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Suicide in Children and Adolescents

Çocuk ve Ergenlerde Özkıyım

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ÖZET

Her yıl tüm dünyada yaklaşık bir milyon insan özkıyım nedeniyle hayatını kaybetmekte ve bu dünyadaki tüm ölümlerin %1.5'ini oluşturmaktadır. Özkıyım genel olarak erişkinlerde ölüm nedenleri arasında 10. sırada yer alırken 10-24 yaş arasındaki çocuk ve ergenlerde ölüm nedenleri arasında üçüncü sıradadır. İlk özkıyım girişiminde hayatta kalanlar arasında daha sonra özkıyımı tamamlayanların karakteristikleri hakkındaki bilgi azdır. Muhtemel bir özkıyım girişimini kestirmeye yarayabilecek risk faktörlerini tanımak çok önemlidir. Bir kez özkıyım girişiminde bulunan birisinin tekrar özkıyım girişiminde bulunma riski artmıştır. Özkıyım davranışı olan çoğu çocuk ve ergen başta duygudurum bozukluğu olmak üzere en azından bir psikiyatrik bozukluğa sahiptir. Risk faktörlerinin araştırılması, özkıyımın aileler ve toplum üzerindeki etkisi, gelecekteki araştırmalara tavsiyeler bu gözden geçirmenin amaçları arasında bulunmaktadır.

Anahtar Sözcükler: Özkıyım, çocuk, ergen

ABSTRACT

Every year, almost one million people commit suicide worldwide which is approximately 1.5% of all deaths. Thus suicide is 10th leading cause of death globally and the third leading cause of death among children and adolescents ages 10 to 24 years. Little is known about the characteristics of successive attempts among individuals who survive the first suicide attempt. It is very important to identify risk factors that can be predictive of future suicide attempts. Subjects with one suicide attempt had an increased risk for a future attempt. Most children and adolescents with suicidal behavior have at least one psychiatric disorder with mood disorders being the most common. A thorough examination of risk factors, the impact of suicidal behavior on patients and on their families and communities, and recommended directions for future research are main focus of this review.

Keywords: Suicide, children, adolescent

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Suicide is a major public health problem. It accounts for a global mortality rate of 16 per 100,000 adults, and comprises 1.8% of the global burden of disease.[1] Suicidality is also present in children and adolescents and has negative effects on their families and peers.[2,3] Studies of suicidality in children and adolescents have increased every year. Most children with suicidal behavior have at least one psychiatric disorder with mood disorders being the most common.[4-7] As such, the goal of this paper is to review the literature on suicidality in children and adolescents.

Suicidality in Children and Adolescents

Suicidal Ideation and Attempt

The term suicidal ideation is often used to refer to having the intent to commit suicide, including planning how it will be done. Suicide attempt in other words suicidal behavior is any action that could cause a person to die. In 2009, 13.8% of United States of America (USA) high school students reported that they had seriously considered attempting suicide during the 12 months preceding the survey. In the study, 6.3% of students reported that they had actually attempted suicide one or more times during the same period.[8] Arria and colleagues examined suicidal ideation among college students.[9] Face-to-face interviews were conducted with 1.249 freshmen, 6% of whom had current suicidal ideation. Forty percent of these individuals with suicidal ideation have showed high level of depressive symptoms according to Beck Depression Inventory scores. In students with both depressive symptoms and suicidal ideation, there were associations with low social support, affective dysregulation, and alcohol overuse. The results indicate that, suicide ideation occurs frequently in the absence of clinically significant depressive symptoms among first-year college students.

Completed Suicide

In 2009, the age-adjusted suicide rate those 10–19 years old in the USA was 4.50 per 100 000.[10] In 2009 completed suicide was the third leading cause of death among children and adolescents aged between 10 to 24 years and the tenth leading cause of death for people (of all races, ages, and both sexes) in the USA.[11] The top three methods used in suicides of young people include firearm (46%), suffocation (37%), and poisoning (8%).[12]

Even worse in the 27 European Union countries, suicide is second leading cause of death among young people aged between 15–19 years old.[13] Every

year, almost one million people commit suicide worldwide which comprises approximately 1.5% of all deaths. Thus suicide is the tenth leading cause of death globally. Every 40 seconds, there is a completed suicide.[14]

In 2011, crude suicide rate was 3.62 per 100 000 in Turkey and the number of completed suicide was 2677. In the same year approximately 3.85% (n=103) of those who completed suicide were younger than 15 year of age and 23.16% (n=620) was between 15-24 years old. The most common-suicide method was hanging among all age groups.[15] Asirdizer et al. reported that suicide rates in Turkey are lowest in Europe and also lower than many countries in the world but however there is a increasing trend in the suicide rates.[16]

Suicide before the age of 15 is uncommon. Most of suicides among children and adolescents occur late in adolescence period. According to published data from the Centers for Disease Control and Prevention (CDC) in 2009, the suicide rate for children ages 10 to 14 was 1.3 per 100,000, adolescents ages 15 to 19 was 7.75, per 100,000, and for young adults ages 20 to 24 was 12.5 per 100,000.

We concluded from these results that as youngsters grow older, the likelihood of completing suicide increases.[10] Increased suicide risk from childhood to adolescence might be related with higher incidence of psychopathology including mood disorder and substance abuse.[17]

Risk Factors for Suicide

Prior History of Suicide Attempt

In the survey conducted among 13.000 high school adolescents by CDC, subjects with one suicide attempt were found to have 15-fold increased risk for a later attempt.[12] Similarly Valtonen and colleagues conducted an 18-month prospective study on 176 patients with bipolar disorder (ages 18-59).[18] Those who had attempted suicide prior to the follow up study had a 4-fold greater subsequent suicide risk compared to those versus the group who had not attempted suicide.

Comorbidity

Several studies have suggested that patients with psychiatric disorders have increased suicidal risk. Shaffer et al. did a case-control, psychological autopsy study on 120 of 170 consecutive subjects who were under 20 years of age and had committed suicide.[17] Sixty percent of the suicide completers had at

least one psychiatric disorder, which were most commonly depressive disorders. Gould and colleagues investigated the relationship between suicidal ideation, suicide attempts, and psychiatric disorders among 1,285 randomly selected children and adolescents aged 9 to 17 years.[4] Of those, 42 had attempted suicide and 67 had suicidal ideation only. Mood, anxiety, and substance abuse disorders were associated with an increased risk of suicide attempts. Furthermore the rates of psychiatric disorders were the same for attempters and completers. The authors concluded both suicide completers and attempters had more psychiatric disorders than non-attempters.

Miranda and colleagues assessed 228 high school students who reported lifetime suicidal ideation or behavior and had a mood, anxiety, or substance use disorder, and then followed them up 4-6 years later.[5] 71% of multiple attempters were diagnosed with a psychiatric disorder initially and 69% were diagnosed with a psychiatric disorder 4-6 years later. 39% of the single attempters were diagnosed with a psychiatric disorder at baseline and 36% were diagnosed with a psychiatric disorder 4-6 years later. Goldston et al. followed-up 180 patients (12-19 year old) for up to 13 years who were consecutive discharges from an adolescent psychiatric inpatient unit.[6] Most comorbid psychiatric disorders (major depressive disorder, dysthymic disorder, generalized anxiety disorder, panic disorder, attention-deficit/hyperactivity disorder, conduct disorder, and substance use disorder) were related to an increased risk of either first-time or repetitive suicide attempts. Çelik et al. evaluated 64 youth who attempted suicide and the found that mood disorder was more common in females and conduct disorder was more common in males.[19]

Substance Use

A number of studies have shown that suicidal behavior has been highly associated with substance use in children and adolescents.[4-6,13,20,21] In youth, suicide tendency, suicidal ideation and suicide attempts are predicted best by early onset of alcohol consumption, marihuana use, tobacco use, other substance use and alcohol and/or substance.[21-24] Early initiation of problem behaviors such as alcohol drinking, cigarette smoking and sexual intercourse, particularly among preteens, predicted later suicidal ideation and suicide attempts in both sexes.[25] The misuse of pharmaceutical drugs, specifically in this case tranquillizers or sedatives, seems to have the strongest association with self-reported suicide attempts. Tobacco use also strongly associated with self-reported suicide attempts. The researchers hypothesize

that preventing tobacco use might exert a protective influence not only on progressing to more hazardous illegal drug use but also on suicide attempts. They concluded that the odds of suicide attempt approximately doubles for every additional substance used.[13]

Psychosocial Factors

Psychosocial factors were associated with an increased risk of suicidal behavior. Miranda and colleagues studied 228 teenagers (ages 12-18, mean 15.5±1.3) to compare multiple suicide attempters and single attempters.[5] Multiple attempters expressed a wish to die more often (53% to 23%), sought intervention less (44% to 76%), regretted recovery more often (26% to 7%), and were much more likely to make a future attempt than single attempters.

Gould and colleagues did a case-control psychological autopsy of 120 of 170 suicides younger than 20 years-old and 47 community ages, sex, and ethnically matched control participants.[26] School problems, a family history of suicidal behavior, poor parent-child communication, and stressful life events were associated with an increased risk of completed suicide in children and adolescents. In high school students, Epstein et al. reported that drug use (e.g. recent smoking, drinking before 13 years of age), victimization (e.g. threatened at school, hit by girlfriend/boyfriend), risky sexual behavior (e.g. forced to have sex, did not use a condom), and poor/fair health or disability/health problems were significantly related with all three indicators of suicidality (suicide attempt consideration, suicide attempt plan, and suicide attempt).[27]

Liu et al. studied 223 young adults with a history of child-onset mood disorder and currently had a diagnosis of either major depressive disorder or bipolar disorder.[28] Controls were 112 young adults without a history of psychiatric disorders. Suicide attempters used more maladaptive response styles (i.e. rumination and dangerous activities such as drinking, drug use, or aggression), and less adaptive response styles (i.e. distraction and problem solving), to manage their depressive mood than non-attempters. Furthermore, both female and male suicide attempters scored on average significantly higher in four out of the five affective temperament scales which contained depressive components (i.e. depressive, cyclothymic, irritable, and anxious).

Akbaş and colleagues reported that compared to the non-suicidal adolescents with major depressive disorder, suicidal adolescents with major

depressive disorder exhibited higher anxious temperament scores.[29] Brent et al., [30] compared 67 adolescent suicide completers and 67 demographically matched living controls. Parent-child relationship problems increased the risk of adolescent suicide. In a community-based longitudinal study investigating 659 families and their children (mean offspring age=22), Johnson et al. found childhood parental divorce, stressful life events, and physical abuse were associated with increased likelihood of suicide attempts during late adolescence and early adulthood.[31] In a study of a birth cohort of more than 1,000 New Zealand children followed until the age of 18 years, Fergusson and colleagues reported a relationship between childhood sexual abuse and increased risk of suicide attempt.[32] Bebbington et al. examined a randomized cross-sectional survey of 8,570 British volunteers aged 16-74.[7] There was a strong association between sexual abuse and history of suicide attempts as well as suicidal intent in both genders, but more commonly among women. Brodsky and colleagues used a self-report and clinical interview of 507 offspring of 271 parent probands diagnosed with major depressive disorder. Childhood sexual abuse was found to be associated with major depression and suicidal behavior.[33]

Family History

A close relationship between family history of suicide and suicide attempts have been reported.[26,34-37] Brent et al. studied the relatives of 58 adolescent suicide probands and 55 demographically similar controls.[34] They found suicide attempts to be greater in the first-degree relatives of suicide victims compared with the relatives of controls, even after adjusting for differences in rates of proband and familial Axis I and II disorders. Another family study assessed 81 suicide attempters and 55 nonattempters and their offspring, 183 and 116 respectively. Offspring of attempters had a six-fold increased risk of suicide attempts relative to offspring of nonattempters.[35]

Kim et al. studied 247 relatives of 25 male suicide completers who were randomly selected from the general population of Montreal and 171 relatives of 25 matched comparison non-attempters subjects.[38] Suicidal behavior had a strong familial component and this effect was particularly higher in the relatives of suicide completers with cluster B personality disorders. Brodsky and colleagues suggested that transmission of suicide risk across generations was related to the familial transmission of sexual abuse and impulsivity.[33]

Diaconu and Turecki evaluated 474 psychiatric outpatient subjects with standardized interviews for Axis I and II psychopathology, history of suicidal behavior in subjects and their families, and measures of impulsive–aggressive behaviors (IAB).[36] They reported a three-fold increase in the frequency of suicidal behavior in families of individuals who attempted suicide compared to families of individuals who did not attempt suicide. A family loading of suicidal behavior was associated with higher proband impulsivity and history of aggressive behavior. Another family study, evaluated 718 first-degree relatives from 120 families. Relatives were in three groups: 296 relatives of 51 depressed probands who committed suicide (mean age 40.47±12.78 years), 185 relatives of 34 nonsuicidal depressed probands (mean age 39.61±10.36 years), and 237 relatives of 35 community comparison subjects (mean age 38.28 ±15.63 years). Psychopathology, suicidal behavior, and behavioral measures were determined via interviews. The authors stated familial aggregation of suicide was partly and significantly explained by transmission of cluster B traits such as impulsivity, hostility, and aggression.[37]

Biological Factors

Serotonergic system is the most extensively investigated biological factor of suicide. Asberg et al. found among 68 depressed patients those in the low 5-hydroxyindoleacetic acid (5-HIAA) mode (below 15 ng/ml) attempted suicide significantly more often than those in the high 5-HIAA mode, and they used more violent means.[39] Serotonin is released in the brain synapses, where it is then re-taken up into the presynaptic neuron by the serotonin transporter (5-HTT). Thus 5-HTT has an important role in serotonergic function [40]. Arango and colleagues found the concentration of serotonin and its metabolites was decreased in the brain in suicide completers. In addition, cerebrospinal fluid and the number of serotonin receptor in the prefrontal cortex was reduced in suicide completers.[41]

Serotonin activity is influenced by genetic factors.[42] Neves and colleagues studied 198 adult bipolar I and II consecutively admitted inpatients and outpatients in a bipolar disorder clinic and 103 healthy controls.[43] They reported that 26.77% of subjects had a lifetime history of non-violent suicide attempts and 16.67% of subjects had a lifetime history of violent suicide attempts respectively. There were a higher proportion of S-allele's carrier patients in the group of violent suicide attempters than in the non-violent suicide attempter group or in the healthy control group. The

authors concluded serotonin polymorphism in the promoter region of the 5-HTT gene was strongly associated with violent suicidal behavior in bipolar patients.

Wang et al. investigated the association between serotonin transporters, receptor genes, and suicidal ideation in 420 patients with major depressive disorder (mean age 31.55±12.58 years).[44] The serotonin 1B receptor was associated with suicidal ideation in patients with major depression. In an association analysis of 154 suicide completers and 289 control subjects, Perroud et al. found tryptophan hydroxylase-2 gene expression levels to be increased in ventral prefrontal cortex of suicide victims.[45]

Impact of Suicidal Behavior

Impact on Family Members

Every year thousands of youths die by suicide and they leave bereaved relatives and peers.[10,13,15] Bereavement refers to the loss of a loved one by death and grief refers to the distress resulting from bereavement. Prigerson and colleagues reported that 6% of bereaved extended family members develop complicated grief (i.e. grief reactions which show a marked deviation from the normal pattern and which are associated with maladjustment and psychiatric problems).[46]

Complicated grief is associated with suicidal ideation, long-term mental and physical health impairments, adverse health behaviors, and long-term dysfunction. During the period immediately after a death by suicide, grieving family members or friends have difficulty understanding what has happened and why it has happened.[3,47] Survivors of suicide victims self-reproach by thinking they were inadequate parents and that they failed to anticipate the tragedy. They search for the motive behind the suicide and feel a sense of helplessness.[3] Survivors may be at risk for a lack of social support because community members at times feel unsure of how to treat individuals bereaved due to suicide and stigmatization of suicide.[48]

Impact on Peers and Friends

Peers and friends of suicide victims have an increased risk of developing post-traumatic stress disorder, major depressive disorder in the 6 months after exposure (risk is 28 times higher within 1 month of the suicide in exposed compared to unexposed youth) and grief reactions including symptoms of yearning, crying, numbness, preoccupation with the deceased, functional

impairment and poor adjustment to the loss.[49-51] Children and adolescents whose friends have attempted or completed suicide have an increased risk of suicidal ideation and suicide attempts, and an increased risk of maladaptive coping strategies.[52,53]

Gould and colleagues reported on a survey of 2,419 high school students with or without first-hand experience with a peer who has suicidal ideation.[53] Those with first-hand experience scored significantly higher on a maladaptive coping strategies factor than those without first-hand experience. Examples of maladaptive coping strategies factor items were: "People should be able to handle their own problems without outside help", "If you are depressed, it is a good idea to keep these feelings to yourself", "Drugs and alcohol are a good way to help someone stop feeling depressed", "Suicide as a possible solution to problems". Therefore, experience with a suicidal peer compromised students' ability to choose effective coping strategies to mitigate further harm. Children and adolescents with exposure to suicide may be at risk for psychiatric problems including suicide. These people may urgently need psychosocial help to avoid any complications.

Suicide Prevention Strategies

School-Based Prevention Programs

There are effective methods for school staff to recognize students who are at increased suicidal risk. Any sudden or dramatic change affecting a child's or adolescent's performance, attendance, or behavior should be considered seriously.[54] A lack of interest in usual activities, an overall decline in grades, a decrease in effort and attention, misconduct in the classroom, unexplained or repeated absences or truancy, excessive tobacco smoking, drinking or illicit drug use, incidents leading to police involvement, and/or student violence should alert school staff. [55] Recognizing students who are at increased suicidal risk should lead to offers of psychological support if needed and the students should be referred to a mental health professional for treatment as needed.

Besides school staffs' observations, screening for suicide risk in the school can help in recognizing students who have a higher risk for suicidality. Scott and colleagues assessed 1,729 students (ages 11-19, mean age 15.4 ± 1.4) with the Columbia Suicide Screen (CSS).[56] They found that 489 of the 1729 students screened had positive results. The clinical status of 641 students (73% of those who had screened positive (n=356) and 23% of those who had

screened negative (n=285) were assessed with modules from the Diagnostic Interview Schedule for Children (DISC). School administrative and clinical professionals most likely to be aware of students' emotional and behavioral problems were providers of clinical information for the students. They were unaware of individual students screening and diagnostic statuses. Approximately 34% of students with significant mental health problems were identified only through screening, 13.0% were identified only by school professionals, 34.9% were identified both through screening and by school professionals, and 18.3% were identified neither through screening nor by school professionals. The authors recommended that school-based suicide screening for high school students be implemented to identify adolescents not identified by school professionals. However, nearly 20% of students with mental health problems were missed by both screening (via CSS) and school professionals. Although one-fifth of students with mental health problems were not accounted for, school staff observation and screening together can increase the percentage of students detected.

Community-Based Prevention Programs

Firearms in the home are a significant risk factor for suicide in youths [57]. In 2000, 16,883 people committed suicide with a firearm. The most used method of suicide was firearm in USA.[12] Restriction of access to lethal means such as firearms is an efficient method for reducing suicide rates in youths.

The media should be responsible about reporting suicide. They should avoid factors that induce suicide contagion by avoiding front page coverage and sensationalizing. They should provide information on treatment resources. There is established support for this concept of responsible media coverage concerning suicide. In a 4-year follow-up period following implementation of media education in Austria, Etzersdorfer and Sonneck found that suicide rates declined by 20%. Similar programs elsewhere may provide similar benefit.[58]

Some professional support services including hotlines can help someone who is planning a suicide attempt. Gould et al. executed a crisis hotline study in 1,085 adult crisis hotline callers to eight centers in the USA.[59] The researchers reported that intent to die, hopelessness, and psychological pain had decreased significantly after the first phone call. A 3-week follow-up study was executed with 35% (n=380) of the 1,085 hotline callers (other callers had

refused re-contact, were not asked for follow-up [counselors were reluctant to ask], refused at follow-up or gave inaccurate contact information). At follow-up each variable had continued to decrease. These findings suggested that hotlines were effective in reducing intent to die, hopelessness, and psychological pain in suicidal callers. However, teenagers have been shown to believe that hotlines are not helpful. Five-hundred and nineteen adolescents in 9th through 12th grades in high schools in New York were recruited in a study on attitudes and familiarity with suicide about hotlines. Few students had used hotlines (2.1%). Overall, students reported negative attitudes for hotlines. The objections to hotlines were strongest among students most in need of help. The most common reasons of the students not wanting to call a hotline included: they think the problem is not serious; and, they want to solve the problem by themselves.[60] Therefore, we can be conclude that crisis hotlines are helpful for suicide prevention in adults but are not perceived as helpful by high school adolescents.

Health Care-Based Prevention Programs

Education/training programs for primary care physicians and pediatricians might also be useful for suicide prevention. Seventy-two percent of 600 family physicians and pediatricians in North Carolina had prescribed an SSRI for a child or adolescent patient. However, only 8% said they had received adequate training in the treatment of childhood depression.[61] This line of investigation demonstrates that, in spite of family physicians and pediatricians not receiving enough education, they inspected and treated children with psychiatric disorders such as depression (presence of which has a significant role in rates of suicide). If family physicians and pediatricians receive more education about psychiatric disorders, we expect that they can better help patients with psychiatric disorders.

A definitive diagnosis is the most important first step for the effective treatment of an illness. Olfson and colleagues showed that, in reviewing national trends from 1990 to 2000 for youth (5-20 years of age) with intentional self-inflicted injuries, annual hospitalization rates had decreased from 49.1 to 44.9 per 100,000 and that the mean length of stay has decreased from 3.6 days to 2.7 days.[62] They also reported that discharge diagnoses increased significantly for depressive disorder (29.2% to 46.0%), bipolar disorder (1.3% to 8.2%), substance use disorder (5.4% to 10.7%); and decreased significantly for adjustment disorders (22.2% to 11.4%) and non-mental disord-

ers (31.9% to 13.6%). They concluded that the focus of youth inpatient care has narrowed to those who have severe psychiatric disorders.

Not everyone has an equal chance for receiving mental healthcare. Health service access and mental health service availability are inversely correlated with youth suicide rates over time. If people who need psychiatric help and treatment have easier access to resources, then their suicide rates will decrease.[63]

In an evaluation of antidepressant prescription rates and youth suicide in the United States and the Netherlands, Gibbons and colleagues found, following the FDA's warning that an SSRI increases suicide risk in children and adolescents, increases in the suicide rate in both countries were associated with decreases in pediatric SSRI prescription rates of over 20%.[64] Similarly Katz et al. reported that the rate of antidepressant prescriptions and ambulatory visits for pediatric depression also decreased in Canada after the FDA warning whereas the pediatric suicide rate rose significantly.[65] After the FDA's warning clinicians and patients' families stood aloof from SSRI treatment. To aid suicide prevention efforts in children and adolescents with psychiatric disorders, psychopharmalogical agents and/or psychotherapeutic methods should be employed as needed.

Conclusion

Suicide is a major contributor to death rates in children and adolescents. Prior history of suicide attempt is also a very important criterion in the prediction of future suicide attempts. Past suicide attempts increased the risk for future suicidal behavior in adults, children and adolescents. Suicidal risk is comparatively increased in prior suicide attempters by as much as four-fold.

The presence of comorbid psychiatric disorders increases the risk of suicide in bipolar children and adolescents. Substance use is the most important comorbidity in the increase of suicide risk in adult and adolescents. There is robust evidence regarding the role of sexual abuse in children and adolescent suicide with bipolar disorder, particularly women. Relatives of suicide victims have an increased suicide risk even after adjusting for differences in rates of proband and familial Axis I and II disorders.[34] Offspring of attempters had a 6-fold increased risk of suicide attempts relative to offspring of non-attempters. Transmission of cluster B traits may have role in familial aggregation of suicide.[37] School problems, poor parent-child communication, stressful life events, parental divorce, stressful life events, physical abuse and

biological reasons are other factors that have a significant effect on suicide rates in children and adolescents.

Children and adolescents who die from suicide leave behind bereaved survivors. Bereaved family members run a risk for developing complicated grief, long-term dysfunction, and suicidal ideation. Parents of suicide victims have feelings of guilt because of their thoughts of inadequate parenting. Peers and friends of suicide victims are also affected negatively. They have an increased risk for post-traumatic stress disorder, major depressive disorder, grief reactions, and suicidal ideation and suicide attempts.

We can strive to prevent suicide. There are effective techniques for lowering suicide rates. Suicide screening at schools can identify adolescents who have mental health problems. The restriction of access to the lethal means of committing suicide (e.g. firearms), can reduce suicide risk. The media should avoid suicide contagion by avoiding front-page coverage, sensationalizing of suicide, and can assist by providing information on treatment resources. Crisis hotlines may be effective in reducing adult callers' intent to die, hopelessness, and psychological pain in adult suicidal callers. Most importantly, the accurate diagnosis of psychiatric disorders and their successful treatment can significantly reduce suicide rates.[66]

References

1. World Health Organization. Suicide Prevention (Supre). http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/index.html (Access date: 06.08.2012).
2. Genevro JL, Marshall T, Miller T, Center for the Advancement of Health. Report on bereavement and grief research. Death Stud 2004; 28:491-575.
3. Lindqvist P, Johansson L, Karlsson U. In the aftermath of teenage suicide: a qualitative study of the psychosocial consequences for the surviving family members. BMC Psychiatry 2008; 8:26.
4. Gould MS, King R, Greenwald S, Fisher P, Schwab-Stone M, Kramer R et al. Psychopathology associated with suicidal ideation and attempts among children and adolescents. J Am Acad Child Adolesc Psychiatry 1998; 37:915-923.
5. Miranda R, Scott M, Hicks R, Wilcox HC, Harris Munfakh JL, Shaffer D. Suicide attempt characteristics, diagnoses, and future attempts: comparing multiple attempters to single attempters and ideators. J Am Acad Child Adolesc Psychiatry 2008; 47:32-40.
6. Goldston DB, Daniel SS, Erkanli A, Reboussin BA, Mayfield A, Frazier PH et al. Psychiatric diagnoses as contemporaneous risk factors for suicide attempts among adolescents and young adults: developmental changes. J Consult Clin Psychol 2009; 77:281-290.

7. Bebbington PE, Cooper C, Minot S, Brugha TS, Jenkins R, Meltzer H et al. Suicide attempts, gender, and sexual abuse: data from the 2000 British Psychiatric Morbidity Survey. Am J Psychiatry 2009; 166:1135-1140.
8. Eaton DK, Kann L, Kinchen S, Shanklin S, Ross J, Hawkins J et al. Youth risk behavior surveillance – United States, 2009. MMWR Surveill Summ 2010; 59:1-142.
9. Arria AM, O'Grady KE, Caldeira KM, Vincent KB, Wilcox HC, Wish ED. Suicide ideation among college students: a multivariate analysis. Arch Suicide Res 2009; 13:230-246.
10. Centers for Disease Control and Prevention. National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online].]. Fatal Injury Reports, National and Regional, 1999 - 2009. Available from URL: http://webappa.cdc.gov/sasweb/ncipc/mortrate10_us.html (Accessed date: 06.08.2012).
11. Centers for Disease Control and Prevention. National Center for Injury Prevention and Control Avaliable from URL: http://www.cdc.gov/violenceprevention/pub/youth_suicide.html (Access date: 06.08.2012).
12. Centers for Disease Control and Prevention (CDC). Methods of suicide among persons aged 10-19 years--United States, 1992-2001. MMWR Morb Mortal Wkly Rep 2004; 53:471-474.
13. Kokkevi A, Richardson C, Olszewski D, Matias J, Monshouwer K, Bjarnason T. Multiple substance use and self-reported suicide attempts by adolescents in 16 European countries. Eur Child Adolesc Psychiatry 2012; 21:443-450.
14. WHO. Supre (Suicide prevention) World Suicide Prevention Day, 10 September 2009: Suicide prevention in different cultures, WHO statement. http://www.who.int/mental_health/ prevention/suicide/ wspd_2008_statement.pdf (Access date: 06.08.2012).
15. Türkiye İstatistik Kurumu. İntihar İstatistikleri 2011. www.turkstat.gov.tr (Access date: 04.08.2012).
16. Asirdizer M, Yavuz MS, Aydin SD, Dizdar MG. Suicides in Turkey between 1996 and 2005 general perspective. Am J Forensic Med Pathol 2010; 31:138-145.
17. Shaffer D, Gould MS, Fisher P, Trautman P, Moreau D, Kleinman M et al. Psychiatric diagnosis in child and adolescent suicide. Arch Gen Psychiatry 1996; 53:339-348.
18. Valtonen HM, Suominen K, Haukka J, Mantere O, Leppämäki S, Arvilommi P et al. Differences in incidence of suicide attempts during phases of bipolar I and II disorders. Bipolar Disord 2008; 10:588-596.
19. Çelik G, Yıldırım V, Metin Ö, Tahiroğlu A, Toros F, Avcı A et al. Özkıyım girişimi olan ergenlerde ruhsal bozukluklar, benlik ve aile işlevselliği. Anadolu Psikiyatri Dergisi 2011; 12:280-286.
20. Cash SJ, Bridge JA. Epidemiology of youth suicide and suicidal behavior. Curr Opin Pediatr 2009; 21:613-619.
21. Vijayakumar L, Kumar MS, Vijayakumar V. Substance use and suicide. Curr Opin Psychiatry. 2011; 24:197-202.

22. Miller M, Borges G, Orozco R, Mukamal K, Rimm EB, Benjet C et al. Exposure to alcohol, drugs and tobacco and the risk of subsequent suicidality: findings from the Mexican Adolescent Mental Health Survey. Drug Alcohol Depend 2011; 113:110-117.
23. Innamorati M, Lested D, Amore M, Girardi P, Tatarelli R, Pompili M. Alcohol consumption predicts the EU suicide rates in young women aged 15–29 years but not in men: analysis of trends and differences among early and new EU countries since 2004. Alcohol 2010; 44:463-469.
24. Swahn MH, Bossarte RM, Ashby JS, Meyers J. Preteen alcohol use initiation and suicide attempts among middle and high school students: findings from the 2006 Georgia Student Health Survey. Addict Behav 2010; 35:452-458.
25. Kim DS, Kim HS. Early initiation of alcohol drinking, cigarette smoking, and sexual intercourse linked to suicidal ideation and attempts: findings from the 2006 Korean Youth Risk Behavior Survey. Yonsei Med J 2010; 51:18–26.
26. Gould MS, Fisher P, Parides M, Flory M, Shaffer D. Psychosocial risk factors of child and adolescent completed suicide. Arch Gen Psychiatry 1996; 53:1155-1162.
27. Epstein JA, Spirito A. Risk factors for suicidality among a nationally representative sample of high school students. Suicide Life Threat Behav 2009; 39:241-251.
28. Liu X, Gentzler AL, George CJ, Kovacs M. Responses to depressed mood and suicide attempt in young adults with a history of childhood-onset mood disorder. J Clin Psychiatry 2009; 70:644-652.
29. Akbaş S, Kesebir S, Böke Ö, Karabekiroğlu K, Sarısoy G, Pazvantoğlu O et al. Hastaneye basvurusu ozkıyım girisimiyle olan ve olmayan major depresif bozukluklu ergenlerin ve annelerinin mizaç ozellikleri. Anadolu Psikiyatri Dergisi 2010;11:9-17.
30. Brent DA, Perper JA, Moritz G, Liotus L, Schweers J, Balach L et al. Familial risk factors for adolescent suicide: a case-control study. Acta Psychiatr Scand 1994; 89:52-58.
31. Johnson JG, Cohen P, Gould MS, Kasen S, Brown J, Brook JS. Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. Arch Gen Psychiatry 2002; 59:741-749.
32. Fergusson DM, Horwood LJ, Lynskey MT. Childhood sexual abuse and psychiatric disorder in young adulthood: II. Psychiatric outcomes of childhood sexual abuse. J Am Acad Child Adolesc Psychiatry 1996; 35:1365-1374.
33. Brodsky BS, Mann JJ, Stanley B, Tin A, Oquendo M, Birmaher B et al. Familial transmission of suicidal behavior: factors mediating the relationship between childhood abuse and offspring suicide attempts. J Clin Psychiatry 2008; 69:584-596.
34. Brent DA, Bridge J, Johnson BA, Connolly J. Suicidal behavior runs in families. A controlled family study of adolescent suicide victims. Arch Gen Psychiatry 1996; 53:1145-1152.
35. Brent DA, Oquendo M, Birmaher B, Greenhill L, Kolko D, Stanley B et al. Familial pathways to early-onset suicide attempt: risk for suicidal behavior in offspring of mood-disordered suicide attempters. Arch Gen Psychiatry 2002; 59:801-807.

36. Diaconu G, Turecki G. Family history of suicidal behavior predicts impulsive-aggressive behavior levels in psychiatric outpatients. J Affect Disord 2009; 113:172-178.
37. McGirr A, Alda M, Séguin M, Cabot S, Lesage A, Turecki G. Familial aggregation of suicide explained by cluster B traits: a three-group family study of suicide controlling for major depressive disorder. Am J Psychiatry 2009; 166:1124-34..
38. Kim CD, Séguin M, Therrien N, Riopel G, Chawky N, Lesage AD et al. Familial aggregation of suicidal behavior: a family study of male suicide completers from the general population. Am J Psychiatry 2005; 162:1017-1019
39. Asberg M, Träskman L, Thorén P. 5-HIAA in the cerebrospinal fluid. A biochemical suicide predictor? Arch Gen Psychiatry 1976; 33:1193-1197.
40. Ramamoorthy S, Bauman AL, Moore KR, Han H, Yang-Feng T, Chang AS et al. Antidepressant and cocaine-sensitive human serotonin transporter: molecular cloning, expression, and chromosomal localization. Proc Natl Acad Sci U S A. 1993; 90:2542-2546.
41. Arango V, Underwood MD, Boldrini M, Tamir H, Kassir SA, Hsiung S et al. Serotonin 1A receptors, serotonin transporter binding and serotonin transporter mRNA expression in the brainstem of depressed suicide victims. Neuropsychopharmacology 2001; 25:892-903.
42. Mann JJ, Brent DA, Arango V. The neurobiology and genetics of suicide and attempted suicide: a focus on the serotonergic system. Europsychopharmacology 2001; 24:467–477.
43. Neves FS, Malloy-Diniz LF, Romano-Silva MA, Aguiar GC, de Matos LO, Correa H. Is the serotonin transporter polymorphism (5-HTTLPR) a potential marker for suicidal behavior in bipolar disorder patients? J Affect Disord 2010; 125:98-102.
44. Wang S, Zhang K, Xu Y, Sun N, Shen Y, Xu Q. An association study of the serotonin transporter and receptor genes with the suicidal ideation of major depression in a Chinese Han population. Psychiatry Res 2009; 170:204-207.
45. Perroud N, Neidhart E, Petit B, Vessaz M, Laforge T, Relecom C et al. Simultaneous analysis of serotonin transporter, tryptophan hydroxylase 1 and 2 gene expression in the ventral prefrontal cortex of suicide victims. Am J Med Genet B Neuropsychiatr Genet 2010; 153B:909-918.
46. Prigerson HG, Bierhals AJ, Kasl SV, Reynolds CF 3rd, Shear MK, Day N et al. Traumatic grief as a risk factor for mental and physical morbidity Am J Psychiatry 1997; 154:616-623
47. Ness DE, Pfeffer CR. Sequelae of bereavement resulting from suicide. Am J Psychiatry 1990; 147:279-285.
48. Calhoun LG, Allen BG. Social reactions to the survivor of a suicide in the family: A review of the literature. Omega 1991; 23: 95-107.
49. Brent DA, Perper JA, Moritz G, Liotus L, Richardson D, Canobbio R et al. Posttraumatic stress disorder in peers of adolescent suicide victims: predisposing factors and phenomenology. J Am Acad Child Adolesc Psychiatry 1995; 34:209-215.

50. Bridge JA, Day NL, Day R, Richardson GA, Birmaher B, Brent DA. Major depressive disorder in adolescents exposed to a friend's suicide. J Am Acad Child Adolesc Psychiatry 2003; 42:1294-1300.
51. Melhem NM, Day N, Shear MK, Day R, Reynolds CF 3rd, Brent D. Traumatic grief among adolescents exposed to a peer's suicide. Am J Psychiatry 2004; 161:1411-1416.
52. Borowsky IW, Ireland M, Resnick MD. Adolescent suicide attempts: risks and protectors. Pediatrics 2001; 107:485-493.
53. Gould MS, Velting D, Kleinman M, Lucas C, Thomas JG, Chung M. Teenagers' attitudes about coping strategies and help-seeking behavior for suicidality. J Am Acad Child Adolesc Psychiatry 2004; 43:1124-1133.
54. Cohen-Sandler R, Berman AL, King RA. Life stress and symptomatology: determinants of suicide behavior in children. J Am Acad Child Adolesc Psychiatry 1982; 21:178-186.
55. Zenere FJ, Lazarus PJ. The decline of youth suicidal behaviour in an urban, multicultural public school system following the introduction of a suicide prevention and intervention programme. Suicide Life Threat Behav 1997; 27:387-403.
56. Scott MA, Wilcox HC, Schonfeld IS, Davies M, Hicks RC, Turner JB et al. School-based screening to identify at-risk students not already known to school professionals: the Columbia suicide screen. Am J Public Health 2009; 99:334-339.
57. Brent DA, Baugher M, Bridge J, Chen T, Chiappetta L. Age- and sex-related risk factors for adolescent suicide. J Am Acad Child Adolesc Psychiatry 1999; 38:1497-1505.
58. Etzersdorfer E., Sonneck G. Preventing suicide by influencing mass-media reporting: the Viennese experience 1980–1996. Arch Suicide Res 1998; 4:67–74.
59. Gould MS, Greenberg T, Munfakh JL, Kleinman M, Lubell K. Teenagers' attitudes about seeking help from telephone crisis services (hotlines). Suicide Life Threat Behav 2006; 36:601-613.
60. Gould MS, Kalafat J, Harrismunfakh JL, Kleinman M. An evaluation of crisis hotline outcomes. Part 2: Suicidal callers. Suicide Life Threat Behav 2007; 37:338-352.
61. Voelker R. SSRI use common in children. JAMA 1999; 281:1882.
62. Olfson M, Gameroff MJ, Marcus SC, Greenberg T, Shaffer D. National trends in hospitalization of youth with intentional self-inflicted injuries. Am J Psychiatry 2005; 162:1328-1335.
63. Campo JV. Youth suicide prevention: does access to care matter? Curr Opin Pediatr 2009; 21:628-634.
64. Gibbons RD, Brown CH, Hur K, Marcus SM, Bhaumik DK, Erkens JA et al. Early evidence on the effects of regulators' suicidality warnings on SSRI prescriptions and suicide in children and adolescents. Am J Psychiatry 2007; 164:1356-1363.
65. Katz LY, Kozyrskyj AL, Prior HJ, Enns MW, Cox BJ, Sareen J. Effect of regulatory warnings on antidepressant prescription rates, use of health services and outcomes among children, adolescents and young adults. CMAJ 2008; 178:1005-1011.
66. Bulut ER, Küçüker H, Bulut NS. İntiharın kısa tarihçesinden sebep ve yöntemlerine genel bir bakış. Cumhuriyet Tıp Dergisi 2012; 34:128-137.

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