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Understanding and managing suicide risk

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Abstract:

Background: Suicidal behaviours and non-suicidal self-harm (NSSH) are global public health concerns which affect millions of lives. **Sources of data:** This review is a narrative synthesis of systematic reviews, meta-analyses of randomised control trials (RCTs) and landmark studies published in scientific journals.

Areas of agreement: Restricting access to lethal means reduces the likelihood of future suicide deaths.

Areas of controversy: Our ability to predict future suicidal behaviour is no better than chance. No individual risk prediction instrument offers sufficient sensitivity and specificity to inform clinically useful decision-making.

Growing points: Different types of psychosocial interventions may be effective in preventing future suicide attempts; such interventions include clinical assessment, tailored crisis response and safety plans, and follow-up contact.

Areas timely for developing research: While some psychosocial interventions can be effective in reducing suicide risk, little is known about the mechanisms of recovery from suicidal thoughts and behaviours.

Keywords: suicidal behaviour; suicide science; treatment.

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The extent and challenge of suicide and suicidal behaviour

Suicidal behaviours and non-suicidal self-harm (NSSH) are global public health concerns which affect millions of lives (1). One of the challenges facing research and clinical practice concerns the categorical conceptualisation of self-harm as either being suicidal or non-suicidal. The reality is that such behaviours often span both categories (2), and an individual's reasons for engaging in self-injury are usually many and change over time (3). Additionally, perceived "desire to die" associated with the episode is also transient, fluctuating from moment to moment. In light of this, and consistent with the UK national clinical guidance, the term self-harm is used herein to refer to any act of self-poisoning or self-injury irrespective of the apparent motivation (4). However, when reporting on the research literature, the terminology used by the original authors will be maintained, where appropriate, so as not to misrepresent their findings. In addition, where we use the term suicide attempt or suicidal behaviour, there has been evidence of suicidal intent.

An additional consideration in fully understanding the extent of self-harm is that self-harm fits an iceberg model (Figure 1) (5). As detailed in Figure 1, the iceberg consists of three levels where suicide deaths (visible and relatively rare) make up the tip of the iceberg. The other observable part of the iceberg is made up of incidences of self-harm where the individual presents to clinical services, including general hospitals. The third level submerged, largely hidden, part of the iceberg represents self-harm

which occurs in the community, which does not receive hospital treatment and which is often hidden.

According to current estimates, around 804,000 people die by suicide globally each year, and the number of people who attempt suicide or engage in NSSH is around 20 times higher than that of fatal suicides (1). Additionally, a recent population-based study of 18-34 year olds in Scotland found that 1 in 9 (11.3%) young people reported having made a suicide attempt whilst 1 in 6 had engaged in NSSH (16.2%) (6). In this latter study over 50% of those who reported a past suicide attempt also had a history of self-harm, and this was more pronounced for women (6). First onset of both NSSH and suicide attempt is younger in girls than boys (7).

Hospital Presentations for Self-harm

Due to between and within country differences in recording self-harm presentations to hospitals, it is difficult to accurately estimate the self-harm rates (1). One study estimated that the routinely collected data in England underestimated the overall hospital-treated rates of self-harm by approximately 60% (8). Findings from the Adult Psychiatric Morbidity Survey (2014) in England indicated that only a quarter (24.4%) of individuals who had engaged in self-harm reported attending hospital for their most recent episode (9).

Self-harm can reoccur in the months following an index episode with studies estimating that around 16% of patients will engage in non-fatal self-harm in the following 12 months (10,11) while between 2-7% of people die by suicide in the

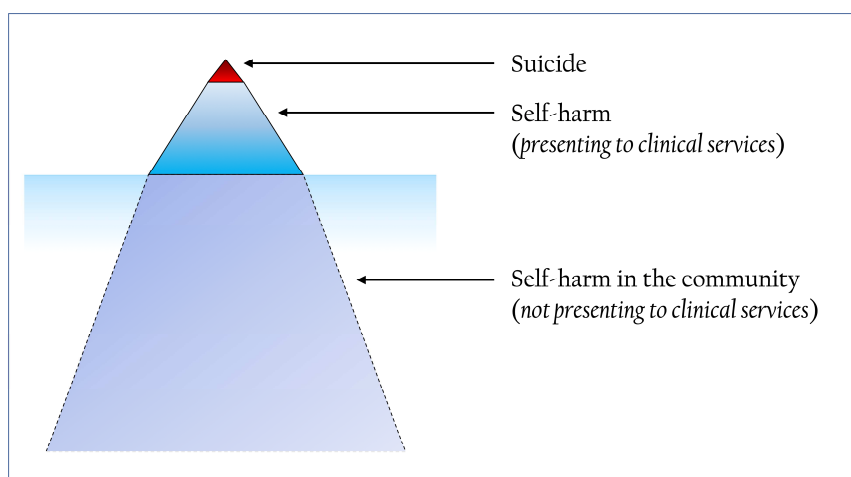


Figure 1. Iceberg model: Representation of the relative prevalence self-harm and suicide in young people (5).

following 1-9 years (10,11). The risk for individuals who attend an emergency department for treatment after attempting suicide is even higher. This group have a 16.3% increased risk of making another suicide attempt and a 3.9% risk of dying by suicide within 5 years (12). Receiving hospital treatment for any self-harm is strongly associated with future suicide (13) with individuals who present to hospital with self-harm being 30 times more likely to die by suicide than those in the general population (14). Recent data in the UK (15), for example, has indicated that 88% of female patients aged under 25 who died by suicide had a history of self-harm.

While suicides still occur in clinical care, the National Confidential Inquiry into Suicide and Safety in Mental Health indicated that in the UK rates have reduced throughout the last decade (15). Data from this report indicated that in the UK alone 14% of all patient suicides (n = 206) occurred within 3 months of receiving hospital treatment for self-harm. The highest suicide risk was in the first 1-2 weeks after discharge and the highest number of deaths occurred on day 3 post-discharge. Risk of suicide is also high in the 30 days following discharge from psychiatric inpatient care (16); men with a diagnosis of depression and stress reactions are at highest risk of suicide following discharge. To date, having engaged in self-harm with or without suicidal intent is the most consistent predictor of a future suicide attempt (17,18). Although our understanding of some of the major risk factors for suicide has increased in recent years (13) our knowledge of specific indicators of risk remains fairly limited (19), making it difficult to identify individuals within high risk groups who are at particularly high risk of taking their own lives than others (20).

From thoughts to actions: psychological processes and suicide risk

It is well established that mental illness increases risk of suicide, with retrospective studies suggesting that as many as 90% of those who die by suicide have a diagnosable psychiatric disorder (21). However, given that the overwhelming majority of people with a mental illness will never die by suicide, this is not a sufficient marker of risk (22). Therefore, from a clinician's perspective, there is considerable utility in identifying factors

that are associated with the development and emergence of suicide risk over and above psychiatric symptoms. The challenge, though, is that a combination of social, biological and psychological variables may act to increase or decrease risk of suicide (23); creating a complex picture of risk and protective factors that may individually only have small associations with the relatively rare phenomenon of suicide (19,22).

To aid prediction and to improve treatment, a number of psychological models have been developed that aim to advance understanding of how this multitude of risk factors combine to increase suicide risk (23). Such models have identified the common factors and pathways involved in the emergence of suicidal ideation and suicidal behaviour. Crucially though, they have also focused on the factors which govern the transition from thinking about suicide to attempting suicide (20). Such models are set within the ideation-to-action framework, which posits that the factors associated with the emergence of suicidal ideation versus those associated with engaging in suicidal behaviour are distinct, yet overlapping, processes (24).

The interpersonal theory of suicide (IPT) (25) was the first to consider suicide within this framework, suggesting that suicidal ideation is driven by perceived burdensomeness and thwarted belongingness, but that individuals also had to possess the capability to harm themselves to actually attempt suicide. This capability comprises a fearlessness about death and a tolerance for physical pain that helps an individual override their self-preservation instincts (26). More recently, O'Connor proposed the integrated motivational-volitional (IMV) model of suicidal behaviour (20). A central premise of the IMV model is that additional factors may aid the transition from suicidal ideation to suicidal behaviour (20). The IMV model proposes that feeling defeated and trapped by life circumstances are key to the emergence of suicidal ideation, and outlines volitional moderators that increase the likelihood that someone acts on their suicidal thoughts (Figure 2). Volitional factors may work by making suicide more accessible or cognitively available, and therefore more likely to be enacted (27).

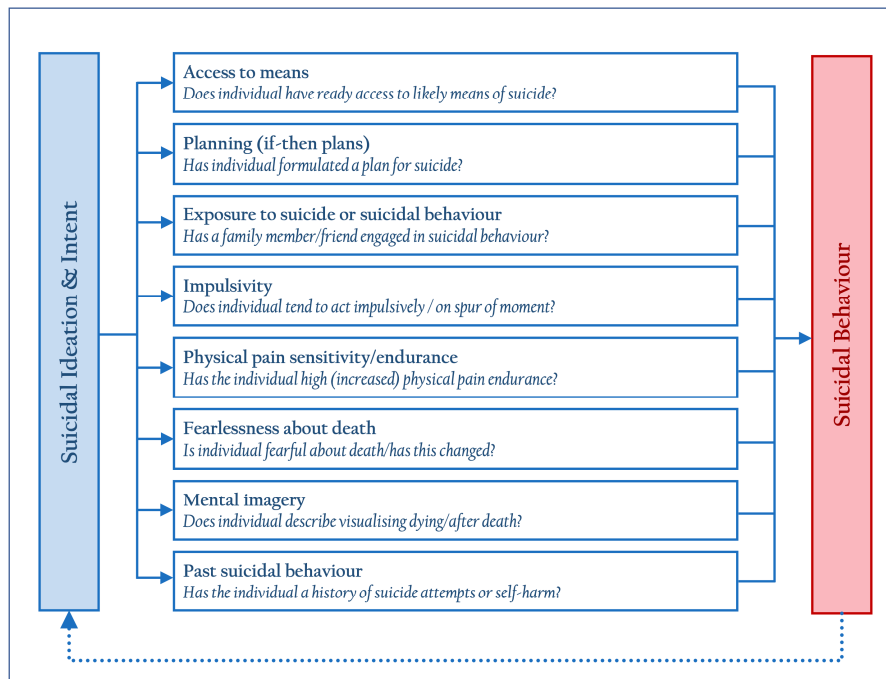


Figure 2. Volitional moderators: factors that increase the risk of transition from suicidal ideation to suicidal behaviour according to the IMV model (20).

Past suicidal behaviour is an important predictor of a future suicide attempt (28), with evidence that even one past suicide attempt is associated with an increased risk of repetition (5). Exposure to the suicidal behaviour of others (i.e., knowing someone who has attempted suicide or died by suicide) also appears to incur a particular risk; a recent birth cohort study found that adolescents who had made a suicide attempt were around five times more likely to have had a friend or family member who had a history of self-harm compared to adolescents who reported suicidal ideation only (29). Additionally, the experience of mental imagery of death increases suicide risk, potentially acting as a cognitive rehearsal for suicidal behaviour (30). Indeed, a growing body of research has shown that these volitional factors differentiate between those who have thoughts of suicide from those who have acted on those thoughts (29,31,32). In a comprehensive test of the volitional factors, young adults who had made a suicide attempt, compared to those who had suicidal thoughts only, scored higher on measures of acquired capability, impulsivity, mental imagery of death and more likely to have a friend who had made a suicide attempt, with no differences found on depressive symptoms (7).

Evidence for how the volitional factors operate over time requires further longitudinal research to establish causality. This may be aided by the utilisation of new technologies within

suicide research, which are uncovering the complex aspects of the development and emergence of suicidal ideation and behaviour. For example, harnessing smartphone technology using Ecological Momentary Assessment (EMA) (33), where participants track their thoughts, feelings and behaviours in real-time (usually multiple times a day over a week) using an app on their smartphone or watch, is growing in utility. EMA methodologies have been shown to be acceptable for use in suicidal samples (33), and findings have shown that suicidal ideation varies and fluctuates very differently across individuals who may score similarly on established measures of suicide risk (34). From a clinician's perspective, gaining an understanding of a patient's own unique suicidal experiences may be informative when evaluating suicide risk, and could help inform treatment.

Clinical decision-making and the problems with predictive instruments for suicide risk assessment

Healthcare settings, whether primary, acute or community-based, represent an important opportunity to identify and prevent suicide in those who are vulnerable. Suicide risk assessments in clinical settings are concerned with identifying and weighing up patient information to determine the extent to which an individual is vulnerable to suicidal behaviour and may require further

treatment or care. In busy clinical environments, assessment of suicide risk may be strongly influenced by time demands and therefore focus on the presence and strength of risk factors considered to be most strongly predictive of suicide. Unfortunately, reviews of the evidence confirm that our ability to predict future suicidal behaviour is poor (19). Even well-established risk factors such as prior suicidal ideation and behaviour, self-harm and psychopathology tend not to improve prediction of future suicide beyond chance (18,19).

Evidence for the use of risk prediction scales, where typically we classify individuals into risk strata (e.g., 'high' vs. 'low') based on clinician or patient ratings across various indicators, is also weak. For example, a meta-analysis of 21 prospective cohort studies found that common risk prediction scales varied substantially in their levels of sensitivity (0.15 - 0.97) and specificity (0.17 - 0.97) for accurately identifying those who will go on to engage in suicidal behaviour and those who will not (35). From these analyses it was concluded that no individual risk prediction scale offered sufficient sensitivity *and* specificity to inform clinically useful decision making (35). Other tests of diagnostic accuracy which are informative for clinical decision making also do not support the clinical utility of risk prediction scales: a meta-analysis of 70 studies found that pooled positive predictive values (i.e. the probability that a person classified as high risk subsequently experiences the outcome) of risk prediction scales were just 6% for suicide and 36% for suicide and self-harm combined (36). Based on this analysis more than 90% of those classified on the basis of risk prediction scales as being at high risk for future suicide do not engage in suicidal behaviour subsequently.

Although risk prediction scales ostensibly offer reassurance to clinicians and service providers, this reassurance is likely misplaced. The potential consequences of utilising risk prediction scales with demonstrably poor diagnostic accuracy in the clinical setting is significant: some individual scales will miss large numbers of those vulnerable to future suicidal behaviour, and therefore the opportunity to offer intervention and treatment to those who need it; furthermore, most scales will yield unacceptably high rates of false positives, leading to unnecessary treatment and clinical intervention in those who will receive no benefit (36,37). The limited clinical utility of risk

prediction scales is also unlikely to be addressed through further refinement or development of existing or new scales, in large part because the low event rate of suicidal behaviour imposes a ceiling effect on the predictive accuracy of risk scales which falls short of those required to inform clinically useful decision making (36,37).

Psychosocial Assessment

The use of standard risk prediction scales or assessment of defined risk factors should not be used in isolation as the basis for determining further treatment or care (4). Current guidance explicitly recommends that integrated psychosocial assessments of individual needs and risk should be offered, which are grounded in the experiences and circumstances of the individual and should serve to engage the individual in any further assessment and treatment (4). Evidence suggests that a psychosocial assessment is associated with reduced risk of self-harm repetition (38,39).

Assessments of this kind are significantly broader in scope than standalone risk assessments and should cover key strengths and vulnerabilities, including any assets and support available, in addition to assessing risk and protective factors for future suicide. Important topics to cover include histories of physical and mental health, life stressors including social and financial circumstances, available support options and coping strategies and interpersonal relationships. The 'risk assessment' aspect of this integrated assessment should reflect the individual's own experiences and explore sensitively those risk and protective factors that are known to contribute or mitigate future suicide risk. Although key risk factors, such as history of self-harm and suicidal behaviour, suicidal ideation, and symptoms of low mood, should feature prominently a more nuanced assessment which moves beyond the presence or absence of various factors will provide a richer assessment of an individual's situation and risk.

Particular attention may be given to those risk and protective factors that are potentially modifiable, given the potential to set in place risk reduction strategies. The emerging picture of an individual's needs, strengths and vulnerabilities may be further tuned to reducing individual risk by considering combinations of factors and their relationships to different dimensions of suicide risk (20,40). For example, symptoms of low mood are

strongly related to the emergence of suicidal ideation but are less crucial in the transition to suicidal acts, whereas the presence of a plan to end one's life or exposure to suicidal behaviour are more closely linked to the transition from suicidal thinking to suicidal behaviour (20). Careful assessment of such modifiable risk factors and their relationship to different dimensions of suicidal risk can enable more targeted risk reduction and treatment strategies.

Finally, because suicidal individuals often report mixed experiences of the care and support received in clinical settings (41) psychosocial assessments offer an opportunity to engage compassionately with individuals (4). For example, reviews have found that negatively evaluated experiences of psychosocial assessments are based on perceptions that the assessment feels superficial and rushed (41). In contrast, positive experiences are reported by patients who understood the intended purpose and aims of the assessment and who are given the opportunity to understand and share in decision-making about their care and support (41).

Psychosocial interventions and suicide risk

In recent years, there has been a growth in evidence for psychosocial assessment interventions that are effective in reducing suicidal thoughts and behaviours including: brief contact psychosocial interventions (42,43), multisession psychological treatments (44,45), and single-session crisis response planning (46). Although these are different types of intervention, it is possible to identify common elements across them. These are: 1) clinical assessment, 2) tailored crisis response and safety plan, and 3) follow-up contact. As a detailed critique of the evidence is out of the scope of this review, this section will focus on some of the key components of psychosocial interventions that may be useful for medical staff. For a detailed and systematic critique of the evidence, see (42,45,47-49). In this section, we briefly describe the supporting evidence for those elements and summarise their dimensions and clinical questions/actions in Table 1.

Clinical Assessment

Clinical assessment is a key component of

treatment for suicide risk (Table 1). As recommended by the WHO (1) and NICE guidelines (4), clinical assessments should not rely on risk assessment tools, but rather on a detailed interview aiming to build a compassionate, trusting, supportive, and engaging relationship with the patient. This interview should facilitate the design of a person-centred comprehensive bio-psycho-social risk mitigation plan which is personalised to the patient and their unique situation (50). Evidence suggests that these aspects are crucial to an effective clinical interview with suicidal patients (49). Assessing the patient's history of suicidal thoughts and behaviours as well as self-harm is important as these are strongly associated with future suicide attempts (1). Such assessment includes asking directly about the specific components of suicide risk such as the characteristics of suicidal ideation (e.g., frequency of thoughts, the presence and details of a suicide plan and preparation), and access to lethal means of suicide (48,51). The clinician should also enquire about the current life/stressful events the patient is experiencing. This is essential to place the patient's suicidal thoughts and behaviours into context and facilitating the understanding of proximal triggers and risk factors (52).

Attention should also be given to how patients use the internet. Emerging evidence suggests that social media may be another factor associated with suicide and self-harm clustering (particularly among young people) through direct exposure to suicidal behaviour, through inappropriate media reporting, and the belief that suicidal behaviours are commonplace (53). Vulnerable individuals searching for suicide methods online, cyberbullying, and online gambling (54) also require consideration. Bearing in mind that this is now a patient safety issue, clinicians should consider how best to ask their patients about their internet use and digital help seeking (55).

During the clinical interview, the clinician should address the barriers to a patient's disclosure of suicidal thoughts, as evidence suggests that nearly 60% of people who go on to die by suicide have not expressed suicidal ideation at a specified earlier time (56). As some patients do not speak out fearing that this would result in their emotional pain being taken less seriously (57), a compassionate and trusting relationship may enable patients to openly talk about their feelings and, ultimately, about their suicidal thoughts (58).

Table 1. Summary of common elements of clinical assessment and interventions for suicide risk based on 43,44,47,59,65.

Intervention element	Dimension	Clinical Questions/Actions
<i>Clinical Assessment</i>	History of suicidal thoughts and behaviours	1. Have you ever tried to take your own life or attempted suicide? 2. Have you ever thought about taking your own life but have not attempted to do so? 3. Have you lost someone by suicide? 4. Have you ever harmed yourself without the intent to die?
	Suicidal ideation	1. When did you begin thinking about suicide? 2. How often do you think about suicide? 3. How long do these thoughts last? 4. When/In which situations do these thoughts generally come? 5. What do you do when you have these thoughts?
	Suicidal intent and preparation	1. Have you formulated a plan to kill yourself? If yes, tell me the details of it. 2. Have you made any preparations? If yes, tell me the details of it. 3. How likely do you think you are to carry out your plan?
	Access to means	1. Do you have access to the methods for use in a suicide attempt? If yes, what are they and where are they?
	Stressful events and coping	1. Have you experienced anything especially stressful recently? 2. When you are feeling distressed or emotionally unwell, how do you cope?
<i>Tailored crisis response and safety plan</i>	Recognising triggers and context	1. Detail the warning signs: what are the thoughts, moods, images, behaviours, context, and other triggers that indicate that a crisis may be developing?
	Use of individual coping strategies	2. List the activities that the patient can do to regulate their emotions and thoughts without contacting another person (e.g., distractions, relaxation techniques, physical activity).
	Interaction with people and social environments that provide distraction	3. List the names and contact details for people and places that can provide distraction, without disclosing the feelings and thoughts of suicide.
	Contact people who can provide help	4. List the names and contact details for closed ones (e.g., family and friends) with whom the patient is comfortable disclosing and talking about their feelings and thoughts of suicide.
	Contact health professionals, agencies, or institutions that can help	5. List the names and contact details for clinicians, suicide hotlines, and emergency departments that can provide help during a suicidal crisis.
	Making the individual's environment safe	6. Discuss with the person and family members or closed ones about reducing access to lethal means of suicide (e.g., giving firearms away, reducing the amount of medication available).
	Reasons for living	7. List the names of things that are positive for the person and represent the reasons for them to be alive.
<i>Follow-up contact</i>	Establishing systematic follow-up contacts	1. Establish follow-up appointments to update clinical assessments and revise the implementation of the crisis response and safety plan. 2. Contact the patient through phone calls, letters, or post-cards to demonstrate availability of health care and support.

Finally, enquiring about the individual's coping responses to those events and their distressing emotional states is crucial to provide a sense of adaptive and maladaptive strategies and their effect on the increase or decrease of risk (59). The information gathered during the clinical assessment will provide a basis for the development of a *collaboratively* tailored crisis response and safety plan.

Tailored Crisis Response and Safety Plan

Developing a crisis response and safety plan is central for any effective intervention for suicide risk (Table 1). Although it has been given different labels (e.g., safety planning, coping plan, stabilisation plan, crisis response plan, risk management plan, etc.), a variant of it is present in most evidence-based interventions that have been shown to be effective in reducing risk of future suicidal behaviour. The development of a tailored crisis response and safety plan should be a collaborative exercise, helping the patient to identify triggering events and warning signs that may increase escalation of a crisis. It also provides an opportunity to identify strategies to help mitigate the psychological distress that may lead to a suicidal crisis. A key element of a safety plan is *means safety*. As methods of self-harm and suicide attempt may change and escalate to lethal means, it is advised that all patients should be routinely assessed (60) and means safety addressed (e.g., giving firearms away, reducing the amount of medication available). In addition to the crisis response or safety plan, it is important that clinicians help their patients to think about coping strategies to deal with psychological distress in general, not focusing only on the suicidal crisis. It is expected that clinicians and patients will collaboratively create a crisis response and safety plan and each one will keep a copy of the plan. Some patients find it helpful to keep the plan with them for easy access (e.g., photo of the plan on their mobile phone) in case they need it on their daily activities. For more information, see Stanley & Brown's Safety Planning Intervention (43).

Follow-up Contact

Finally, follow-up contact is an imperative in the treatment of suicide risk (Table 1). Evidence

suggests that making a series of active contact and follow-up interventions is associated with reduced likelihood of suicidal behaviour and future hospital presentation for self-harm, particularly during the first six months after discharge from an emergency department after a suicide attempt (61,62). Research suggests that the implementation of safety planning with at least two follow-up telephone calls is associated with a reduction in suicide attempts and improved treatment engagement for patients who had attempted suicide (63). In a large-scale study, researchers described their follow-up contact as telephone calls to monitor suicide risk, review, revise and discuss the patient's experiences with the safety planning implementation (63). During the follow-up contact, clinicians should be sensitive to the patient's successes, but also to their difficulties related to the crisis response and safety plan. A feasibility study of delivering a similar safety planning and telephone support intervention has recently been conducted in the UK (64).

Conclusion

Suicidal behaviour remains one of the main challenging areas for treatment given its complexity and variability. Evidence suggests that traditional risk assessment exclusively based on standardised questionnaires of risk factors are of limited clinical utility. Instead, understanding the psychosocial factors associated with increase and reduction of suicide risk can be useful to plan effective treatment. Research shows that psychosocial interventions involving clinical assessment, tailored crisis response and safety plans, and follow-up contact can significantly reduce suicide risk and the odds of future suicidal behaviour.

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