the mental health of adolescents is of significant importance, given that a majority of them reside on campus and maintain proximal relationships with their peers. Bullying in school settings is a salient issue that garners significant attention. School bullying is a distinct risk factor for suicidal ideation among adolescents (50, 51). The intensity of this relationship is influenced by depression, and it is most pronounced among adolescents who are both victims and perpetrators of bullying (52). The phenomenon of school bullying has been found to elicit negative emotional responses in adolescents, including feelings of frustration and self-blame, which have been linked to suicidal ideation and behavior. A positive correlation was found between peer aggression and suicidal ideation among adolescents (53). Prolonged exposure to peer aggression among adolescents can result in feelings of frustration and shame associated with being victimized, ultimately contributing to suicidal ideation (54). Cohen et al. have highlighted that suicidal ideation was independently linked with adolescent self-blame when confronted with peer bullying (55). The majority of studies have centered on non-clinical adolescent populations. However, those who have experienced school bullying tend to hold negative perceptions of themselves and their environment, which can ultimately result in a sense of alienation and disconnection (56, 57). The presence of negative affective states, such as depression and self-encumbrance, has been found to be associated with suicidal ideation. Moreover, research suggests that the severity of school bullying experienced by adoles-

cents with depressive symptoms is positively correlated with the intensity of their suicidal ideation (58, 59). The aforementioned analysis reveals that the primary result of the extant investigation pertains to suicidal ideation. Furthermore, a discernible correlation exists between bullying on campus and suicidal conduct, which may be influenced by a range of adverse affective states (60). According to Stewart et al., in the case of adolescents diagnosed with depressive disorder, there exists a correlation between peer public aggression and reputation aggression with a higher frequency of suicide attempts (61).

Due to the complexity of conducting quantitative research on variables such as macroeconomics, politics, culture, religion, media, and community atmosphere, there is a scarcity of available literature on the subject matter. There exists a correlation between social media exposure and adolescent suicidal ideation (62, 63). Specifically, unconscious social media exposure has a positive correlation with adolescent suicidal ideation (64). An interesting finding showed that a negative correlation between Confucian values and suicidal ideation in male youth suffering from depression, while a positive correlation was observed in female youth (65).

## Conclusion

There has been an increasing focus on the psychosocial determinants of adolescent suicide in the context of depression. The manifestation of suicidal tendencies among adolescents diagnosed with depression is attributed to the confluence of multiple factors. The prevalent explanation for the mechanism of factors associated with suicidal behavior is the “diathesis stress or differential susceptibility” model (66). Prior research has predominantly examined the influence of external stressors on suicide in individuals with depression, while insufficient attention has been given to internal factors, specifically susceptibility. Furthermore, it should be noted that the scope of suicidal behavior encompasses a wider range of phenomena, such as suicidal ideation, suicide attempts, and completed suicides. It is crucial to recognize that the factors contributing to each of these behaviors may differ, which may contain certain limitations in the findings. Studies on adolescent suicide among those with depression have primarily concentrated on identifying risk factors. However, with the emergence of positive psychology, there has been a growing interest in exploring protective factors and positive interventions. There is a growing need for research to prioritize the examination of protective factors associated with suicide, with the aim of scientifically investigating effective interventions that can mitigate the incidence of adolescent suicide.

Potential avenues for future research on the topic of suicide among adolescents with depressive disorder may include the following directions: (i) The assessment of suicide risk in adolescents with depressive disorder can be accomplished by considering a combination of multiple risk factors that encompass both psychosocial and biological aspects. (ii) Factors related to suicide that are normative. The utilization of a clinical definition is imperative in order to enable the comparison of various studies. (iii) Undertake longitudinal research by means of extended follow-up to investigate the correlation between suicide and psychosocial factors in adolescents who suffer from depression. (iv) Protective factors encompass a range of attrib-

utes including personality traits, cognitive characteristics, behavioral patterns, and social environment that serve to mitigate

the likelihood of negative outcomes. ■

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Received: March 15, 2023

Revised: March 28, 2023

Accepted: April 02, 2023

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