REVIEW ARTICLE

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Child and Adolescent Suicide

Epidemiology, Risk Factors, and Approaches to Prevention

Mirjami Pelkonen[1,2] and *Mauri Marttunen*[1,2]

1 Department of Mental Health and Alcohol Research, National Public Health Institute, Helsinki, Finland
2 Department of Adolescent Psychiatry, Peijas Hospital, Hospital District of University of Helsinki, Vantaa, Finland

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Abstract

Suicide is rare in childhood and early adolescence, and becomes more frequent with increasing age. The latest mean worldwide annual rates of suicide per 100 000 were 0.5 for females and 0.9 for males among 5–14-year-olds, and 12.0 for females and 14.2 for males among 15–24-year-olds, respectively. In most countries, males outnumber females in youth suicide statistics. Although the rates vary between countries, suicide is one of the commonest causes of death among young people. Due to the growing risk for suicide with increasing age, adolescents are the main target of suicide prevention. Reportedly, less than half of young people who have committed suicide had received psychiatric care, and thus broad prevention strategies are needed in healthcare and social services. Primary care clinicians are key professionals in recognizing youth at risk for suicide.

This article reviews recent population-based psychological autopsy studies of youth suicides and selected follow-up studies of clinical populations and suicide attempters, analyzing risk factors for youth suicides. As

youth suicides are rare, research on risk factors for youth suicidal ideation and attempted suicide is also briefly reviewed.

The relationship between psychiatric disorders and adolescent suicide is now well established. Mood disorders, substance abuse and prior suicide attempts are strongly related with youth suicides. Factors related to family adversity, social alienation and precipitating problems also contribute to the risk of suicide. The main target of effective prevention of youth suicide is to reduce suicide risk factors. Recognition and effective treatment of psychiatric disorders, e.g. depression, are essential in preventing child and adolescent suicides. Research on the treatment of diagnosed depressive disorders and of those with suicidal behavior is reviewed.

In the treatment of youth depression, psychosocial treatments have proved to be useful and efficacious. Although studies on the effectiveness of selective serotonin reuptake inhibitors are limited in number, evidence supports their use as first-line antidepressant medication in youth depression. Available evidence suggests that various treatment modalities are useful in the treatment of suicidal youths, e.g. cognitive behavioral therapy and specialized emergency room interventions. Much of the decrease in suicide ideation and suicide attempts seems to be attributable to nonspecific elements in treatment. For high-risk youth, providing continuity of care is a challenge, since they are often noncompliant and commonly drop out or terminate their treatment prematurely. Developing efficacious treatments for suicidal children and adolescents would offer better possibilities to prevent suicides.

Completed suicides are a major health problem among young people. In particular, high suicide rates among adolescent males have prompted growing public concern. Although the rates vary between countries, in Europe and many other Western countries suicide is one of the leading causes of death among young people. For example, in Finland in 2000, completed suicide was the leading cause of death among 15–19-year-old males; 34% of all deaths of males in this age group were suicides.[1]

Although completed suicides are rare in children and young adolescents, they become increasingly frequent with increasing age.[2,3] Due to the growing risk for suicide with increasing age, adolescents can be regarded as the main target of suicide prevention among young people. The prevalences of suicide attempts,[4] as well as those of mental disorders,[5,6] are higher in adolescence than in childhood.

Research on risk factors for youth suicide provides the basis for suicide prevention. Primary prevention of such rare events as youth suicide faces several problems, and the effectiveness of preventive efforts in schools, social services and primary healthcare has been questioned.[7] Since most young people who commit suicide have experienced psychiatric disorders,[8-11] early recognition and effective treatment of these disorders are key issues in the prevention of youth suicide.

In suicide research, suicidal ideation is defined as one's wish or threat to die, suicide attempt/parasuicide is defined as any self-injurious behavior with a nonfatal outcome irrespective of intention, and suicide as cause of death on a death certificate.[12] This article first briefly reviews the epidemiology of completed suicide among children and adolescents. Research on risk factors for child and adolescent suicides is reviewed. As youth suicide is a rare phenomenon, research on risk factors for youth suicidal ideation and attempted suicide is also briefly reviewed. Then, primary preventive approaches are reviewed. Depressive disorders are among the most important psychiatric disorders associated with youth suicides, but they are under-recognized and under-treated.[13,14] This paper therefore reviews controlled treatment studies of child and adolescent depressive disorders. Finally, since adolescents with a history of suicidal ideation or suicide attempts are at particularly high risk for suicide,[15,16] research on the effects of interventions aiming at reducing further suicidal behavior in these individuals are reviewed.

1. Epidemiology of Child and Adolescent Suicides

1.1 Age and Youth Suicides

A direct relationship exists between age and the incidence of suicide in children, adolescents and young adults. According to the WHO statistics,[2] the mean worldwide (104 countries reporting their mortality data) annual rates of suicide per 100 000 in 1995 (or the latest available year) were 0.5 for females and 0.9 for males in the age group 5–14 years. The respective rates among 15–24-year-olds were 12.0 for females and 14.2 for males. Figure 1, based on Finnish suicide mortality data,[1] demonstrates the sharp rise of suicide rates during the adolescent years.

There is little empirical data to explain the sharp rise in suicides during adolescence. Children may be protected from suicide due to the lack of cognitive maturity required to plan a successful suicidal act and to develop feelings of despair or hopelessness.[17] Those

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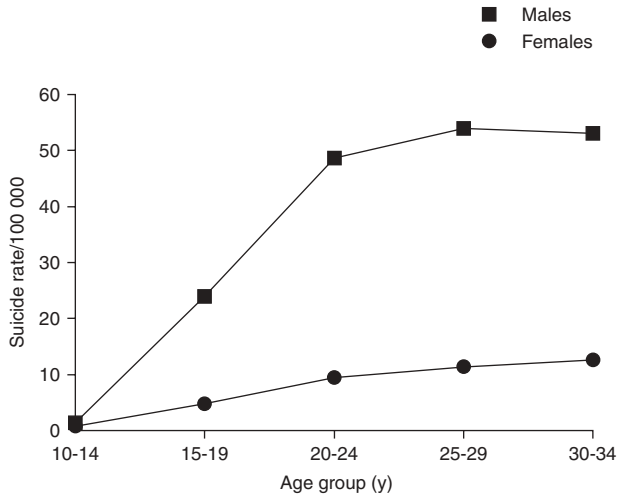

Fig. 1. 10-year average suicide mortality in Finland by age group during 1991–2000.

who committed suicide while children and early adolescents have reportedly been physically and cognitively precocious.[18] It has been suggested that the family provides social and emotional support, reduces social isolation and thereby protects children from suicide. Adolescents' increasing self-consciousness and growing drive for individuation is likely to weaken support from family, school and other support systems.[18] Developmental factors, such as rapid psychological, biological and social changes may make adolescents vulnerable to environmental stress.[19,20] The complex organization of genetic, psychological, and environmental developmental domains and risk factors may contribute to psychopathology in adolescence.[20-23] Furthermore, the higher prevalence rates of mental disorders in adolescence than in children are mainly due to increasing rates of depression and substance abuse,[5,6] both well known risk factors for youth suicide. Recent longitudinal studies have shown that emotional and behavioral disturbances, and exposure to adverse life events during adolescence, have predictive impact for subsequent psychiatric disorders, psychosocial impairment, suicidal ideation, suicide attempts and suicides.[23-25]

1.2 Secular Changes in Youth Suicide and Comparison Between Countries

During the last decade, youth suicide rates have increased in several European countries, New Zealand, and Australia, and most of the increase is due to more young men committing suicide.[3,26-28] In England and Wales, an increase in suicide rates for males aged 15–19 years between the 1970s and the 1990s was reported, whereas no major increase among 10–14-year-olds was found.[3] In Sweden, the previously observed rise in suicide rates among young males stabilized at the end of the 1970s, and remained at the same level during the 1990s.[29] In the US, a 3-fold increase occurred in suicide rates among 15–19 year-olds between the early 1960s and late 1980s, but since 1994 male suicide rates have declined.[30] In Finland, a country with particularly high and rising rates of youth suicide until 1991, an approximately 20% decline had taken place by 1998.[1]

The background of such secular changes in youth suicide rates is largely unknown, but it has been suggested that the decline in the rates of youth suicides is due to restriction of the availability of lethal methods, e.g. firearms,[31] and better treatment of depression.[32,33]

There are large variations in youth suicide rates between countries. Table I gives 2-year averages of suicide rates per 100 000 of the population among 15–19 year-olds from selected countries reporting their statistics to the WHO.[2] In most countries, young males outnumber females in suicides, but in some countries such as China rates of female suicide are comparable or higher than those of males.[2] Suicide research in Asia is scarce. Recent evidence suggests that the psychiatric risk factors for suicide are the same as in Western countries.[34] However, the findings from China also seem to support a cultural explanation, such as a lower social status in Chinese women than in Chinese men.[35]

The rates for young males are high in the Baltic Countries, Russian Federation, New Zealand and Finland. Probably the variation between countries is partly explained by social and cultural factors and alcohol consumption, as well as by attitudes toward suicide.[36,37] Disparities in the classification of suicide (i.e. listing suicide as the cause of death on death certificates) may also contribute to the international variation. The reliability of international suicide data is generally considered to be high; however, the influences of varying data collection procedures have to be taken into account in interpreting the findings.[38]

2. Risk Factors for Child and Adolescent Suicide

For effective prevention, knowledge of the key risk factors for suicide is essential. Psychiatric suicide research has studied the relationships between suicide and psychiatric disorders, and identified risk factors related to mental disorders and to biological, familial, and situational factors. The most important and widely accepted method of research on risk factors for suicide is studying nonselected and representative samples of suicides by using the psychological autopsy. It is a procedure for retrospectively reconstructing the life history, behavior and social and psychological features of the deceased, as well as the events preceding the suicide, by interviews with key persons who knew the deceased. Usually, data from different records are also collected.[39,40] The general methodological problems of psychological autopsy in-

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Table I. 2-year average suicide rates among 15–19-year-old adolescents per 100 000 of the population in selected countries[2]

Country	Year 1			Year 2			Mean of 2 years	
	year	males	females	year	males	females	males	females
Albania	1998	9.4	10.9	1997	8.1	6.5	8.8	8.7
Armenia	1999	1.6	0.0	1997	1.1	0.0	1.4	0.0
Australia	1998	16.3	5.6	1997	18.7	5.2	17.5	5.4
Austria	2000	19.3	5.1	1999	17.8	4.7	18.6	4.9
Azerbaijan	1999	0.3	0.3	1998	0.0	0.3	0.2	0.3
Belarus	1999	20.6	6.2	1998	22.1	4.9	21.4	5.6
Belgium	1995	12.1	5.6	1994	17.0	1.3	14.6	3.5
Bosnia and Herzegovina	1991	19.5	3.8	1990	10.6	3.3	15.1	3.6
Bulgaria	1998	10.7	4.2	1997	13.0	4.8	11.9	4.5
Canada	1997	19.8	5.5	1996	18.4	4.2	19.1	4.9
China: selected urban and rural	1998	3.5	5.6	1997	4.2	7.2	3.9	6.4
China: selected rural	1999	4.3	7.1	1998	4.8	8.5	4.6	7.8
China: selected urban	1999	2.1	2.4	1998	2.2	2.7	2.2	2.6
Croatia	1999	18.8	5.9	1998	16.5	4.7	17.7	5.3
Czech Republic	1999	12.5	3.1	1998	10.4	3.0	11.5	3.1
Denmark	1996	8.2	2.6	1995	9.1	1.3	8.7	2.0
Estonia	1999	35.1	11.4	1998	22.4	3.8	28.8	7.6
Finland	1998	23.2	5.6	1997	25.2	5.6	24.2	5.6
France	1998	7.9	2.6	1997	7.2	3.1	7.6	2.9
Georgia	1992	5.4	1.7	1991	3.2	1.7	4.3	1.7
Germany	1999	9.4	2.4	1998	9.5	3.2	9.5	2.8
Greece	1998	1.1	0.6	1997	3.4	0.3	2.3	0.5
Hungary	2000	10.9	3.2	1999	13.4	3.0	12.2	3.1
Iceland	1996	18.5	9.6	1995	18.7	0.0	18.6	4.8
Ireland	1997	17.0	4.2	1996	14.9	5.4	16.0	4.8
Italy	1997	4.8	1.4	1996	5.5	1.5	5.2	1.5
Japan	1997	6.9	2.8	1996	6.6	3.0	6.8	2.9
Kazakhstan	1999	32.0	9.4	1998	29.4	11.1	30.7	10.3
Kyrgyzstan	1999	14.3	4.4	1998	15.0	5.5	14.7	5.0
Latvia	1999	16.6	4.6	1998	27.5	7.1	22.1	5.9
Lithuania	1999	34.5	11.4	1998	22.4	9.2	28.5	10.3
Luxembourg	2000	0.0	0.0	1999	16.4	0.0	8.2	0.0
Macedonia	1997	2.3	3.7	1996	1.2	3.7	1.8	3.7
Netherlands	1999	5.5	3.5	1998	6.3	2.2	5.9	2.9
New Zealand	1998	28.0	19.8	1997	38.3	14.4	33.2	17.1
Norway	1997	15.5	6.2	1996	12.5	7.7	14.0	7.0
Poland	1996	14.5	2.8	1995	14.2	2.9	14.4	2.9
Portugal	1999	1.1	1.8	1998	2.8	0.9	2.0	1.4

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Table I. Contd

Country	Year 1			Year 2			Mean of 2 years	
	year	males	females	year	males	females	males	females
Republic of Moldova	1999	8.8	4.8	1998	5.5	1.8	7.2	3.3
Romania	1999	7.5	2.9	1998	5.7	2.6	6.6	2.8
Russian Federation	1998	34.0	8.5	1997	35.0	8.5	34.5	8.5
Slovak Republic	1999	8.2	1.4	1997	7.6	2.2	7.9	1.8
Slovenia	1999	15.1	5.8	1998	32.1	8.4	23.6	7.1
Spain	1998	4.4	1.2	1997	5.4	2.0	4.9	1.6
Sweden	1996	8.5	3.2	1995	10.3	3.6	9.4	3.4
Switzerland	1996	14.6	3.6	1995	15.7	7.2	15.2	5.4
Tajikistan	1995	5.2	2.1	1994	3.5	1.4	4.4	1.8
Turkmenistan	1998	16.6	8.8	1997	20.0	10.3	18.3	9.6
Ukraine	2000	19.6	4.9	1999	17.6	4.3	18.6	4.6
UK	1999	6.5	1.8	1998	6.0	2.1	6.3	2.0
USA	1998	14.6	2.9	1997	15.2	3.4	14.9	3.2
Uzbekistan	1995	7.6	3.0	1994	8.5	4.2	8.1	3.6

clude the possibility of incomplete and biased information and difficulties in the assessment of psychopathology of the individuals. However, interviewing several informants, using structured interviews to elicit psychiatric symptoms, and using explicit diagnostic criteria have reportedly increased the accuracy of the assessment of psychopathology.[39-41]

In population-based studies using psychological autopsy, the prevalence of rare psychiatric disorders, such as psychotic disorders, has been low. Follow-up studies of child and adolescent psychiatric patients and suicide attempters provide data to confirm the associations between suicide and risk factors found in psychological autopsy studies.[42,43] Data collection procedures, characteristics of the samples and the definitions of psychiatric disorders in the various chart-based studies may, however, vary and have to be taken into account in interpreting the findings.[12] The following sections review the most important research on risk factors for suicide in children and adolescents. Our main focus is in identifying risk factors for suicide. However, adolescent suicide is a rare phenomenon, and therefore research on risk factors for suicidal ideation and suicide attempts is briefly reviewed.

2.1 Family-Related and Psychosocial Risk Factors

Population-based psychological autopsy studies of adolescent suicides have reported parental divorce in approximately half of the individuals' families.[8-10,15,44-46] Family history of suicide or suicide attempt has varied between 2% and 30%.[8-10,15,44-46] Parental mental problems (in 15–47%) and substance abuse (16–35%) are also common.[9,10,15,44,45,47]

In line with findings in psychological autopsy studies, follow-up studies of child and adolescent patients and suicide attempters have found a family history of substance abuse and mental disorders or problems to be associated with death by suicide.[24,48-51] One follow-up study of adolescent male outpatients reported familial disturbance in terms of weakened parental support in 63% of those deceased during a 6-year follow-up.[52]

In the few controlled psychological autopsy studies of representative samples of children and adolescents having committed suicide,[46,53,54] the individuals were more likely than controls to come from a non-intact family of origin (table II). The family-related psychosocial factors increasing the risk for suicide were poor communication with mother and father, family history of suicidal behavior, and parental problems with the police.[53,54] Family history of depression and substance abuse, and lifetime history of parent-child discord, were also associated with adolescent suicide.[46] Parental suicidal behavior has been reported to be common in youth suicides. In a sophisticated study on this issue, Brent et al.[55] found that the rates of suicide attempts, but not suicidal ideation, were increased among first-degree relatives of adolescent suicides compared with the relatives of community controls, independent of familial psychiatric disorders. Thus, liability to suicidal behavior might be familially transmitted as a trait, and the transmitted spectrum of suicidal behaviors might include both attempted and completed suicides.

Individual psychosocial risk factors for young suicides include recent disciplinary crisis, interpersonal loss and school problems.[53,54] Interestingly, one study found that children and adolescents neither working nor in school were at a particularly high risk

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Table II. Psychosocial risk factors for adolescent completed suicide in controlled psychological autopsy studies[46,53,54]

Risk factor	Odds ratio
Family related factors	
Non-intact family origin	1.8–3.1
Poor communication with mother	4.3
Poor communication with father	4.0
Parent-child discord	5.1
Parental psychopathology	
Family history of depression	11.0
Family history of substance abuse	10.4
Father had trouble with police	4.0
Family history of suicidal behavior	4.6
Stressful (negative) life events	
Disciplinary crisis	5.1
Interpersonal loss	1.9 (males 2.6)
School/work problems	
Failed a grade	3.3
Suspended from school	6.1
Dropped out of school	5.1
Neither working nor in school	44.1

for suicide, supporting the evidence of the marked role of social isolation and alienation in suicide.[53]

2.2 Psychiatric Risk Factors

Psychological autopsy studies have reported mental disorders in 81–95% of child and adolescent suicides (table III).[8-10,15,44,45,47,56] Studies comparing young suicides with general population controls have estimated that the risk for suicide in young people having a psychiatric disorder ranges from odds ratio (OR) 12 to OR 35.[8,16,57]

Table III. Psychiatric risk factors for adolescent completed suicide in psychological autopsy studies[8-10,15,44,45,47,56]

Risk factor	Frequency (%)	Gender ratio	Odds ratio		
			males	females	all
Any psychiatric diagnosis	81–95	M = F	ND	ND	35
Psychiatric comorbidity	51–81	M = F?	ND	ND	ND
Mood disorder	49–76	M < F	10–11	17–25	14–20
Major depression	23–54	M < F	15–16	29	27
Substance abuse	0–62	M > F	7–13	13	5–13
Conduct/disruptive behavior disorder	5–46	M > F?	4–6	2–3	3–6
Schizophrenic psychosis	3–7	M = F	ND	ND	ND
Personality disorder	29–32	M = F?	ND	ND	ND
Anxiety disorders	4–27	M = F?	3–11	0.7–3	2–6
Adjustment disorder	0–21	M > F?	ND	ND	ND
Previous suicide attempt	5–40	M < F	28–34	119	49

F = female; **M** = male; **ND** = no data; **?** = uncertain.

Approximately 50–75% of children and adolescents who commit suicide have had a mood disorder, most commonly major depression.[58] Mood disorders and prior suicide attempts seem to be more common among young females, whereas antisocial disorders tend to be more prevalent among males.[15,31,59] About one-quarter to two-thirds of adolescents who commit suicide have received a diagnosis of substance abuse or dependence.[9,10] Substance misuse, not fulfilling the diagnostic criteria of substance abuse or dependence, is also associated with adolescent suicides.[60] Schizophrenic psychoses and personality disorders have been diagnosed more commonly in young adult suicides than in adolescent suicides,[8,10,11,61] whereas disruptive disorders and adjustment disorders have been more prevalent among younger individuals.[10,15,57,62]

Disruptive disorders seem to convey a 3–6-fold increased risk for suicide in youth.[8,15,54] In a recent study,[63] adolescents with disruptive disorders committing suicide had higher rates of current substance abuse, past suicide attempts, a family history of substance abuse and mood disorders than did living controls with disruptive disorder. Disruptive adolescents appear thus to be at particular risk for suicide when they have a history of previous suicide attempts and comorbid substance abuse. Behavior problems and symptom clusters not fulfilling the diagnostic criteria of conduct disorder are also common among child and adolescent suicides, being reported in 43–73% of those who commit suicide, often in combination with depressive symptoms and/or substance abuse.[19,45,56] Problems with the law and court sentences are also over-represented among youth suicides (16–28%),[11,44,64,65] as well as running away.[15]

Psychiatric comorbidity is common among young people who commit suicide (51–81%).[8-10,15,44,45,47,56] The impact of comorbid conditions on suicide risk is complex and thus far little studied. In one study,[8] substance abuse in the presence of a coexisting mood disorder conveyed a much higher risk of suicide (OR 17.0) than in the absence of a mood disorder (OR 3.3), whereas anxiety disorders were risk factors only when comorbid with mood disorders (OR 7.0). Interestingly, conduct disorder comorbid with a mood disorder was associated with lower risk (OR 2.5) than was noncomorbid conduct disorder (OR 12.0), suggesting that conduct disorder may be a risk factor for child and adolescent suicide independent of mood disorders.

About one-third of young people who commit suicide have a history of prior attempts and up to two-thirds of children and adolescents who commit suicide have verbally communicated

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their suicidal intent.[8,10,44,47,66] In controlled studies the risk for suicide has been estimated to be about 30-fold higher among youth with a suicide attempt history compared with those without previous attempts.[15,16]

Follow-up studies of child and adolescent psychiatric patients and suicide attempters provide complementary data on risk factors that are rare in nonclinical populations, e.g. bipolar disorder and other psychotic disorders. Generally, higher than expected overall and suicide mortality has been observed in children and adolescents with these disorders, with the proportion of suicides varying from less than 1% to almost 8%.[24,48-52,67-82] This large variation in suicide mortality probably reflects different characteristics of the initial patient samples and varying follow-up times. Risk factors for eventual suicide have been comparable with those reported in psychological autopsy studies. In line with findings in psychological autopsy studies, most follow-up studies report that depressive and antisocial disorders, aggressive behavior, substance abuse and dependence, previous suicide-spectrum behaviors, severity or prolonged course of psychiatric disorder and previous inpatient status are commonly associated with suicide during the follow-up.[24,48,69,71,76] As might be expected, associations between psychotic disorders and suicide have been more common among child and adolescent psychiatric patients[24,48,50,68,69,74,83] and suicide attempters[71,79] compared with findings in nonclinical populations, and some studies show the particular importance of bipolar disorder.[24,69] One study on adolescent outpatients found that only males (7.1% of 156) had committed suicide during a 6-year follow-up.[52] Current suicidal behavior, poor psychosocial functioning and a recommendation for psychiatric hospitalization at baseline were associated with suicide,[52] reflecting the importance of severity and protracted course of disorder to outcome.

2.3 Age-Related Factors Associated with Suicide

Factors associated with suicide by age have been studied in three psychological autopsy studies on adolescents who have committed suicide under age 20 years,[10,15,31] and in a comprehensive record-based study on child and adolescent suicides.[84] The cut-off age between younger versus older suicides has been 15,[84] 16,[31] and 17 years.[10,15] In general, the frequencies of any psychiatric disorder, particularly substance abuse and conduct disorder, as well as prior suicide attempts, have been more common in the older than younger adolescents (table IV). Mood disorders comorbid with substance abuse lead to an over 50-fold risk for suicide among older adolescents,[31] and the proportion of alcohol- or drug-positive individuals has been greater in older adolescents.[31] Somewhat surprisingly, the prevalence of adjustment disorders was higher among younger individuals in one sample,[15] but lower in another.[10]

Table IV. Risk factors for suicide in 'younger' versus 'older' adolescents[10,15,31,84] (reproduced from Marttunen and Pelkonen,[58] with permission)

Risk factor	Younger adolescents		Older adolescents	
	frequency (%)	odds ratio	frequency (%)	odds ratio
Family related factors and stressors				
Non-intact family of origin	47–61	3	47–61	3
Conflict with parent	29–51	6	7–30	2
Conflict with boy/girlfriend	0–9	6	32–42	3
Legal or disciplinary problems	14–31	2	13–38	6
Psychiatric factors				
Any psychiatric disorder	43–83	6	79–95	25
Mood disorder	29–57	20–24	48–64	7–20
Substance abuse	6–18	4	31–48	15
Conduct disorder	14–36	3–6	18–52	6–7
Anxiety disorders	23–31	8	11–25	3
Adjustment disorder	6–17		8–28	
Alcohol intoxication at time of suicide	0–3		38–51	
Previous suicide attempt	0–36	36	27–43	4–76

The higher risk for suicide among older children and adolescents may be attributed to the higher prevalence of psychopathology.[31,84] Psychopathology may not only be more prevalent but also convey a higher risk for suicide among older adolescents,[31] but the finding is not consistent.[84] As might be expected, parent-child conflicts seem to be more prevalent among younger, and romantic disappointments more common in older, adolescent suicides (table IV).

2.4 Risk Factors for Adolescent Suicidal Ideation and Suicide Attempts

As youth suicides are rare, much of the knowledge on risk factors is based on studies of other suicide-spectrum behaviors, including suicidal ideation or threats and suicide attempts/parasuicides. Due to variations in the definitions, sample characteristics, and lack of accurate statistics, the prevalence rates of suicidal ideation and suicide attempts are difficult to estimate. However, it has been estimated that up to 25% of young people have had suicidal ideation, and approximately 2–12% have attempted suicide at some time in their lives.[12,85] Schmidtke et al.[86] reported a mean rate of suicide attempts in 13 European countries, assessed by healthcare professionals, of 168 per 100 000 population for

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males and 283 per 100 000 for females in the age group of 15–24 years. In the following paragraphs, the main risk factors for suicidal ideation, as well as suicide attempts, are briefly reviewed. For more comprehensive recent reviews, see Gould and Kramer[33] and Beautrais.[85]

The family environments of youth with suicidal ideation have reportedly been more troubled compared with those of nonsuicides.[87] In a longitudinal study,[88] family violence, combined with family arguements, was a risk factor for both genders; however, its impact was greater for the males, whereas the females with suicidal ideation perceived themselves as less valued by their family members. Furthermore, early onset of psychiatric disorders was a risk factor for adolescent suicidal ideation for both genders, as well as preschool dependence and anxiety for the males, and aggressive and hyperactive preschool behavior for the females. Family-related risk factors in adolescent suicide attempters have included disadvantageous childhood circumstances,[89-91] not living with both parents,[92] low level of parental support,[93] frequent geographic moving,[94] and exposure to sexual abuse.[95]

As for completed suicide, psychiatric disorders, especially mood disorders, are among the most significant risk factors for suicidal ideation and suicide attempts.[88,90,96-98] Substance use disorders seem to be more strongly associated with suicide attempts than with suicidal ideation.[35] Previous suicidal ideation has been reported to predict subsequent suicide attempts.[12,88] The continuum from milder to more severe forms of suicide-spectrum behaviors seems not to be as well established in nonclinical populations[12,89] as in clinical populations.[44,99]

3. Preventive Approaches

Suicide prevention has been identified as an increasingly important area of public health, and recommendations or guidelines for developing and implementing strategies to decrease the rates of youth suicides are available.[27,30,33,100,101] Comprehensive national strategies, in which activities are multifaceted and integration between components is planned, have been developed in New Zealand, Norway, Australia, Sweden and Finland.[102] The strategy being implemented in Finland had four stages commencing with a research project using psychological autopsy methods. Information on completed suicides was assessed using content analysis and a prevention strategy developed from empirical data and expert advice. Target areas were identified, and subsequent implementation was conducted. In addition, continued monitoring of the implementation and effectiveness of interventions were used.[102-104] In New Zealand, a nongovernmental organization has been developed for planning, consultation and implementation.[102] The Netherlands and Great Britain have specific nationwide programs aiming at single targets, and in addition, the US, France, and Estonia have some national programs.[102] Research evidence of the efficacy of such preventive programs in reducing suicide rates is, however, still preliminary.[100] In Finland, youth suicide mortality declined by over 20% from 1990–1998, probably due to better treatment of depression[32] and actions to prevent suicides launched throughout the country.[103]

Few preventive efforts for children and adolescents have been scientifically evaluated thus far. Primary prevention includes programs in educational settings. It seems that effective prevention strategies for child and adolescent suicide should consist of identification and appropriate treatment of those at risk, e.g. those with depression (secondary prevention), and particularly those at high risk, e.g. suicide attempters (tertiary prevention).[30]

3.1 Primary Prevention

3.1.1 School-Based Programs

One of the most popular approaches has been to focus on high school students' suicide awareness.[105] Such programs, as well as indirect case-finding programs through education, have aimed to increase disturbed adolescents' help-seeking behavior. However, controlled studies have found that these programs have no significant impact.[106-108] It seems that suicide awareness programs may also have detrimental effects, including an increase in positive attitudes towards suicide[7] and negative reactions among students with a history of suicidal behavior.[109] Due to the limitations of school-based suicide awareness curriculum programs, more emphasis has been paid to interventions aiming at skills training, such as enhancing coping skills, self-esteem, problem-solving and communication skills.[33] In school settings, it seems advisable to implement more general programs focusing on skills training or training in the development of coping strategies rather than focusing on issues dealing with suicidal behavior. Thus, the research evidence indicates that concern over disturbed adolescents with real or assumed risk for suicidal behavior should not lead to the implementation in school settings of any program for which scientific evidence of efficacy in preventing youth suicidal behavior is lacking.

3.1.2 Crisis Hotlines

Crisis hotlines are widely available for people with suicidal thoughts. Yet, evidence of their impact in reducing rates of completed suicide is equivocal.[33] They may be helpful, but it seems that hotlines do not reach those young people, e.g. adolescent males, in greatest need of personal help. There are reports that disturbed adolescents prefer to turn to other adolescents, not adults, parents or professionals, when in need of help.[33,110]

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3.1.3 Restriction of Lethal Methods

Methods used in suicide vary by gender and nation. A large international survey of suicides among 15–24 year-olds found that 34% of the suicides were firearm-related.[111] Based on the lethality and common use of firearms in male youth suicides, it has been suggested that reducing firearm availability would reduce incidence of suicide,[31] yet evidence of its effectiveness has been contradictory.[30] It has been reported that in countries where firearms are widely available, lower rates of youth suicides have been found after the restriction of gun availability.[112,113] On the other hand, others have reported less hopeful effects.[33,114] There are, however, promising findings on the impact of parental education in the emergency department to limit access to firearms.[115] Restriction of the availability of drugs, commonly used by females in overdoses, has also been recommended by researchers.[116] Limitations of this approach are the difficulty to restrict many methods (e.g. hanging, drowning, intake of liquids and solids), and the possibility of method substitution.[117,118]

3.1.4 Media Education

Current evidence suggests that an increase in suicides follows after suicide stories in the mass media.[33] Findings that following a youth suicide the number of suicides is increased beyond that expected among the individuals' friends[119,120] suggest that suicide clustering is a real phenomenon among youth. However, factors that initiate such suicide outbreaks are largely unknown. Recommendations for journalists and healthcare professionals when reporting suicides have been developed. Recommendations for media generally include descriptions of factors to be avoided (e.g. front page coverage) and suggestions how to increase the usefulness of the report (e.g. describing treatment resources).[3,30] Health care professionals are recommended to assist media professionals towards responsible and accurate reporting. Instead of focusing on the individual cases, scientifically established information about risk factors for youth suicidal behavior should be provided. It has been suggested that suicide contagion may be reduced by responsible reporting.[30]

3.1.5 Identification of Adolescents at High Risk for Suicide

Although the vast majority of children and adolescents who commit suicide have had mental problems, and previous suicidal behavior is common, only about 20–50% of individuals have received psychiatric care, and remarkably few (5–20%) were in psychiatric care at the time of suicide.[58] Even in adolescents with a prior suicide attempt, only one-third to one-half have received psychiatric care.[54,66] Moreover, one study found that within 1 year prior to the suicide, 44% of the females, but only 18% of the males, had been in contact with psychiatric care.[66]

In a chart-based retrospective follow-up study in the UK, Appleby et al.[121] found that regardless of increasing number of general practitioner visits before adolescent suicides, significant suicide risk assessments were not noted in the final visits. Similar findings of people who commit suicide not communicating their suicide intent to professionals have been reported in a nationwide study of suicides in Finland.[122] A recent case-control study by Barnes et al.[123] reported that prior to nearly lethal suicide attempts, young people had sought help more often from peers and family than from professionals compared with general population controls. Hence, in primary care, the recognition of those children and adolescents most at risk of suicide is a major task. Effective clinical assessment of previous and current medical, psychiatric and psychosocial functioning is recommended.[27,121]

Children and adolescents will provide accurate information about their suicidal behavior if asked directly in a nonthreatening way.[27,33,124,125] Evidence suggests that by age 8–9 years children understand the concept of suicide, and by the age of 12 years that death is permanent and final, and that psychosocial dynamics may lead to suicide.[125]

The assessment of suicide risk is best undertaken by direct questioning of the young person's wish to die and the lethality of any plans. Multistage school-based case identification screening procedures have reportedly been effective in identifying youth at high risk for suicide.[126-128] However, it seems that special efforts are needed in order to refer these identified high-risk individuals from school to appropriate clinical assessment and care.[33] Psychometric screening tests seem not to be helpful for primary care clinicians in formulating their assessment of a young person's suicide risk.[27] It has been recommended that primary care clinicians should be trained in recognizing risk factors for suicide. Collaboration with a psychiatrist and ensuring that adequate and appropriate treatment is given is essential.[27,30,101]

3.2 Secondary Prevention

Data from the reviewed psychological autopsy studies on child and adolescent suicide indicate that psychiatric disorders (as discussed in section 2.2), particularly mood disorders, are among the most important risk factors. Recognition and effective treatment of these disorders are cornerstones in clinical prevention of youth suicides. During the past 2 decades, depressive disorders in children and adolescents have received attention as common, serious and incapacitating problems. There has been an increasing interest in developing efficacious psychosocial and biological treatments for youth experiencing these disorders. Opinions vary as to whether psychosocial or pharmacological interventions, or a combination of them, should be used as first-line treatment for youth with

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Table V. Randomized comparative studies of the efficacy of psychosocial treatments in children and adolescents with depressive disorders

Study	Individuals	Design	Interventions	Outcome in terms of treating depression
Lewinsohn et al.[132]	59 adolescent outpatients and volunteers with MDD (DSM-III) or minor depression (RDC), age 14–18y	Randomized controlled	CBT vs CBT and PT vs WL. 14 × 2h group sessions, 7 parent sessions, duration 7wks	CBT > WL; CBT + PT > WL; CBT = CBT + PT
Reed[133]	18 adolescent volunteers with MDD or dysthymia (DSM-III-R), age 14–19y	Randomized	CBT vs AE, 6 group sessions, duration 12wks	CBT 'moderately successful', AE 'unsuccessful'
Vostanis & Harrington[134]	57 outpatients with depressive disorder (DSM-III-R), age 8–17y	Randomized controlled	CBT vs NFI, 9 sessions, duration 18wks	CBT = NFI
Wood et al.[135]	53 outpatients with MDD (DSM-III-R) or minor depression (RDC), age 9–17y	Randomized	CBT vs RT, 8 sessions, duration 8wks	CBT > RT post-test, NS at 6mo follow-up
Brent et al.[136]	107 adolescent outpatients and volunteers with MDD (DSM-III-R), age 13–18y	Randomized	CBT vs SBFT vs NST, 12–16 sessions, duration 12–16wks	CBT > NST; CBT > SBFT
Clarke et al.[137]	123 adolescent volunteers with MDD or dysthymia (DSM-III-R), age 14–18y	Randomized controlled	CBT vs CBT + PG vs WL, 16 × 2h group sessions, 8 PG sessions, duration 8wks	CBT > WL; CBT + PT > WL; CBT = CBT + PG
Mufson et al.[138]	48 outpatients with MDD (DSM-III-R), age 12–18y	Randomized controlled	IPT-A vs CM, 12 sessions + 12 telephone contacts, duration 8wks	IPT-A > CM
Rossello & Bernal[139]	71 outpatients with MDD or dysthymia (DSM-III-R), age 13–17y	Randomized controlled	IPT-A vs CBT vs WL, 12 sessions, duration 12wks	IPT-A > WL; CBT > WL; IPT-A = CBT

AE = art exercises; **CBT** = cognitive behavior therapy; **CM** = clinical monitoring; **DSM-III** = Diagnostic and Statistical Manual of Mental Disorders, Third Edition; **DSM-III-R** = Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised; **IPT-A** = interpersonal psychotherapy for depressed adolescents; **MDD** = major depressive disorder; **NFI** = nonfocused intervention; **NS** = not significant; **NST** = nondirective supportive therapy; **PT** = parent training; **RDC** = Research Diagnostic Criteria; **RT** = relaxation training; **SBFT** = systemic behavior family therapy; **WL** = waiting list; **=** indicates no difference between groups; **>** indicates statistically significant difference between groups.

depressive disorders.[129,130] This section reviews research on the treatment of diagnosed depressive disorders among youth.

3.2.1 Psychosocial Treatment of Depressive Disorders

Several controlled studies have been published on psychosocial, mainly cognitive-behavioral psychotherapy (CBT), in children and adolescents with depressive symptoms (for a review see Harrington et al.[131]). The results support the use of psychosocial interventions in these subsyndromal depressive youth. However, the findings may not be fully generalizable to youth diagnosed with depressive disorders. Table V summarizes the results of eight randomized trials of psychotherapy for children and adolescents with an appropriate diagnosis of depressive disorders. Seven of these trials have investigated the effectiveness of CBT, and two trials investigated interpersonal psychotherapy (IPT).

Cognitive-Behavioral Psychotherapy

Lewinsohn et al.[132] studied the efficacy of two versions of group CBT in adolescent school students experiencing depressive disorders. Fifty-nine individuals were randomly assigned to adolescent group CBT, adolescent CBT and parent training, or a waiting list control group. Those in both active treatment groups improved significantly more than controls, but no differences between the two treatment groups were found. Treatment gains were maintained at 2-year follow-up. The same group replicated their findings in a second trial using a sample of 123 depressed adolescents.[137] The study design was basically similar: individuals were randomly allocated to two intervention groups and waiting list. The treatments were slightly modified, but one was only for adolescents and the other contained also parent groups. Again, the two CBT groups yielded higher depression recovery rates (67%) than the controls (48%), with no difference between the two active treatment groups. In this trial the researchers further assessed the effects of maintenance CBT during a 2-year follow up. The intervention group received booster sessions of CBT every 4 months. The booster sessions did not reduce rates of recurrence of depression during the 2-year follow-up but seemed to accelerate

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recovery among individuals who were still depressed after the acute phase CBT.

Reed[133] conducted a small study where 18 depressed adolescents were randomized either to cognitive-behavioral social skills training, called structural learning therapy, or to art and imagery exercises. Based on clinician's ratings, structural learning therapy was considered moderately successful whereas the control treatment was unsuccessful. Due to the small sample size and use of nonstandardized assessment of outcome, these results should be regarded as preliminary.

In a trial of clinically referred depressed children and adolescents, Vostanis and Harrington[134] randomized 57 children and adolescents either to CBT or a relatively inactive control treatment called nonfocused intervention (NFI). After an average of six sessions, 87% of patients in the CBT group and 75% in the NFI group no longer had depression. The two treatment groups did not differ significantly on any clinical measure at the end of treatment. The relatively small sample and nonspecific supportive components of the NFI probably affected the results. Another explanation for the negative finding may be that nonspecific supportive therapy is helpful in youthful depression. The findings by Fine et al.[140] that depressed adolescent outpatients in a supportive therapy group showed greater reductions in depression than those in a social skills training group support this view.

The effectiveness of brief individual CBT and relaxation training was studied among 53 outpatients with depressive disorders.[135] The CBT intervention, containing a combination of cognitive, social problem solving and symptom-focused interventions, was associated with significant reductions in depressive symptoms and improvement in psychosocial functioning. Patients receiving CBT were also more likely to remit from depression than those in the control condition. Due to the high relapse rate in the CBT group, the differences between the two treatment groups were, however, no longer significantly different at 6-month follow-up.

Brent et al.[136] conducted a sophisticated and methodologically rigorous trial of 107 adolescents with major depressive disorder (MDD), of whom 67% were referrals to an outpatient clinic. Individuals were randomly assigned to one of three treatment conditions: individual CBT, systemic behavioral family therapy, and nondirective supportive treatment. Individuals receiving CBT responded more rapidly and the treatment result was more complete than in the two other treatments.

Interpersonal Psychotherapy

The first controlled study on the efficacy of IPT in adolescent MDD was conducted by Mufson et al.[138] In an 8-week trial of clinic-referred youths, they compared IPT for adolescents (IPT-A) with clinical monitoring, and found that 75% of patients receiving IPT-A compared with 46% of control patients had recovered. Individuals receiving IPT-A also showed greater improvement in social functioning overall and with their friends, and specific problem-solving skills.

Further support for the efficacy of IPT in adolescent depression comes from the randomized controlled trial by Rossello and Bernal[139] from Puerto Rico. They compared CBT, IPT, and a waiting list control condition among 71 adolescent outpatients with MDD or dysthymia. Using self-report scales as outcome measures, they found that both IPT and CBT significantly reduced depressive symptoms when compared with the waiting list condition. According to their findings, 82% of adolescents receiving IPT and 59% of those receiving CBT were functional after treatment, but the difference between the active treatments was not statistically significant.

Psychodynamic Psychotherapy

There is a paucity of research evidence on the efficacy of psychodynamic psychotherapy in youthful depressive disorders. Target and Fonagy[141] conducted a retrospective chart review of 352 child and adolescent outpatients with mixed diagnoses (99 with depressive disorders) who had received either psychoanalysis or intensive psychoanalytic therapy. The median length of therapy was 2 years. At the end of treatment, 40% of the patients with depression had no diagnosis and were functioning well, and in 62% a reliable improvement in psychosocial functioning was seen. Although many clinicians have found psychodynamic therapy useful in the treatment of depressive children and adolescents, there are no published controlled studies thus far to support this view.

3.2.2 Biological Treatment of Depressive Disorders

When the first drug studies for depressed children and adolescents were planned in the late 1970s and early 1980s, it was expected that antidepressant treatment would be efficacious in children and adolescents. This hypothesis was based on the similarity and continuity of depressive disorders across the life span.

Tricyclic Antidepressants

According to Hazell et al.,[142] 15 double-blind randomized placebo-controlled studies on the efficacy of tricyclic antidepressants (TCAs) in child and adolescent depression have been published, of which 12 were included in their meta-analysis. Most studies suggested a larger improvement in favor of the active medication compared with placebo, but the difference was statistically significant in only two. The meta-analysis did not show a clinically significant treatment effect for TCAs. However, in subgroup analysis, effect size estimates favored TCAs over placebo among adolescents but not among prepubertal children. The au-

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thors concluded there is marginal evidence to support the use of TCAs in the treatment of depression in adolescents, but no evidence for their use in children.

It has been suggested that the seeming lack of efficacy of TCAs in child and adolescent depression may be due to maturational differences in neurotransmitter regulation. The noradrenergic system may not be fully functional until early adulthood, the adolescents' more efficient liver metabolism may limit the compounds' availability, and hormonal changes associated with puberty have been suspected to inhibit neurotransmitter activity.[129] Significant adverse effects of the TCAs in children and adolescents, including cardiotoxic effects and marked toxicity in overdose, limit their use.[143]

Selective Serotonin Reuptake Inhibitors

Several double-blind randomized placebo-controlled studies on the efficacy of selective serotonin reuptake inhibitors (SSRIs) and other new antidepressants in child and adolescent depression are under way, but only four have been published thus far (table VI). Three studies report on the efficacy of SSRIs,[144-146] two on fluoxetine and one on paroxetine, and one on the efficacy of venlafaxine, an agent that primarily inhibits both serotonin and norepinephrine (noradrenaline) reuptake at the synaptic cleft.[147] Many additional nonblind reports on the newer antidepressants have been published (for a review, see Findling et al.[148]). These medications have fewer adverse effects, only modest cardiovascular effects, and are less toxic in overdose than the TCAs.

The first double-blind study comparing an SSRI with placebo[144] showed no significant drug effect. The authors reported that two-thirds of patients showed mild to moderate improvement with either fluoxetine or placebo. On all clinical measures except sleep disturbance, individuals receiving fluoxetine improved more, although the group differences were not statistically significant. The high placebo response and the small sample size (n = 40) probably explain the negative finding. Unfortunately, the limited reporting of study methodology and results hampers detailed reviewing of the study.

The other double-blind randomized placebo-controlled study on the efficacy of fluoxetine[145] included 96 child and adolescent patients and found fluoxetine to be superior to placebo in the treatment of juvenile depression. However, complete remission of symptoms was rare. Another fluoxetine study using a historical case-control design[149] reported fluoxetine to be more efficacious than imipramine in the treatment of severely depressed adolescent inpatients.

The recent multicenter trial by Keller et al.[146] compared paroxetine with placebo and imipramine with placebo in 275 adolescents with major depression. On all observer-reported, but not on

Table VI. Double-blind, randomized controlled trials of the efficacy of new antidepressants in children and adolescents with depressive disorders

Study	Individuals	Interventions	Daily dosage (mg)	Outcome in terms of treating depression
Selective serotonin reuptake inhibitors				
Simeon et al.[144]	40 out- and inpatients with MDD (DSM-III) age 13–18y	Fluoxetine vs PL, duration 8wks	40–60	Fluoxetine = (>) PL
Emslie et al.[145]	96 outpatients with MDD (DSM-III-R), age 7–17y	Fluoxetine vs PL, duration 8wks	20	Fluoxetine > PL
Keller et al.[146]	275 adolescents with MDD (DSM-IV) age 12–18y	Paroxetine vs PL, imipramine vs PL, duration 8wks	Paroxetine 20–40; imipramine 200–300	Paroxetine > PL; imipramine = PL
Other new antidepressants				
Mandoki et al.[147]	33 outpatients with MDD (DSM-IV), age 8–17y	Venlafaxine + CBT vs PL + CBT (6 CBT sessions), duration 6wks	8–12y, 37.5; 13-17y, 75	Venlafaxine + CBT = PL + CBT

CBT = cognitive behavior therapy; **DSM-III** = Diagnostic and Statistical Manual of Mental Disorders, Third Edition; **DSM-III-R** = Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised; **DSM-IV** = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; **MDD** = major depressive disorder; **PL** = placebo; **=** indicates no difference between groups; **(>)** indicates statistically nonsignificant trend between groups; **>** indicates statistically significant difference.

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parent- and self-reported, outcome measures, paroxetine demonstrated significantly greater improvement compared with placebo. Interestingly, the response to imipramine was not significantly different from that to placebo. Paroxetine was better tolerated than imipramine. These findings further support the use of SSRIs rather than TCAs in child and adolescent MDD.

Other New Antidepressants

Only one double-blind randomized placebo-controlled trial has studied the efficacy of new antidepressants other than the SSRIs in major depression in children and adolescents. In the study by Mandoki et al.,[147] depressed child and adolescent outpatients received a combination of CBT and either venlafaxine or placebo. Patients in both groups improved significantly but no statistically significant group differences were found. Possible explanations of the negative finding are a small sample size (n = 33), low dosage of venlafaxine, and concomitant active psychotherapy.

Mood Stabilizers and Electroconvulsive Therapy

Follow-up studies (reviewed by Geller and Luby[150]) of child and adolescent major depression in clinical samples have shown a high risk of bipolar disorder. The only double-blind placebo-controlled study of lithium in adolescents with bipolar disorder and secondary substance use disorder[151] found lithium to be efficacious for both disorders. Other mood stabilizers, such as valproate and carbamazepine, are also used in the treatment of bipolar disorders in the young, although their efficacy has yet to be demonstrated. Electroconvulsive therapy (ECT) has shown efficacy in acute manic and depressive states among adults but its rigorous evaluation in adolescent bipolar disorder is lacking. According to Rey and Walter[152] there were no controlled trials of ECT in children and adolescents. Based on a comprehensive review of open trials and case reports, the authors concluded that ECT in the young seems similar in effectiveness and adverse effects to ECT in adults.

3.2.3 Overview

Taken together, the above studies, as well as two recent meta-analyses,[153,154] suggest that various psychosocial treatments, such as CBT and IPT, are useful and efficacious in the treatment of child and adolescent depression. Given the high rate of improvement also in the relatively 'inactive' control treatment groups, Harrington et al.[153] suggest that there is a strong case for using brief supportive intervention as the first-line treatment of youthful depressive disorders.

It seems that TCAs should not be used as first-line medications due to the lack of evidence of their effectiveness in childhood depression, their toxicity in overdose, and the risk of serious adverse events. Studies on the effectiveness of SSRIs are limited in number but seem to support their use as first-line antidepressant medication in youthful depression. ECT also appears to be well tolerated and effective for severe and intractable depression and bipolar disorder in adolescence, although it continues to be rarely used. For children and adolescents with bipolar disorder, mood stabilizers should be preferred as first-line medications.

3.3 Tertiary Prevention

Studies reporting the treatment histories of young people who commit suicide have found that only a minority of young people who commit suicide have received psychiatric treatment. Even in individuals with a previous suicide attempt, less than half have been in psychiatric care.[54,66] Furthermore, discontinuity of psychiatric care seems to characterize young suicides.[155] Adolescents who have attempted suicide have an 8-fold increased risk for another attempt,[156] and a previous suicide attempt is one of the strongest correlates of completed suicide among the young.[157] Noncompliance in the treatment of adolescent suicide attempters is a remarkable problem.[158] However, in the study by Pelkonen et al.,[159] outpatient adolescents with suicidal behavior were less likely to discontinue treatment early compared with outpatients having behavior problems. According to Granboulan et al.,[160] compliance with follow-up care was better among more severely impaired young people and when the follow-up appointment was scheduled before discharge.

Obviously, developing efficacious treatments for suicidal children and adolescents, and particularly treatment modalities for the aftercare of youthful suicide attempters, would offer possibilities for preventing suicides.

3.3.1 Psychosocial Treatment

Hawton et al.[161] reviewed in their meta-analysis 23 trials, mostly in adult suicide attempters, and concluded that evidence is still lacking for the most effective forms of treatment of these patients. However, they found promising results for problem-solving therapy compared with standard care and for provision of an emergency contact card in addition to standard care compared with standard aftercare alone. Furthermore, dialectical behavior therapy (DBT) for female suicide attempters with borderline personality disorder showed promising results. DBT has been adapted for the treatment of suicidal adolescents. This modification of DBT is an intensive 12-week treatment consisting of a multi-family skills training group, individual therapy, and phone consultations when needed.[162]

Limited evidence exists on the efficacy of psychosocial treatments in suicidal young people. Table VII summarizes the main results of eight comparative studies of suicidal youth. Deykin et al.[163] conducted a nonrandomized 2-year intervention trial in a general hospital with another general hospital serving as a control

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Table VII. Comparative studies on the efficacy of psychosocial treatment of suicidal children and adolescents

Study	Individuals	Design	Interventions	Outcome
Deykin et al.[163]	379 suicidal adolescents seen in emergency room in two separate hospitals, age 13–17y	Nonrandomized	DS provision for at-risk adolescents + EC for human service workers for 172 individuals vs TAU for 147 controls Duration of intervention: NS Duration of study: 2y	DS + EC > TAU in increasing compliance and facilitating early help-seeking; DS + EC = (>) TAU in diminishing emergency room admissions for suicidality; DS + EC = TAU in reducing suicidal episodes
Lerner & Clum[164]	18 volunteering females with 'clinically significant' suicidal ideation, age 18–24y	Nonrandomized	PS for 9 individuals vs ST for 9 individuals, 10 group sessions, duration 5–7wks Duration of intervention: 5–7wks Follow-up: 3mo	PS = (>) ST post-test in reducing suicidal ideation; PS > ST in reducing hopelessness and depression
Cotgrove et al.[165]	105 hospitalized suicide attempters age 12–16y (mean 14.9y)	Randomized	GC for 47 individuals vs TAU for 58 individuals Duration of intervention: NS Duration of study: 3y Follow-up: 12mo	GC = (>) TAU in reducing suicide attempts during 1-year follow-up
Donaldson et al.[166]	101 adolescent suicide attempters from emergency department, age 12–18y	Nonrandomized	SPC + CE intervention for 23 individuals, SPC only for 78 historical comparison individuals Duration of intervention: 6wks Follow-up: 3–4mo	SPC + CE (>) SPC in reducing outpatient psychotherapy no-shows (9% vs 18%), in enhancing therapy attendance, in preventing reattempts (all trends)
Spirito et al.[167]	63 adolescent suicide attempters from emergency department, age 12–18y	Randomized	29 individuals attended CE group, 34 received SPC Duration of intervention: 8wks Follow-up: 3mo	CE > SPC in enhancing therapy attendance in 3mo follow-up after controlling for barriers to services in the community
Harrington et al.[168]	162 suicide attempters after hospitalization, age 10–16y	Randomized	TAU + home-based FI for 85 individuals, 5 family PS sessions, vs TAU for 77 comparison individuals Duration of intervention: 4wks Follow-up: 66mo	TAU + FI = TAU in reducing suicidal ideation during 2 and 6mo follow-up; TAU + FI > TAU among individuals with no depression
Rotheram-Borus et al.[169]	140 female hospitalized suicide attempters, age 12–18y	Nonrandomized	SERC including staff training, videotape viewing and crisis therapy session for 65 individuals vs ERC for 75 controls Duration of intervention: 1 session + 20min videotape viewing Follow-up: 18mo	SERC = (>) ERC in reducing reattempts; SERC > ERC in enhancing attendance in aftercare SERC > ERC in reducing depression

Continued next page

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Table VII. Contd

Study	Individuals	Design	Interventions	Outcome
Wood et al.[170]	63 adolescents referred to mental health services due to repeated deliberate self-harm, age 12–16y	Randomized	32 individuals received DGP, duration 6 sessions, thereafter longer-term when needed, + TAU, 31 comparison individuals TAU only Duration of intervention: 6wks Follow-up: 7mo	DGP + TAU (>) TAU in reducing further deliberate self-harm in 7mo follow-up; DGP + TAU > TAU in reducing further repeated deliberate self-harm in 7mo follow-up DGP + TAU = TAU in effect on depression, suicidal thinking and global outcome

CE = compliance enhancement; **DGP** = developmental group psychotherapy; **DS** = direct service provision; **EC** = educational curriculum; **ERC** = standard emergency room care; **FI** = family intervention; **GC** = green card for readmission to hospital; **NS** = not specified; **PS** = problem-solving therapy; **SERC** = specialized emergency room care; **SPC** = standard psychiatric care; **ST** = supportive therapy; **TAU** = treatment as usual; **=** indicates no difference between groups; **(>)** indicates statistically nonsignificant trend between groups; **>** indicates statistically significant difference.

site. The intervention consisted of provision of direct service for adolescents treated in the emergency room for suicidality and an educational curriculum directed at health and human service personnel, teachers, court personnel, and peer leaders in high and middle schools. Direct service was provided by a trained community social worker and aimed at supporting the at-risk adolescents as a primary resource, ensuring that the adolescents kept their follow-up appointments, and acting as an advocate for the adolescent. It further aimed at providing a liaison between the adolescent and the hospital and between the hospital and the community agencies, and at helping the adolescent use social supports available. The educational curriculum was designed to increase participants' knowledge of adolescent depression and suicidal behavior and to inform of community resources and the direct service program. Adolescents seen in the emergency room of the control hospital were offered treatment as usual. During the 2-year program, the intervention had a clear impact on increasing the individuals' compliance with medical recommendations. A slight, but statistically nonsignificant, reduction in emergency room admissions for suicidality was found at the intervention site. Unfortunately, no difference between the intervention and the control sites was found in episodes of self-destructive acts.

Lerner and Clum[164] compared the effects of two group psychotherapies, cognitive-behavioral problem-solving and supportive therapy, in reducing clinically significant suicidal ideation among female late adolescent/young adult students. General improvement, decrease in depressive symptoms and hopelessness were significantly higher in the problem-solving group. Problem-solving was slightly more efficacious in reducing suicidal ideation, but the group difference was statistically nonsignificant. At 3-month follow-up, the gains were maintained.

Cotgrove et al.[165] studied a novel method to reduce the incidence of further suicide attempts in a group of children and adolescents admitted to hospitals after an attempted suicide. During a 3-year recruitment period, on discharge from hospital, 105 youths were allocated randomly either to the intervention group or to the control group. The intervention group received a green card, which acted as a passport to immediate readmission into hospital whenever the individual felt suicidal. The control group received standard follow-up and treatment from their clinic or child psychiatry department. During the 1-year follow-up, the rate of reattempts in the control group was twice that of those with the green card, but due to low statistical power the difference was not statistically significant.

Donaldson et al.[166] reported on the effects of structured disposition planning for adolescent suicide attempters and compared their experimental group (n = 23) with a historical comparison group of attempters receiving standard psychiatric evaluation (n =

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78). Their intervention contained a 1-hour compliance enhancement intervention consisting of a review of expectations and possible concerns about therapy after the emergency room evaluation, confrontation of resistance toward therapy, contracting verbally minimum attendance to therapy, and providing the parents and the adolescent with information on different services. The patients and their parents were thereafter contacted by telephone at 1, 2, and 6 weeks after discharge. In the intervention group, there were fewer outpatient therapy no-shows, greater number of sessions attended, and less reattempts. Due to the small number of patients in the intervention group, none of the between-group differences were statistically significant. The research group later tested the efficacy of their intervention in a randomized trial of 63 individuals with complete data.[167] The intervention was essentially the same as described in the first study. The intervention was essentially the same as that described in the first study, with telephone contact at 1, 2, 4, and 8 weeks after discharge. Control individuals received standard psychiatric care. At 3-month follow-up, after controlling for barriers to service in the community, individuals in the intervention group attended significantly more treatment sessions than those in the comparison group.

In the setting of children and adolescents who had taken overdoses and their families, a combination of treatment as usual and a brief home-based family intervention conducted by child psychiatric social workers was compared with treatment as usual by Harrington et al.[168] The intervention program contained five sessions, was intensive, action orientated, and aimed to improve family functioning by focusing on communication and problem-solving. Patients (n = 162) from referrals to child mental health teams from hospital wards were randomized to the intervention group consisting of the family intervention plus routine care, and to the control group receiving routine care only. When assessed 2 and 6 months after recruitment, suicidal ideation and hopelessness had decreased markedly in both study groups, but no statistically significant between-group differences were found. However, in subgroup analyses, individuals without depression before treatment in the intervention group had much less suicidal ideation than the control group.

Recently, Rotheram-Borus et al.[169] compared a specialized emergency room intervention and standard emergency room care in 140 female suicide attempters and followed them for 18 months. The specialized intervention consisted of routine aftercare plus staff training, videotape viewing, and one crisis therapy session. Staff training aimed to enhance positive patient interactions, reinforce the importance of outpatient aftercare, and recognize the seriousness of the suicide attempt. The aim of the videotape viewing was to instill realistic expectations regarding treatment, and that of the crisis therapy session to achieve an explicit contract of outpatient treatment and help the patient cope with suicidal feelings. During the follow-up, rates of suicide reattempts and suicidal ideation decreased similarly in both groups, but the specialized intervention was more efficacious in reducing depression. In addition, over 18 months, the specialized intervention was associated with greater attendance and completion of aftercare outpatient therapy.

A randomized trial compared developmental group psychotherapy and treatment as usual in the treatment of deliberate self-harm in adolescents referred to mental health services.[170] The intervention comprised one assessment session and six 'acute' group sessions focusing on relationships, school problems and peer relationships, family problems, depression and self-harm, and hopelessness and feelings about the future. The acute phase was followed by weekly group therapy in a 'long-term group' continuing until the adolescent felt ready to leave. Treatment as usual comprised individual supportive sessions or supportive sessions with parents. In 7-month follow-up, adolescents in the intervention group tended to have fewer episodes of self-harm and had significantly less repeated episodes of self-harm. However, the intervention had no significant effect on depressive symptoms, suicidal thinking, or global outcome.

Two randomized controlled psychotherapy trials of depressed adolescents[136,138] have reported changes in suicidality (see table V). Brent et al.[136] found CBT to be the most efficacious treatment for adolescent depression in comparison with nondirective supportive therapy and systemic family therapy. Clinically significant suicidality decreased significantly during the 12–16-week treatment in all the studied psychotherapy modalities, but there were no significant differences between the treatments. In the study by Mufson et al.,[138] IPT was more efficacious than clinical monitoring in alleviating depression, but no significant differences in reductions of suicidality between the treatments were found. However, in their study more individuals in the clinical monitoring condition were removed from the trial due to suicidality.

Research on adult suicide attempters and the above studies on children and adolescents suggest that different psychosocial treatment modalities may be useful in the treatment of suicidal youth. It seems that much of the change in suicidality across studies is attributable to nonspecific elements in different psychotherapy modalities. Clear research evidence in favor of one treatment over another is lacking. Obviously, larger trials of promising interventions are needed.

3.3.2 Biological Treatment

Research on the neurobiological correlates of suicide suggests that serotonergic activity may be reduced in individuals who commit suicide.[171] Alterations in noradrenergic indices in indi-

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viduals who commit suicide have also been reported, but the results are less consistent than those for the serotonergic system.[172] Interestingly, the serotonergic correlations with suicide seem to be equally strong regardless of the psychiatric disorder the individual has had.[171] These findings suggest that the serotonergic abnormality may be related to the predisposition to suicidal behavior, not only to the associated mental disorder (for a comprehensive review, see Mann & Stoff[173]). This further suggests that treating patients with medications that increase serotonergic activity might reduce the risk for severe suicidal behavior.

In the meta-analysis of studies on mostly adult suicide attempters,[161] no clear evidence was found that antidepressants were effective in preventing repetition of suicide attempts. However, in one study,[174] subgroup analyses indicated a marked reduction in attempts in patients who received an SSRI and who had a history of one to four suicide attempts, compared with similar patients who received placebo. There was no indication of similar benefit among those patients with a history of five or more previous attempts. Significantly reduced rates of further self-harm were observed for depot flupenthixol versus placebo in multiple repeaters.[175] Small sample sizes in most trials limit the generalizability of the results. There clearly is a need for large trials of interventions showing promise in published small trials.

To the best of the authors' knowledge, there are no rigorously designed controlled studies on the efficacy of psychopharmacologic interventions in reducing suicidal behavior in children and adolescents. Therefore, suggestions on the pharmacological treatment of suicidal youth are largely based on literature on suicidal adults. Choosing medication for suicidal youth depends on the psychiatric disorder associated with suicidal behavior. The efficacy and adverse effects of each drug need to be weighed. Although medications may be essential in stabilizing and treating the suicidal child and adolescent, all administration must be carefully monitored by a parent or other caregiver who can report any unexpected change of mood, increase in agitation or adverse effects and who may regulate dosage.[30]

The SSRIs appear to be well tolerated in children and adolescents. The evidence on the efficacy of these medications in treating youthful depressive disorders is still preliminary, yet promising. None of the studies in table VI investigated specifically the efficacy of antidepressants in the treatment of suicidal youth. The most severely suicidal individuals were excluded from randomization, and the authors do not report changes in suicidal ideation of the studied individuals. Therefore, one has to be careful in drawing conclusions for the treatment of suicidal youth from those studies. On the other hand, it is plausible to expect a reduction in the risk of suicidal behavior when depressive disorders remit.

Due to the limited evidence of the efficacy of TCAs, their unfavorable adverse-effect profile, and lethality in overdose, one should be very careful in prescribing TCAs to suicidal children and adolescents. SSRIs, due to their low lethal potential, are a first-choice medication compared with TCAs.[30]

In a recent meta-analysis on suicide risk in major affective illness,[176] suicide risk was lower during long-term treatment of major affective disorders with lithium compared with treatment without lithium. The authors also raised the possibility that lithium may decrease the risk of suicide by having a direct effect on aggressive or impulsive behavior, independent of its mood-stabilizing properties. It has been recommended that depressed suicidal children and adolescents with a history of bipolar disorder should first be treated with a mood stabilizer before receiving antidepressant medication.[30]

3.4 Postvention

'Postvention' is the term used to refer to intervention after a suicide has occurred. After the suicide of a child or adolescent, crisis intervention among the survivors, e.g. at school, has been commonly recommended.[30,33] Reportedly, friends of individuals who commit suicide are at risk for developing depression, posttraumatic stress disorder and complicated grief reactions.[177-179] Systematic evaluation of community postventive crisis interventions have not been published thus far. Preliminary findings have reported that, following a suicide, the number of suicides during the year after the suicide increased beyond chance in schools without adequate postventive crisis interventions compared with schools with proper crisis intervention.[177]

4. Conclusions

Suicide rates increase greatly among adolescents with increasing age. Suicide is one of the commonest causes of death among adolescents. Youth suicide is a major public health concern worldwide, although the rates of suicides vary between countries. Hence, prevention of suicide in young people is highly important. In order to be successful, youth suicide prevention cannot be restricted to, for example, psychiatric care, but action needs to be taken at different levels of society. The consistent finding that less than half of adolescent suicides have received psychiatric care suggests that broad prevention strategies are needed in healthcare and social services. It has been recommended that primary care clinicians be trained in recognizing youth at risk for suicide. Information on the strong association of psychopathology and suicides should be provided for healthcare professionals. Active screening and direct questioning on suicide-spectrum behavior by healthcare practitioners should be encouraged, because young

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people do not always communicate their suicidal thoughts with adults. Although many suicidal adolescents confide their suicidal thoughts only to peers,[44,66] young people should be encouraged to turn to adults whenever their friends communicate suicidal ideas. All expressions of suicide intent have to be taken seriously, and indicate a need for assessment of the adolescent's development and life circumstances.

The main target of effective prevention of youthful suicides is to reduce suicide risk factors. Psychiatric morbidity, particularly mood disorders, antisocial disorders and substance abuse, are strongly related with youth suicide. Therefore, recognition and effective treatment of these disorders are of utmost importance in the clinical prevention of child and adolescent suicides. In the treatment of child and adolescent depression, psychosocial treatments have proved to be useful and efficacious. Although studies on the effectiveness of SSRIs are limited in number, evidence supports their use as first-line antidepressant medication in depression in children and adolescents.

The limited evidence suggests that different treatment modalities are useful in the treatment of suicidal youth. It seems that much of the improvement in suicidal ideation or decrease in suicide attempts is attributable to nonspecific elements in treatment. For high-risk youth, providing continuity of care is a challenge, since they are often noncompliant and commonly 'drop out' or terminate their treatment prematurely. Preventive and treatment efforts targeted at high-risk young people may be seen as useful not only in prevention of suicides but also in producing subsequent psychosocial well-being later in life.

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Correspondence and offprints: Dr *Mirjami Pelkonen*, Department of Mental Health and Alcohol Research, National Public Health Institute, Mannerheimintie 166, Helsinki, FIN-00300, Finland.
E-mail: mirjami.pelkonen@ktl.fi

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