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For which strategies of suicide prevention is there evidence of effectiveness?



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Abstract

Suicide is a serious global public health problem; it is associated with an array of factors, including mental illness, social isolation, physical illness, substance abuse, family violence and access to means of suicide. The epidemiology of suicide rates varies across countries and regions; those in eastern Europe are among the highest in the world. Despite substantial efforts in many countries, including through dedicated national plans, it remains unclear as to which interventions are the most effective.

This report therefore aims to synthesize research findings from existing systematic reviews to address two questions:

- What types of preventive interventions have been evaluated in the published literature?
- Which strategies have good-quality evidence to support them?

Limited evidence – as well as variability by population characteristics, social, cultural and socioeconomic situation – suggests that a combination of preventive approaches, addressing different risk factors at different levels, is required. In addition, an evaluation framework should accompany the implementation of any new intervention.

Keywords

DECISION SUPPORT TECHNIQUE

EVIDENCE BASED PRACTICE

HARM REDUCTION

PREVENTIVE HEALTH SERVICES

RISK REDUCTION BEHAVIOR

SUICIDE – PREVENTION AND CONTROL

SUICIDE, ATTEMPTED – PREVENTION AND CONTROL

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Summary

The issue

Suicide is a serious global public health problem. Despite substantial efforts in suicide prevention, it remains unclear which interventions are effective in preventing suicide. The objective of this report is to synthesize research findings from systematic reviews to address two questions:

1. What types of suicide preventive intervention have been evaluated in the published research?
2. Which suicide preventive interventions have good-quality evidence to support them?

Findings

Around 34 types of suicide preventive interventions were evaluated in the published systematic reviews, which covered the whole spectrum of suicide prevention efforts from prevention through to treatment and maintenance. More than half of these interventions fell into the domain of treatment and maintenance rather than prevention. This is not surprising given that the motivation may be to “treat” or reduce risk factors such as depression or mental illness.

Evidence from seven systematic reviews (rated as “average” or “good” in relation to their methodological quality) indicated that some interventions may be promising.

- School-based suicide prevention programmes that focused on behavioural change and coping strategies in the general school population and skill training and social support for at-risk students had beneficial effects on intermediate outcomes, such as suicidal tendencies and risk factors for suicide; however, the effect of these interventions on suicide rates is not known.
- There was limited evidence that multifaceted suicide prevention programmes based on risk factor identification and educational and organizational changes reduced the rates of suicide and attempted suicide among military personnel.
- Restriction of access to lethal means (e.g. firearms and pharmacological agents) may reduce the rate of cause-specific suicide in the general population, but its effect on the overall suicide rate was unclear.

- The administration of lithium reduced the risk of suicide and deliberate self-harm in patients with mood disorders.
- Psychosocial and pharmacological treatments, such as problem-solving therapy, provision of a card for emergency contact, cognitive behavioural therapy and administration of flupenthixol, were promising in reducing rates of repeated self-harm among suicide attempters.

Policy considerations

Although the effectiveness of a variety of suicide preventive interventions has been examined in the primary research, not all of these studies are represented in the systematic review literature. In addition, many interventions that are currently in use have not yet been evaluated in primary research.

Based on the limited evidence to date, some interventions aimed at specific populations showed some benefit for intermediate outcomes, but few of the reviews demonstrated direct effects on mortality rates. Owing to the limited evidence and the heterogeneity of the interventions, it was not possible to determine if one single intervention was more effective than another. Local factors, such as population characteristics and the social, cultural and socioeconomic context, need to be taken into consideration when attempting to generalize these findings to other populations.

Suicide is a result of complex interactions among various risk factors and protective influences. Consequently, a strategy including a combination of suicide prevention approaches addressing different risk factors at various levels will be required. When implementing a new strategy, an evaluation framework should be established to help to determine its effectiveness.

Glossary

Indicated prevention. Targeted to high-risk individuals who are identified as having minimal, but detectable, signs or symptoms foreshadowing mental, emotional or behavioural disorder, or biological markers indicating predisposition to such a disorder, but who do not meet diagnostic levels at the current time (1).

Non-fatal suicide behaviour. A non-habitual act with non-fatal outcome that the individual, expecting to or taking the risk to die or to inflict bodily harm, initiated and carried out with the purpose of bringing about wanted changes (2).

Postvention. Activities developed by, with or for suicide survivors to facilitate recovery after suicide and to prevent adverse outcomes, including suicidal behaviour (3).

Prevention. Interventions occurring prior to the onset of a disorder that are intended to prevent or reduce risk of the disorder (1).

Protective factors. A characteristic at the biological, psychological, family or community (including peers and culture) level that is associated with a lower likelihood of problem outcomes or that reduces the negative impact of a risk factor on problem outcomes (1).

Risk factors. A characteristic at the biological, psychological, family, community or cultural level that precedes and is associated with a higher likelihood of problem outcomes (1).

Selective prevention. Interventions targeted to individuals or a population subgroup whose risk of developing mental disorders is significantly higher than average. The risk may be imminent, or it may be a lifetime risk. Risk groups may be identified on the basis of biological, psychological or social risk factors that are known to be associated with the onset of a mental, emotional or behavioural disorder (1).

Suicide. An act with a fatal outcome that the deceased, knowing or expecting a potentially fatal outcome, initiated and carried out with the purpose of bringing about wanted changes (2).

Suicide attempt. A potentially self-injurious behaviour that is associated with at

least some intent to die as a result of the act. Evidence that the individual intended to kill himself/herself, at least to some degree, can be explicit or inferred from the behaviour or circumstance. A suicide attempt may or may not result in actual injury (4).

Suicide ideation. Passive thoughts about wanting to be dead or active thoughts about killing oneself, not accompanied by preparatory behaviour (4).

Treatment. Interventions targeted to individuals who are identified as currently suffering from a diagnosable disorder and that are intended to cure the disorder or reduce the symptoms or effects of the disorder, including the prevention of disability, relapse or comorbidity (1).

Universal prevention. Interventions targeted to the general public or a whole population that has not been identified on the basis of individual risk. The intervention is desirable for everyone in that group (1).

Introduction

Suicide is a serious global health problem. Rates of suicide have increased by 60% over the last 45 years, with almost one million people now dying from suicide annually. This translates to an overall rate of 16 people per 100 000 worldwide, making suicide the 10th leading cause of death globally and one of the three leading causes of death among people aged between 15 and 44 years (5). The magnitude of the problem is even more significant when the number of attempted suicides is included, as attempted suicide is 20 times more common than completed suicide (5).

Suicide rates vary greatly between countries, with the lowest annual rates reported in Muslim and Latin American countries (fewer than 6.5 per 100 000) and the highest occurring in eastern Europe, where rates of more than 30 suicides per 100 000 persons have been reported in countries such as Belarus, Lithuania and the Russian Federation (5,6). The majority of suicides (73%) occur in developing countries, with approximately 60% of all suicides occurring in Asia, particularly China, India and Japan (7–9). This reflects both the large populations and the relatively high prevalence of suicide in many Asian countries (above 15 per 100 000 persons in India and above 20 per 100 000 in China, Japan, the Republic of Korea and Sri Lanka) (10).

The epidemiology of suicidal behaviour is strikingly variable. In developed countries, suicide is most common among those aged between 15 and 24 years and in elderly men over 65 years of age, whereas in developing countries people younger than 30 years of age are the most likely to commit suicide. More than 90% of people who die by suicide in developed countries have a mental disorder, while this is the case in 60–90% of suicides in developing countries (7,11). In most countries, men are more likely to commit suicide than women. In China, however, the reverse is true, particularly in rural areas (11,12).

The majority of researchers and professionals involved in suicide prevention agree that suicide is associated with a complex array of factors such as mental illness, social isolation, a previous suicide attempt, physical illness, substance abuse, family violence and access to means of suicide (5,6,13,14). In response to this serious public health problem, substantial efforts have been made by many countries to prevent suicide. However, risk factors differ between countries and

often vary with age, sex and ethnic group, and there has been no single factor identified as a sufficient cause of suicide (5,12,15). Consequently, national suicide prevention plans have generally encompassed a multifaceted approach rather than focusing on a single risk factor (6,16,17). Striking the right balance between local relevance, cultural appropriateness and cost in a suicide prevention strategy can be challenging, and it is essential to continually evaluate the effectiveness of such strategies (6,7).

The objective of this report is to synthesize research findings from systematic reviews to address the following two questions.

1. What types of suicide preventive intervention have been evaluated in the published research?
2. Which suicide preventive interventions have good-quality evidence to support them?

Methodology

This report is an update of a previous overview of reviews (18,19), which included quantitative (use of meta-analysis) or qualitative systematic reviews published from January 1990 to October 2003 that assessed the effectiveness of suicide preventive interventions by evaluating changes in non-fatal suicide behaviour (including repetition of self-harm), protective factors or risk factors for suicide, and rates of suicide. An update search was conducted in November 2010 to identify any relevant systematic reviews that had been published since October 2003. Details of the literature search strategy and inclusion criteria for the selection of systematic reviews are presented in Annex 1. A list of the excluded reviews is provided in Annex 2.

Interventions evaluated in the systematic reviews are presented according to the mental health intervention spectrum proposed by the National Research Council and Institute of Medicine, which provides a useful conceptualization of the various types of suicide preventive intervention available (Box 1) (1).

Box 1 Mental health intervention spectrum

- Promotion
- Prevention
 - universal
 - selective
 - indicated
- Treatment
 - case identification
 - standard treatment for known disorders
- Maintenance
 - compliance with long-term treatment (goal: reduction in relapse and recurrence)
 - after care (including rehabilitation).

Source: Adapted from O'Connell et al. (1)

In the previous overview of reviews (18,19), the 10 systematic reviews identified in the literature search conducted to October 2003 were critically appraised for their methodological quality using a tool that was developed for evaluating reviews on health promotion and school education (20).

The update search identified an additional 14 systematic reviews on suicide prevention that had been published since October 2003. These reviews were critically appraised for their methodological quality using a tool that was developed by the Institute of Health Economics (21). This tool differs from the one used in the previous overview of reviews in that it provides a more comprehensive and contemporary assessment of the key aspects of study design that may introduce bias in a systematic review.

This overview of reviews was written to provide health policy decision-makers with a summary of the evidence from methodologically robust systematic reviews and to discuss gaps in knowledge on suicide prevention strategies.

Findings

Of the 10 reviews (22–31) identified in the previous overview of reviews (18,19), only three (22–24) were considered to be of good quality based on their total scores (Table 1). The results of these three reviews, which formed the evidence base for the previous overview of reviews, are presented in this section.

Table 1 Systematic reviews of average to good quality included for review

Review	Intervention	Population	Outcomes	Search End Date
New reviews included in the update				
Cipriani et al. (37)	Long-term (at least 3 months) lithium prophylaxis	Patients with mood disorders (unipolar depression, bipolar disorder, schizoaffective disorder, dysthymia and rapid cycling)	Suicide, deliberate self-harm (including attempted suicide), and death from all causes	2003
Cusimano & Sameem (38)	Middle to high school-based suicide prevention curriculum lasting at least one session and consisting of multiple educational modalities aimed at increasing knowledge and changing behaviours related to suicide	Adolescents, 13 to 19 years of age	Not specified	October 2009
Hahn et al. (32,33)	Firearm laws including bans on specified firearms or ammunition, restrictions on firearms acquisition, waiting periods for firearms acquisition, firearms registration, licensing of firearms owners, “shall issue” carry laws, child access prevention laws, zero tolerance laws for firearms in schools, and combinations of firearms laws	Not specified	Rates of violent crimes, suicide, and unintentional firearm injury	July 2001
Shekelle et al. (17), Bagley et al. (34)	Any suicide prevention strategy	Veterans and active military duty personnel	Rates of suicides or suicide attempts	May 2008

Review	Intervention	Population	Outcomes	Search End Date
Reviews included in the earlier overview (18,19)				
Guo & Harstall (22)	Suicide prevention programmes for children and youth, including school-based or community-based suicide prevention programmes	Children/ adolescents, 5 to 19 years of age	Changes in the awareness of suicide-related knowledge, suicide protective factors or suicide risk factors; rates of suicidal ideation, suicide attempts or completed suicides	May 2001
Hawton et al. (23)	Psychosocial or psychopharmacological treatment	Men and women of any age who, shortly before entering the study, had engaged in any type of deliberately initiated self-poisoning or self-harm	Rate of repeated self-harm (fatal and non-fatal) within a follow-up period of up to 2 years	February 1999
Van der Sande et al. (24)	Psychosocial/psychotherapeutic treatment and interventions aimed at improving compliance with aftercare following a suicide attempt	Suicide attempters	Rate of repeated self-harm (fatal and non-fatal)	December 1995

Fourteen new systematic reviews met the inclusion criteria. Two of these reviews, Hahn et al. (32,33) and Shekelle et al. (17,34), were each published in two separate publications. Three reviews were meta-analyses (quantitative systematic reviews) (35–37), while the other 11 were qualitative systematic reviews (6,17,32–34,38–45). There was a great deal of overlap among the primary studies that were assessed in the systematic reviews.

About 34 types of suicide preventive intervention were evaluated in the 14 systematic reviews. These interventions are presented in Table 2 using the intervention spectrum outlined in Box 1. The majority of the interventions fell into the domain of treatment and maintenance rather than prevention.

Table 2 Suicide preventive interventions that were analysed in the systematic reviews (categorized according to the mental health intervention spectrum, Box 1)

Intervention category	Interventions
Prevention	
Universal	Media reporting restrictions (6,17) Means access restrictions (6,17,32,33,42) National suicide prevention programmes (6,17)
Selective	Suicide prevention centres (17,42) Community-based suicide prevention programmes (17,42,45) School-based suicide prevention programmes (6,22,24,42,43,45) Workplace-based prevention programmes (45) Prison-based prevention programmes (42,45) Programmes for veterans and military personnel (17,34,42,45) Drug misuse programmes (17,34,42)
Indicated	Training and peer education (e.g. gatekeeper training, education programmes for families) (6,17,41,42) Providing assistance to general practitioners (17) Telephone-based suicide prevention services (17,40) Assistance to family/friends of high-risk individuals (17) Postvention (17,22,34)
Treatment	
Case identification	Screening (6,39)
Standard treatment for known disorders	Pharmaceutical interventions (e.g. anticonvulsants (42), antidepressants (6,17,23,34,36,39,42,44), antipsychotics (6,23,39,42), benzodiazepines (42), lithium (6,35,37,42,44)) Electroconvulsive therapy (42,44) Neurosurgery (42) Intensive care plus outreach (23,39) General hospital admission (23,39) Cognitive behavioural therapies (17,23,24,34,36,39,42,44) Inpatient-based therapies (23,39,42) Outpatient-based therapies (39) Home-based therapy (23,39,42) Psychosocial interventions (e.g. problem-solving) (23,24,36,39,44) Psychotherapy (6,39,42)
Maintenance	
Compliance with long-term treatment	Ongoing contact (e.g. postal or telephone follow up) (6,17,39,42) Crisis cards (6,23,39,42) Inpatient shelter (24) Home-based therapy (23) Compliance management (24)
After care	Long-term therapy (23,39) Service restructuring and case management (17,42)

Note: The bolded interventions were evaluated by the selected systematic reviews.

When the quality assessment criteria (21) were applied to the 14 systematic reviews, only four (17,32–34,37,38) were considered to be of average to good

quality based on their total scores (Table 1). Details of the 10 excluded reviews are provided in Annex 3. Following the methods of the previous overview of reviews, only the results of those systematic reviews that were rated as average to good quality are summarized in this section. There were considerable limitations associated with the methodological quality of most of the 14 systematic reviews. Some reviews did not provide sufficient information about study participants, intervention protocols, intervention implementation or the review methodology.

The interventions evaluated in the seven reviews rated as average to good quality (Table 1) are bolded in Table 2, and a summary of results related to those interventions is presented in the following section. Caution is needed in interpreting these results given the poor methodological quality of some of the primary studies included in the reviews.

Prevention

National suicide prevention programmes

Shekelle et al. (17) identified two poorly described prospective cohort studies of multicomponent national suicide prevention programmes. Both studies reported declines in suicide rates after the introduction of the programmes, but it was unclear to what extent the programmes contributed to these reductions.

Community-based suicide prevention centres and programmes

The review by Shekelle et al. (17) found one observational study reporting on the effects of a very poorly described community-based programme; two others documented a programme providing a 24-hour suicide telephone hotline. The quality of the studies was low and the results were inconclusive.

In addition, one randomized controlled trial (RCT) examined the effect of providing a collaborative care manager to primary care clinics and found a statistically significant reduction in suicidal ideation among depressed older patients who received the treatment, compared with those who did not. Another RCT reported on the provision of assistance to family or friends of men at high risk for suicide. There was a statistically significant reduction in suicide attempts post-intervention, but the study was methodologically weak and did not report the effect of treatments in comparison with a control group (17).

School-based suicide prevention programmes

The earlier overview of reviews included a qualitative review by Guo and Harstall (22), which included 10 studies (three were RCTs) that focused mainly on high school students aged 12 to 19 years. These school-based suicide prevention programmes for adolescents varied considerably in terms of programme objective, focus, target population and delivery modes. The duration of the programmes ranged from one 1.5-hour session to 180 sessions of 55 minutes each. The prevention programmes were usually delivered by school staff (teachers, school nurses or counsellors) or social workers with previous training. Three suicide prevention programmes for adolescents at high risk that focused on skill training and social support appeared to be effective in reducing risk factors (depression, hopelessness, stress, anxiety and anger) and enhancing protective factors (personal control, problem-solving skills, self-esteem and network support). Two suicide prevention programmes that focused on behavioural change and coping strategies in the general school population demonstrated lowered suicidal tendencies, improved ego identity and improved coping ability. However, the authors pointed out that methodological limitations meant that the results from these studies were difficult to compare, and the soundness of conclusions based on such studies may be questioned (22).

The update search identified a qualitative review by Cusimano and Sameem (38) on middle and high school-based suicide prevention programmes. Of the eight RCTs included, four were also included in the Guo and Harstall review (22). However, only one of these was considered an RCT by Guo and Harstall. The four studies that were not included in Guo and Harstall review (22) assessed a didactic style psychoeducational programme, a three-day long curriculum programme and a programme aimed at teaching youth to recognize the signs of suicide in themselves and their peers. In the three studies that reported it, there were statistically significant improvements in knowledge of and attitude to suicide after the intervention. For help-seeking behaviour, only one of three studies showed an improvement. Two studies that assessed self-reported suicide attempts showed a reduction in the rate of attempts compared with the control group. None of the studies reported on rates of suicide. The authors concluded that suicide prevention programmes based in middle and high schools can improve knowledge, attitudes and, potentially, help-seeking behaviours among youth. However, there was no evidence that these prevention programmes reduced suicide rates (38).

Interventions for veterans and military personnel

Shekelle et al. (17,34) assessed seven prospective cohort studies (17 on multifaceted interventions for military personnel that used a conceptual model of risk factor

identification followed by educational and organizational changes to reduce those factors or increase education and awareness about them. All of the studies reported declines in suicides or suicide attempts, but data reporting was inadequate and the quality of the analyses was generally poor. Three studies involving veterans were identified. One small RCT found a trend in favour of dialectical behaviour therapy, compared with individual therapy, for reducing rates of intentional self-harm among female veterans with borderline personality disorder, but the difference was not statistically significant. One observational study reported mixed results with respect to suicide attempts for substance abuse treatment programmes (either residential or outpatient), while another observational study reported a reduction in suicide rates among veterans receiving antidepressant treatment (17,34).

Restriction of access to lethal means

Firearms

Two reviews examined the effect of firearm laws on rates of suicide (17,32,33). The review by Hahn et al. (32,33) included 51 studies that assessed the effectiveness of firearm laws in preventing violence. Although a variety of violent crimes were included as outcomes, only the subset of studies reporting on suicide rates is reported here. Five specific laws were assessed.

1. Three studies reported on the effects of bans on specified firearms or ammunition, two of which found a decrease in suicide after the introduction of a handgun ban, compared with control regions. The third study found increases and decreases in suicide rates associated with several types of ban.
2. One RCT examined restriction on firearm acquisition. Restriction based on prior felony conviction produced a slight, but not statistically significant, decline in rates of firearm-related suicide and total suicide in people aged 21 years and older. Although there was a statistically significant decline in firearm-related suicide deaths among people aged 55 years and older, this was attributed to the waiting period component of the law rather than the felony restriction. A minor method substitution effect (individuals switching to another method of suicide) was evident as there was an 8.6% decrease in firearm-related suicide, but a 3% increase in non-gun suicide over the same time period.
3. Six studies found conflicting results on the effectiveness of waiting periods for firearms acquisition for preventing suicide.
4. Four studies on licensing of firearm owners, one of which also examined the effect of firearm registration, reported conflicting results with respect to suicide rates.

5. Two studies on child access prevention laws, which are designed to limit children's access to and use of firearms, reported mixed results for effects on suicide rates among juveniles.

The Hahn et al. (32,33) review also evaluated whether the degree to which firearm possession and use is regulated was associated with rates of violent crimes. One study reported that the instigation of a comprehensive national law in Canada was associated with increased rates of firearm-related suicide. A cross-national (United States and Canada) comparison of comprehensive laws found that more regulation was associated with lower rates of firearm-related suicide, but higher rates of other forms of suicide. Five studies compared the degree of firearms regulation with rates of suicide among states and cities in the United States. While all of the studies showed a reduction associated with greater regulation, only two found a statistically significant difference.

Based on their findings, Hahn et al. (32,33) concluded that the evidence base was insufficient to determine the effectiveness of any of the firearm laws reviewed, either singly or in combination, in reducing suicide rates.

Shekelle et al. (17) identified 20 studies, six of which were also included in the review by Hahn et al. (32,33), that compared suicide rates before and after the implementation of laws restricting access to firearms. Although the results were mixed, there was some suggestion of a protective effect of firearm restrictions in some population subgroups as determined by age and gender. However, it was unclear whether this affected the overall suicide rate or was offset by method substitution (individuals switching to another method of suicide).

Pharmacological agents

Shekelle et al. (17) reported on 10 studies of various designs that assessed the effects of limiting the package size of paracetamol (acetaminophen) and salicylates, or otherwise restricting access to these drugs. The studies generally demonstrated a decline in suicides coincident with the restrictions, although many of the studies had very short follow-up periods. In addition, there was some suggestion that these data may be confounded by a coexisting downward trend in suicide over time. A further two studies demonstrated a decline in suicide by lethal overdose of sedative drugs following restrictions on their availability.

Respiratory toxins

Shekelle et al. (17) identified one study that found a decrease in deaths from carbon monoxide poisonings after the source of domestic gas was changed from coal to natural gas, which significantly lowered the carbon monoxide content. Three studies

that examined the effect of adding catalytic converters to cars, which decrease the carbon monoxide content of exhaust gas, had conflicting results.

Bridge barriers

A single observational study identified by Shekelle et al. (17) reported an increase in the number of suicides by jumping after protective screens were removed from a bridge. The data suggested that this resulted from an actual increase in the suicide rate rather than just displacement from other bridges.

Restriction of media reporting of suicides

In Shekelle et al. (17) one controlled study showed a decline in suicide among women (but not men) during a long-running newspaper strike. However, this was potentially confounded by a coexisting decline in suicide rates over time before the strike began.

Treatment and maintenance

The earlier overview of reviews included two meta-analyses on treatment and maintenance (23,24). The meta-analysis by Hawton et al. (23) examined the effectiveness of various interventions provided in hospital or outpatient clinics, mainly involving psychosocial and pharmacological treatments for patients with a history of deliberate self-harm or attempted suicide. The meta-analysis included 23 RCTs and grouped the studies into 11 categories according to the similarity of treatment strategies. The outcome measures were rates of repetition of deliberate self-harm. The effects of psychosocial interventions were often compared with standard care (control group) in the clinical trials, but details of standard care, such as treatment content, were not always provided. The interventions that showed some benefit were problem solving (five studies) and emergency card (two studies), which showed trends towards less repetition of deliberate self-harm, compared with standard after-care (not statistically significant); dialectic behavioural therapy, which significantly reduced the rate of repetition of deliberate self-harm, compared with standard after-care in women with borderline personality disorder and recurrent self-harm (one small study); and flupenthixol, which significantly lowered the rate of repetition of self-harm, compared with placebo (one small study).

The meta-analysis by van der Sande et al. (24) comprised studies of patients after a suicide attempt. Fifteen RCTs were included and grouped into four categories according to therapeutic background and treatment protocol. In all trials, the outcome of interest was rate of repeated suicide attempts. The only intervention that showed some benefit was cognitive behavioural therapy. However, since the pooled analysis was not

performed on an intention-to-treat basis, the results may overestimate the effect that is likely to be achieved when the intervention is applied in standard clinical practice.

It has been noted that the patient population receiving psychosocial and pharmacological treatments in research studies on suicide treatment and maintenance is highly selected. The majority includes those individuals who attend general hospitals, most of whom have attempted self-poisoning rather than any other form of self-harm, such as cutting (26). In addition, up to one-third of the self-harm episodes might not lead to medical contact. Therefore, caution should be used when generalizing results from these studies to other populations.

The update search identified a review by Shekelle et al. (17,34) that included 12 studies (nine of which were RCTs) reporting on case management or therapeutic interventions after suicide attempts. Six of these studies were included in the reviews by Hawton et al. (23) and van der Sande et al. (24). Although the interventions varied, they mostly comprised additional resources, such as case management to monitor patients and to facilitate access to mental health services. A wide range in suicide attempt rates was noted, but the majority of the studies did not report any statistically significant differences between the treatment and control groups.

Shekelle et al. (17,34) also reported on four RCTs examining low-intensity post-suicide attempt interventions by phone or mail from research or hospital staff. Two of these studies were included in the reviews by Hawton et al. (23) and van der Sande et al. (24). Overall, the results showed either no difference between the treatment and control groups or modest efficacy in favour of the intervention for reducing repetition or suicide attempts or self-harm.

Cipriani et al. (37) assessed the effectiveness of long-term (at least three months) lithium prophylaxis in preventing suicide and deliberate self-harm in patients with mood disorders. Thirty-two RCTs of 3458 patients were included, of which seven trials reported on the occurrence of suicides. Two trials reported on lithium versus placebo, two for lithium versus amitriptyline, two for lithium versus carbamazepine, and one for lithium versus lamotrigine. Patients who received lithium were less likely to die by suicide (odds ratio (OR), 0.26; 95% confidence interval (CI), 0.09–0.77). Fewer suicides occurred in the lithium group in all the trials except one, in which one suicide occurred in both the lithium and carbamazepine groups. Among patients who received lithium, the composite measure of suicide plus deliberate self-harm was also lower (OR, 0.21; 95% CI, 0.08–0.50), and there were fewer deaths overall (11 trials: OR, 0.42; 95% CI, 0.21–0.87), compared with patients in the control groups. All of the trials reported fewer instances of suicide or deliberate self-harm in the lithium-treated groups. The authors concluded that lithium was more effective in preventing suicide, deliberate self-harm and death from all causes than placebo or another compound in patients with mood disorders (37).

Study limitations

Although overviews of reviews can be a useful way of gathering together a large body of evidence to answer broad questions, there are several limitations with this approach. Overviews of reviews are limited in their scope by the availability of high-quality, current systematic reviews on the topic of interest, and these reviews are, in turn, limited by the breadth, depth and quality of the underlying primary evidence. Consequently, a lack of systematic reviews on a particular suicide preventive intervention should not be interpreted as an absence of evidence. It is also important to be aware of the serious bias that may occur when an intervention with a relatively poor-quality evidence base gains prominence over an effective intervention with substantial primary data merely because it has been evaluated in a good-quality systematic review, while the other intervention has not. Bias can also arise when the studies used in one review overlap with those of another, giving the false impression of a fulsome evidence base.

The questions that can be addressed by overviews of reviews are also circumscribed by the questions asked by the available systematic reviews, which may not necessarily correspond to those of primary interest to the reader. In addition, systematic reviews do not always ask the same research questions; even if they do, they may not answer those questions in the same way. Differences among reviews in the inclusion and exclusion criteria and the quality assessment tools used to appraise the included studies can greatly affect their results, leading to discrepant interpretations of the same evidence base.

This overview of reviews identified high-quality systematic reviews that assessed a variety of interventions for preventing suicide in various population groups. However, many suicide preventive interventions have been developed and implemented, and only some of these have been formally evaluated for their effectiveness. Therefore, the results of this overview represent only the handful of strategies that have been evaluated in good-quality systematic reviews.

Generalization of the results from this overview of reviews is difficult because of the various factors that can influence the effectiveness of suicide prevention strategies, such as demographic variables (e.g. age, sex and ethnic origin), the cultural and

socioeconomic context and the extant health and social systems. Poor descriptions of some interventions made it difficult to identify similarities and differences among the strategies or to determine which particular components of a strategy may be effective, either alone or in combination. As suicide is a relatively rare event, large sample sizes are necessary to measure differences between strategies. However, many of the studies included in the systematic reviews used small sample sizes, which made it difficult to detect such differences. This was further exacerbated by the difficulty of separating the effects of community-based or national prevention strategies from general population trends in suicide rates over time.

Cost-effectiveness

The focus of this review was not on evidence of costs associated with suicide prevention interventions. It will be important to consider costs and resource availability (e.g. for delivery of psychosocial interventions) when evaluating any new programme.

Conclusions

Good-quality systematic reviews of the evidence relating to the effectiveness of suicide preventive interventions are limited. In addition, a good-quality systematic review does not mean that the studies included in the review were methodologically robust. The evidence from the seven systematic reviews identified that were of average to good quality can be summarized as follows.

- Evidence on the effectiveness of community-based suicide prevention centres and national suicide prevention programmes for reducing rates of suicide and suicidal ideation was scant and equivocal.
- In the general adolescent school population, suicide prevention programmes based on behavioural change and coping strategies were found to be effective in decreasing suicidal tendencies and increasing protective factors. In adolescents at high risk, school-based suicide prevention programmes based on skill training and social support appeared to be effective in reducing risk factors and enhancing protective factors for suicide. However, the effect of these interventions on rates of suicide is unknown.
- In military personnel, there was limited evidence that multifaceted suicide prevention programmes based on risk factor identification and educational and organizational changes reduced the rates of suicide and attempted suicide.
- Restriction of access to lethal means through firearm laws potentially reduced rates of cause-specific suicides, but its effect on the total suicide rate was unclear because of the possible confounding effect of individuals switching to another method of suicide. Restricting access to pharmacological agents appeared to achieve a reduction in rates of suicide in the general population, but the extent of this effect was difficult to estimate as the data may be confounded by a coincident downward trend in suicide over time.
- Evidence suggested that some types of psychosocial and pharmacological treatment, including problem-solving therapy, provision of a card for emergency contact, administration of flupenthixol, and cognitive behavioural therapy, were promising in reducing rates of repeated self-harm in patients with a history of deliberate self-harm or attempted suicide.
- The administration of lithium reduced the risk of death and suicide by approximately 60% and the risk of a composite of suicide and deliberate self-harm by about 70% in patients with mood disorders.

Although the effectiveness of a variety of suicide preventive interventions has been examined in the primary research, not all of these studies have been compiled into systematic reviews. In addition, many interventions that are currently in use have not yet been evaluated in the primary research. Caution must be exercised when considering the results of any type of research, particularly as generalization of the findings to other populations and social contexts may not be appropriate.

Future programme planning and research challenges in the area of suicide prevention include standardizing definitions for suicide-related terminology, standardizing assessment protocols for identifying at-risk populations, and using outcome measures whose validity and reliability have been tested and established.

Policy considerations

- Suicide is a serious public health problem, and reported suicide rates may be underestimated. Suicide rates in eastern Europe are among the highest in the world.
- Suicide is a result of complex interactions of various risk factors and protective factors. Consequently, a combination of suicide preventive interventions addressing different risk factors at various levels in different populations may be required.
- Reviews of average to good quality exist for only some of the many suicide preventive interventions available. Other large-scale social measures, such as restriction of alcohol availability and support for the unemployed, were not assessed by the included systematic reviews.
- The evidence presented in this overview of reviews applies to specific groups and, therefore, the findings are applicable only to other similar populations. Other factors, such as the cultural, social and socioeconomic context, can limit the transferability of suicide preventive interventions.
- Most of the evidence from systematic reviews of average to good quality centred on the effects of interventions on intermediate outcomes, such as risk and protective factors and rates of repeated self-harm in certain populations, but not on actual mortality rates.
- Generally, it was not possible to determine which elements of each of the more effective approaches exerted a beneficial effect, or whether one intervention was more effective than another.
- When implementing a new intervention, an evaluation framework needs to be established at the outset, with standardized definitions of suicide. However, the low prevalence of suicide in the general population can make the measurement of the effectiveness of a single suicide prevention strategy challenging.

Annex 1. Search strategy

Search strategy

The following databases were searched for systematic reviews published in English from October 2003 to November 2010: the Cochrane Database of Systematic Reviews, MEDLINE, EMBASE, PsycINFO, the NHS Centre for Review and Dissemination (CRD) databases (DARE, HTA and NHS EED), and Web of Science. The web sites of various health technology assessment agencies were also scanned. An Internet search engine was used to locate grey literature. The bibliographies of all articles retrieved were manually searched for relevant references that may have been missed in the literature search. No language limit was applied.

The following MeSH terms and keywords (including suffix variations of the root words) were used alone or in combination: suicide/parasuicide/self harm/self-poisoning/self-injurious/intentional/overdose/prevention/primary prevention/secondary prevention/method/means restriction/restrict/reduce/postvention/meta-analysis/systematic/review/systematic review.

Study selection

The eligibility of English language articles was determined by one reviewer based on the following predefined inclusion and exclusion criteria. Three other researchers from the Institute for Health Economics (IHE) and Health Technology Assessment international (HTAi) assisted with reviewing non-English articles.

Inclusion criteria

The reviews had to meet certain criteria regarding relevance, study design and the information provided. Therefore, an article was deemed to be a relevant systematic review if it:

- had a clear objective or research question;
- had a systematic search strategy and defined the search strategy;
- had clear inclusion and exclusion criteria for studies reviewed;
- included evaluations of the effectiveness of suicide prevention strategies (no restriction on types of intervention, target population or settings);
- provided information about participants and intervention contents;
- measured suicide-related outcomes such as a reduction in suicide risk factors or in suicidal behaviours (completed suicide, suicidal ideation, suicide attempts or repetition of self-harm);

- critically appraised the methodological quality of studies reviewed with a level of evidence hierarchy or a quality tool or checklist; and
- qualitatively or quantitatively synthesized the data from studies reviewed.

Exclusion criteria

Quasi-systematic reviews and narrative reviews were excluded. A review was considered to be quasi-systematic if it used a systematic search strategy to identify literature but did not use a level of evidence hierarchy or a quality tool to critically appraise the included studies. Narrative reviews were evidence syntheses that reported neither a systematic search strategy nor a method of appraising the quality of the included studies.

Reviews that only focused on the treatment of underlying mental diseases and did not report suicide-related outcomes were also excluded.

When two or more systematic reviews had identical comparators and patient populations, only the most recently published review was included, unless it was less comprehensive and of poorer quality than the earlier review.

Annex 2. Excluded studies

Table 3 List of excluded studies with reasons

Study	Study type	Reason for exclusion
Aguilar EJ, Siris SG. Do antipsychotic drugs influence suicidal behavior in schizophrenia? <i>Psychopharmacol Bull</i> , 2007, 40(3):128–42	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Andriessen K, Krysinska K. Can sports events affect suicidal behavior? A review of the literature and implications for prevention. <i>Crisis</i> , 2009, 30(3): 144–52	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Baldessarini RJ et al. Ecological studies of antidepressant treatment and suicidal risks. <i>Harvard Rev Psychiatry</i> , 2007, 15(4):133–45	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Baldessarini RJ, Tondo L. Suicidal risks during treatment of bipolar disorder patients with lithium versus anticonvulsants. <i>Pharmacopsychiatry</i> , 2009, 42(2):72–5	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Bell GS. Suicidality in people taking antiepileptic drugs: what is the evidence? <i>CNS Drugs</i> , 2009, 23(4):281–92	Narrative review	Not a systematic review
Berg AO et al. Screening for suicide risk: recommendation and rationale. <i>Ann Intern Med</i> , 2004, 140(10):820–1	Statement	Not a systematic review
Bridge JA et al. Clinical response and risk for reported suicidal ideation and suicide attempts in pediatric antidepressant treatment: a meta-analysis of randomized controlled trials. <i>JAMA</i> , 2007, 297(15):1683–96	Systematic review	Not relevant; focused on the frequencies of suicidal behaviours as side-effects of antidepressant treatment
Burns J et al. Clinical management of deliberate self-harm in young people: the need for evidence-based approaches to reduce repetition. <i>Aust N Z J Psychiatry</i> , 2005, 39(3):121–8	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Cardish RJ. Psychopharmacologic management of suicidality in personality disorders. <i>Can J Psychiatry</i> , 2007, 52(6 Suppl 1):115S–27S	Narrative review	Not a systematic review
Cherpitel CJ. Acute alcohol use and suicidal behavior: a review of the literature. <i>Alcoholism: Clin Exp Res</i> , 2004, 28(5 Suppl):18S–28S	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies

Study	Study type	Reason for exclusion
Cipriani A et al. Lithium versus antidepressants in the long-term treatment of unipolar affective disorder. <i>Cochrane Database Syst Rev</i> , 2006, (4):CD003492	Systematic review	Not relevant; focused on the frequencies of suicidal behaviours as side-effects of antidepressant treatment
Cipriani A et al. Metareview on short-term effectiveness and safety of antidepressants for depression: an evidence-based approach to inform clinical practice. <i>Can J Psychiatry</i> , 2007, 52(9):553–62	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Combalbert N, Bourdet-Loybere S. Le suicide par saut et les stratégies de prévention [Suicide by jumping and strategies to prevent it]. In: <i>Evolution psychiatrique</i> , 2006, 71(4):685–695	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Crawford MJ et al. Psychosocial interventions following self-harm: systematic review of their efficacy in preventing suicide. <i>Br J Psychiatry</i> , 2007, 190:11–17	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Daniel AE. Preventing suicide in prison: a collaborative responsibility of administrative, custodial, and clinical staff. <i>J Am Acad Psychiatry Law</i> , 2006, 34(2):165–75	Narrative review	Not a systematic review
Daniel SS, Goldston DB. Interventions for suicidal youth: a review of the literature and developmental considerations. <i>Suicide Life-Threat Behav</i> , 2009, 39(3):252–68	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Dubicka B, Hadley S, Roberts C. Suicidal behaviour in youths with depression treated with new-generation antidepressants. <i>Br J Psychiatry</i> , 2006, 189:393–8	Quasi-systematic review; no critical appraisal of the included studies	Not relevant; focused on the frequencies of suicidal behaviours as side-effects of antidepressant treatment
Dudley M et al. New-generation antidepressants, suicide and depressed adolescents: how should clinicians respond to changing evidence? <i>Aust N Z J Psychiatry</i> , 2008, 42(6):456–66	Narrative review	Not a systematic review
Ernst CL, Goldberg JF. Antisucide properties of psychotropic drugs: a critical review. <i>Harvard Rev Psychiatry</i> , 2004, 12(1):14–41	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Fergusson D et al. Association between suicide attempts and selective serotonin reuptake inhibitors: systematic review of randomised controlled trials. <i>BMJ</i> , 2005, 330(7488):396 [erratum in <i>BMJ</i> , 2005, 330(7492):653]	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies

Study	Study type	Reason for exclusion
Fountoulakis KN et al. Psychotherapeutic intervention and suicide risk reduction in bipolar disorder: a review of the evidence. <i>J Affect Disord</i> , 2009, 113(1–2):21–9	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Fountoulakis KN, Gonda X, Rihmer Z. Suicide prevention programmes through community intervention. <i>J Affect Disord</i> , 2011, 130(1–2):10–16	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Gearing RE, Lizardi D. Religion and suicide. <i>J Religion Health</i> , 2009, 48(3):332–41	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Grek A. Clinical management of suicidality in the elderly: an opportunity for involvement in the lives of older patients. <i>Can J Psychiatry</i> , 2007, 52(6 Suppl 1):47S–57S	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Guilé JM et al. Is psychotherapy effective for borderline adolescents? <i>Clin Neuropsychiatry</i> , 2005, 2(5):277–82	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Gunnell D et al. The epidemiology and prevention of suicide by hanging: a systematic review. <i>Int J Epidemiol</i> , 2005, 34(2):433–42	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Gunnell D, Saperia J, Ashby D. Selective serotonin reuptake inhibitors (SSRIs) and suicide in adults: meta-analysis of drug company data from placebo-controlled, randomised controlled trials submitted to the MHRS's safety review. <i>BMJ</i> , 2005, 330:385–8	Quasi-systematic review; no critical appraisal of the included studies	Not relevant; focused on the frequencies of suicidal behaviours as side-effects of SSRIs
Guzzetta F et al. Lithium treatment reduces suicide risk in recurrent major depressive disorder. <i>J Clin Psychiatry</i> , 2007, 68(3):380–3	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Heisel MJ. Suicide and its prevention among older adults. <i>Can J Psychiatry</i> , 2006, 51(3):143–54	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Hennen J, Baldessarini RJ. Suicidal risk during treatment with clozapine: a meta-analysis. <i>Schizophr Res</i> , 2005, 73(2–3):139–45	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Hepp U et al. Psychological and psychosocial interventions after attempted suicide: an overview of treatment studies. <i>Crisis</i> , 2004, 25(3):108–17	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies

Study	Study type	Reason for exclusion
Julien M. La prévention du suicide chez les jeunes, un aperçu sommaire des études évaluatives [Suicide prevention in young people, a review of evaluative studies]. In: <i>Revue québécoise de psychologie</i> , 2003, 24(1):201–226	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Kaizar EE et al. Do antidepressants cause suicidality in children? A Bayesian meta-analysis. <i>Clin Trials</i> , 2006, 3(2):73–98	Quasi-systematic review	Not relevant; focused on the frequencies of suicidal behaviours as side-effects of antidepressant treatment
Kostenuik M, Ratnapalan M. Approach to adolescent suicide prevention. <i>Can Family Physician</i> , 2010, 56(8):755–60	Narrative review	Not a systematic review
Krysinska K, De LD. Suicide on railway networks: epidemiology, risk factors and prevention. <i>Aust N Z J Psychiatry</i> , 2008, 42(9):763–71	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Kutcher S, Gardner DM. Use of selective serotonin reuptake inhibitors and youth suicide: making sense from a confusing story. <i>Curr Opin Psychiatry</i> , 2008, 21(1):65–9	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Links PS, Hoffman B. Preventing suicidal behaviour in a general hospital psychiatric service: priorities for programming. <i>Can J Psychiatry</i> , 2005, 50(8):490–6	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Llorca PM, Pere JJ. Leponex [®] , 10 ans après : Une revue clinique [Clozapine, 10 years after: A clinical review]. In: <i>Encéphale-Revue de psychiatrie clinique biologique et thérapeutique</i> , 2004, 30(5):474–491	Narrative review	Not a systematic review
Macgowan MJ. Psychosocial treatment of youth suicide: a systematic review of the research. <i>Res Social Work Pract</i> , 2004, 14(3):147–62	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Mamo DC. Managing suicidality in schizophrenia. <i>Can J Psychiatry</i> , 2007, 52(6 Suppl 1):59S–70S	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Marangell LB. Suicide risk and prevention in bipolar disorder. <i>Curr Psychosis Therapeut Rep</i> , 2006, 4(4):167–70	Narrative review	Not a systematic review
McElroy SL et al. Antidepressants and suicidal behavior in bipolar disorder. <i>Bipolar Disord</i> , 2006, 8(5 Pt 2):596–617	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies

Study	Study type	Reason for exclusion
McMain S. Effectiveness of psychosocial treatments on suicidality in personality disorders. <i>Can J Psychiatry</i> , 2007, 52(6 Suppl 1):103S–14S	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Moller HJ. Is there evidence for negative effects of antidepressants on suicidality in depressive patients? A systematic review. <i>Eur Arch Psychiatry Clin Neurosci</i> , 2006, 256(8):476–96	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Moller HJ. Evidence for beneficial effects of antidepressants on suicidality in depressive patients: a systematic review. <i>Eur Arch Psychiatry Clin Neurosci</i> , 2006, 256(6):329–43	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Mujoomdar M, Cimon K, Nkansah E. <i>Dialectical behavior therapy in adolescents for suicide prevention: systematic review of clinical-effectiveness</i> . Ottawa: Canadian Agency for Drugs and Technologies in Health, 2009	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Muller-Oerlinghausen B et al. The impact of lithium long-term medication on suicidal behavior and mortality of bipolar patients. <i>Arch Suicide Res</i> , 2005, 9(3):307–19	Narrative review	Not a systematic review
Nrugham L, Herrestad H, Mehlum L. Suicidality among Norwegian youth: review of research on risk factors and interventions. <i>Nord J Psychiatry</i> , 2010, 64(5):317–26	Quasi-systematic review; no critical appraisal of the included studies	Not a comprehensive search; reviewed evidence for interventions from Norway only
Oyama H et al. Effect of community-based intervention using depression screening on elderly suicide risk: a meta-analysis of the evidence from Japan. <i>Commun Mental Health J</i> , 2008, 44(5):311–20	Quasi-systematic review; no critical appraisal of the included studies	Not a comprehensive search; reviewed evidence for interventions from Japan only
Pena JB, Caine ED. Screening as an approach for adolescent suicide prevention. <i>Suicide Life-Threat Behav</i> , 2006, 36(6):614–37	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Pompili M et al. Preventing suicide in jails and prisons: suggestions from experience with psychiatric inpatients. <i>J Forensic Sci</i> , 2009, 54(5):1155–62	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Safer DJ, Zito JM. Do antidepressants reduce suicide rates? <i>Public Health</i> , 2007, 121(4):274–7	Narrative review	Not a systematic review
Sakinofsky I. The current evidence base for the clinical care of suicidal patients: strengths and weaknesses. <i>Can J Psychiatry</i> , 2007, 52(6 Suppl 1):7S–20	Quasi-systematic review	Not relevant; does not specifically address the effectiveness of prevention strategies

Study	Study type	Reason for exclusion
Speckens AE, Hawton K. Social problem solving in adolescents with suicidal behavior: a systematic review. <i>Suicide Life-Threat Behav</i> , 2005, 35(4):365–87	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Steele MM, Doey T. Suicidal behaviour in children and adolescents. Part 2: treatment and prevention. <i>Can J Psychiatry</i> , 2007, 52(6 Suppl 1):35S–45S	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Siyez DM. Ergenlik Döneminde İntiharın Önlenmesi [Prevention of suicides during adolescence: A review]. In: <i>Çocuk ve Gençlik Ruh Sağlığı Dergisi</i> , 2005, 12(2):92–101	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Tishler CL, Reiss NS. Inpatient suicide: preventing a common sentinel event. <i>Gen Hosp Psychiatry</i> , 2009, 31(2):103–9	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
van Engeland H. Prävention parasuizidalen Verhaltens in der Adoleszenz: Möglichkeiten und Grenzen [Parasuicidal behavior in adolescence: Possibilities and limits of prevention]. In: <i>Kindheit und Entwicklung</i> , 2004, 13(1):38–46	Primary comparative study	Not a systematic review
Weinberg J et al. Strategies in treatment of suicidality: identification of common and treatment-specific interventions in empirically supported treatment manuals. <i>J Clin Psychiatry</i> , 2010, 71(6):699–706	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies
Youssef NA, Rich CL. Does acute treatment with sedatives/hypnotics for anxiety in depressed patients affect suicide risk? A literature review. <i>Ann Clin Psychiatry</i> , 2008, 20(3):157–69	Quasi-systematic review	Not a systematic review; no critical appraisal of the included studies

Notes: Narrative review: A review that reported neither a systematic search strategy nor a method of appraising the quality of the included studies; Quasi-systematic review: A review that used a systematic search strategy to identify literature but did not use a level of evidence hierarchy or a quality tool to critically appraise the included studies.

Annex 3. Reviews excluded after quality assessment

Table 4 Summary of critically appraised systematic reviews whose results were not included in the evidence base

Study	Objective	Reason for exclusion	Summary of review's conclusions relating to suicide
Baldessarini et al. (35)	To review comparisons of rates of suicides and suicide attempts among patients with major affective disorders with versus without long-term lithium treatment	Quality rating poor	Over an average of 18 months' follow-up, the risk of completed and attempted suicide in patients with bipolar and other major affective disorders who were taking lithium was 80% lower than in those who were not treated with lithium
Gaynes et al. (39)	To determine whether screening for suicide risk in primary care settings decreases morbidity and mortality	Quality rating poor	No study directly addressed whether screening for suicide in primary care reduces morbidity and mortality. Intervention studies provided fair and mixed evidence that treating those at risk of suicide reduces the number of suicide attempts or completions. There was mild to moderate improvement for interventions addressing intermediate outcomes such as suicidal ideation
Hailey et al. (40)	To review the evidence of benefit from use of "telemental" health	Quality rating poor	There were conflicting results for telephone-based suicide prevention services
Isaac et al. (41)	To review the state of evidence on gatekeeper training for suicide prevention	Quality rating poor	Gatekeeper training positively affects the skills, attitudes and knowledge of trainees. Research is limited in demonstrating an effect on suicide rates and ideation
Leitner et al. (42)	To provide a comprehensive overview of the effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population	Quality rating poor	The broad range of pharmaceutical interventions evaluated show a rather chequered profile in terms of outcome, with few indicators of consistent positive impact. In contrast, non-pharmaceutical interventions, such as restrictions in access to means, maintaining ongoing contact with the suicidal person, telephone-based support, service provision via specialist centres with highly trained personnel, and individualized and intensive cognitive and behavioural therapies, showed some promise as preventive strategies

Study	Objective	Reason for exclusion	Summary of review's conclusions relating to suicide
Mann et al. (6)	To examine evidence for the effectiveness of specific suicide-preventive interventions and to make recommendations for future prevention programmes and research	Quality rating poor	The most promising interventions were physician education in depression recognition and treatment, means restriction and gatekeeper education. Other interventions need more evidence of efficacy. Many universal or targeted educational interventions were multifaceted. Ascertaining which components of suicide prevention programmes are effective in reducing rates of suicide and suicide attempt is essential in order to optimize use of limited resources
Miller et al. (43)	To provide a comprehensive overview of school-based suicide prevention programmes from a public health perspective	Quality rating poor	There is some evidence that prevention programmes that incorporate informational and skill-building elements are potentially useful, although the extent to which these programmes have actually reduced more severe forms of suicidal behaviour (e.g. suicide attempts) is unclear. It was not possible to draw any conclusions regarding selected or indicated prevention programmes
Sakinofsky et al. (44)	To determine whether antidepressants induce suicidality in patients with mood disorders	Quality rating poor	There is fairly good evidence that lithium reduces rates of completed suicide and suicide attempt in people with bipolar disorder and recurrent unipolar depression. Antidepressants and psychological treatments may reduce suicidal ideation in depressed patients. Although antidepressants have been implicated in suicide in the elderly and in youth, most meta-analyses have found no significant excess of completed suicide among antidepressant users, compared with placebo, in adults and juveniles. However, excess non-fatal suicidality is found more often in children and adolescents who take antidepressants (except fluoxetine)

Study	Objective	Reason for exclusion	Summary of review's conclusions relating to suicide
Takada and Shima (45)	To review the literature on suicide prevention programmes conducted in the workplace and other settings, such as school, the community, medical facilities, jail and the army	Quality rating poor	The most suitable content for a comprehensive strategy programme in the workplace included education, training and screening of individuals, development of support networks, and education and training of managers and staff. In school settings, only programmes implementing suicide education yielded significant effects on suicide prevention, suggesting that suicide education methods used in schools may also prove beneficial in the workplace
Tarrier et al. (36)	To investigate whether cognitive behavioural therapies would reduce suicide behaviour	Quality rating poor	There was a significant treatment effect for adults (but not adolescents), for individual treatments (but not for groups), and for cognitive behavioural therapy when compared with minimal treatment or treatment as usual (but not when compared with another active treatment)

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Abstract

Suicide is a serious global public health problem; it is associated with an array of factors, including mental illness, social isolation, physical illness, substance abuse, family violence and access to means of suicide. The epidemiology of suicide rates varies across countries and regions; those in eastern Europe are among the highest in the world. Despite substantial efforts in many countries, including through dedicated national plans, it remains unclear as to which interventions are the most effective.

This report therefore aims to synthesize research findings from existing systematic reviews to address two questions:

- What types of preventive interventions have been evaluated in the published literature?
- Which strategies have good-quality evidence to support them?

Limited evidence – as well as variability by population characteristics, social, cultural and socioeconomic situation – suggests that a combination of preventive approaches, addressing different risk factors at different levels, is required. In addition, an evaluation framework should accompany the implementation of any new intervention.

This Health Evidence Network (HEN) evidence report is part of a series designed to synthesize key and high quality evidence from existing reviews, in order to be used to inform policy-making. These reports are initiated by the HEN team in response to a policy issue or question of interest to one or more Member States in the WHO European Region. HEN is part of the Division of Information, Evidence, Research and Innovation's (DIR) programme on Evidence and Information for Policy (EIP).

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