Creating Hope Together

Scotland's Suicide Prevention Strategy 2022-2032

A Rapid Review of the Effectiveness of Interventions for Reducing Suicide Risk in Young People Within Different Settings

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25 March 2024

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Introduction

In 2022, Scotland launched the National Suicide Prevention Strategy *Creating Hope Together* (Scottish Government., 2022). A key objective of the strategy is to ensure that all children, young people, and adults who experience suicidal thoughts and behaviours are supported appropriately, compassionately and in a timely manner. *Creating Hope Together* places particular emphasis on understanding the needs of young people, given the high prevalence of suicidal-related behaviour in this age group (Public Health Scotland., 2022). To help inform *Creating Hope Together*, the Scottish Government's Suicide Prevention Delivery Collective requested the Academic Advisory Group (AAG) to conduct a rapid review intended to identify which interventions, within which contextual settings, are effective in preventing suicide-related outcomes among young people.

1.1 What do we already know?

Prior to this rapid review, several systematic reviews have been conducted to understand more about suicide prevention interventions in young people. However, this research has mostly been limited to specific study designs (e.g., randomised control trials (RCTs); Calear et al., 2016) or concentrated on particular settings (e.g., schools and universities; Breet et al., 2021). However, in 2018, Robinson et al. (2018) published a comprehensive systematic review and meta-analysis on the full spectrum of suicide prevention interventions in young people. Their findings identified a number of psychotherapeutic (including Dialectical Behaviour Therapy (DBT) and Cognitive Behavioural Therapy (CBT)), brief contact and educational interventions which seem to be effective in reducing suicide-related outcomes in clinical, community and school settings. Robinson et al. (2018) called for more interventions adapted specifically for young people, especially youth at particularly high risk of suicide-related outcomes (e.g. LGBTQ+ young people).

Given it has now been six years since the publication of this review, and with the COVID-19 global pandemic potentially changing the mental health landscape and delivery context of interventions, it is timely to update the literature. This rapid review aims to synthesise findings published since the Robinson et al. (2018) search end date (September 2017) until November 2023.

Methods

A literature search was conducted on 28th November 2023 using three academic databases: Medline, PsycINFO and CINHAL. The search was guided by existing systematic reviews investigating suicide prevention interventions for young people, specifically Robinson et al. (2018), and by consulting with a librarian. Separate searches were conducted for each database using Subject Headings (e.g. MedLine Subject Headings 'MeSH') and Boolean phrases (e.g. OR/AND) related to: (i) suicide-related outcomes (see section 2.3), (ii) interventions, and (iii) young people. A date restriction was placed on each of the searches, capturing papers from 1st September 2017 to 28th November 2023. Each search was further limited to papers published in English. A detailed summary of the search strategy and search terms can be found in Appendix 1.

2.1 Eligibility Criteria

Studies were included if: i) they were written in English, ii) published within a peer-reviewed academic journal, iii) published between 1st September 2017 and 28th November 2023, iv) explored suicide-related outcomes, v) reported on a suicide prevention intervention, vi) had extractable data on participants aged between 12-25 years or on a sample in which the majority of participants fell within this age range.

Studies were excluded if: (i) the full text was not accessible; (ii) they were case studies, employed qualitative study designs, were reviews, commentaries, letters to editors, book chapters, conference

abstracts, study protocols or published in the grey literature; (iii) they reported on an intervention which focused on mental health more broadly, and did not specifically include a primary suicide-related outcome; (iv) they reported on an outcome of non-suicidal self-injury (NSSI), and; (v) their data were reported on in Robinson et al. (2018) (for example, if the study conducted a secondary data analysis).

2.2 Data extraction

The retrieved articles were exported from the individual databases to EndNote software. Duplicate records were removed electronically and manually by the first author. The selection process was also completed using EndNote. The primary researcher (KL) screened titles and abstracts of the identified papers and a random 10% were checked for inter-rater reliability by another member of the research team, resulting in 85% concordance. Discrepancies in eligibility for inclusion were resolved through discussion, reaching 100% concordance. The same procedure was followed for full-text screening, reaching 100% concordance in the first instance with no requirement for further discussion. Data extraction was completed by the first author using a data extraction form developed on Microsoft Excel.

2.3 Terminology

For the purposes of this rapid review, young people were defined as those aged 12-25 years, consistent with existing systematic reviews on this topic (e.g., Robinson et al., 2018).

For consistency with Robinson et al. (2018), the outcome of this review, 'suicide-related outcomes', included suicide, suicide attempt, self-harm (any act of self-injury irrespective of motive), suicidal ideation, suicide risk and/or reasons for living. See Table 1. for terminology and definitions (De Leo et al., 2021; van Zyl et al., 2023).

Table 1. Terminologies

Terminology	Definition
Suicide	An act resulting in death which is initiated and carried out by an individual to the end of the action, with the knowledge of a potentially fatal result, and in which intent may be ambiguous or unclear, may involve the risk of dying, or may not involve explicit intent to die.
Suicide attempt	An act in which a person harms himself or herself, with the intention to die, and survives.
Self-harm	A non-fatal act in which a person harms himself or herself intentionally, with varying motives including the wish to die.
Suicidal behaviour	Includes suicide attempt and (suicidal) self-harm.
Suicidal ideation	To think of suicide with or without suicidal intent, or hope for death by killing oneself, or state suicidal intention without engaging in behaviour.
Suicide risk	Likelihood that a person will engage in suicidal behaviour
Reasons for living	An individual's reasons for choosing to continue to live when faced with the thought of suicide.

The results span three overarching suicide prevention approaches: i) universal approaches (delivered to the whole population); ii) selective approaches (delivered to specific communities or groups at higher risk of suicide) and; iii) indicated approaches (delivered to those who have a history of experiencing or are currently experiencing suicide-related outcomes, as defined above). Studies are further categorised based on four types of intervention: psychotherapy, policy, educational or brief contact. Where possible, the type of intervention (e.g., DBT, CBT) is noted. Appendix 2 provides a brief description of each intervention type.

Results

Seventy-two peer-reviewed articles were eligible for inclusion in this review. However, several papers reported findings from the same dataset, resulting in the exclusion of six articles (Berk et al., 2022b; Wu et al., 2020; Wu et al., 2023; Zhang et al., 2021; Zisk et al., 2019; Zisk et al., 2023). Where multiple papers on the same dataset were found the first published manuscripts (Diamond et al., 2019; McCauley et al., 2018; Slesnick et al., 2020) were chosen for inclusion in order to avoid over-representation of the data. The review therefore includes findings from 66 studies (see Appendix 3 for PRISMA statement). For a detailed overview of all study findings, see Appendix 4 (study summary tables).

3.1 Overview

Of the 66 studies, 28 were conducted in clinical settings, 22 studies in community settings, 14 in educational settings and two in a workplace setting (military).

Most of the studies employed a quasi-experimental design (n=31), followed by RCTs (n=25), cohort studies (n=7) and repeated cross-sectional studies (n=3). Thirty-seven of the studies tested indicated interventions, 16 tested selective interventions, 12 tested universal interventions, and one was multi-modal (universal and selective). Most of the studies were psychotherapeutic interventions (n=44). Eight of the studies were brief contact, eight were psychoeducational, five assessed the effectiveness of policy and one had both brief contact and psychotherapeutic components. Thirty-three of the interventions were delivered in-person, while the remaining interventions were delivered digitally (n=11), via hybrid methods (n = 10), via policy (n=5) or via text/telephone (n=2). The method of delivery was not reported in five studies.

The majority of the studies were conducted in the USA (n=43), followed by Australia (n=5), Canada (n=2), and Spain (n=2). A single intervention was conducted in each of the following countries: Brazil, China, Germany, Ireland, Austria, Israel, the Netherlands, Norway, South Korea, and Switzerland. Only two papers investigated the effectiveness of interventions in low- or middle-income countries (LMICs; both in India). Two studies collected data in more than one country: Barzilay et al. (2019) conducted their study across 10 EU countries and Kirchner et al. (2022) collected data in Germany and Austria.

Previous research has emphasised the importance of relationships formed in the early stages of psychotherapy in reducing suicidal ideation and attempts (Huggett et al., 2022). However, of the psychotherapy interventions included within this review (n=44), none reported on the therapeutic alliance.

3.2 Studies Conducted in Clinical Settings

Twenty-eight studies were conducted in clinical settings. Most interventions used an indicated approach (n=26), while two used a selective approach. Twenty-one of the interventions were psychotherapy, six were brief contact and one included both brief contact and psychotherapeutic

components (Haruvi Catalan et al., 2020). For ease of reading, the results of Haruvi Catalan et al. (2020) have been synthesised within section 3.2.2 (brief contact approach intervention).

3.2.1. Psychotherapeutic Interventions

Of the 21 studies with a psychotherapeutic intervention, 13 were effective in reducing suicidal ideation, five were effective in reducing suicide attempts, one reduced self-harm and one reduced suicide risk. Five utilised DBT, of which two found a significant reduction in suicidal ideation post-intervention (Berk et al., 2020; Gillespie et al, 2019), with some indication that a 24-week programme may be more effective than a 16-week programme (Gillespie et al, 2019). However, two RCTs found no difference in suicidal ideation for DBT for adolescents (DBT-A) groups compared to Treatment as Usual (TAU) and Enhanced Usual Care (EUC) groups, respectively (Santamarina-Perez., 2020; Mehlum et al., 2019). Further, Asarnow et al. (2021) reported a higher self-harm remission rate for an inpatient hospital sample receiving DBT compared to those receiving Individual and Group Supportive Therapy (IGST).

Both studies that examined family-focused therapy were effective in reducing suicidal ideation post-therapy (Family-Focused Therapy, Miklowitz et al., 2020; Attachment Based Family Therapy, van der Spek et al., 2023). Of three studies examining motivational interviewing-based interventions, only one (MI-SafeCope, Cryz et al., 2019) reduced suicidal ideation compared to a control group, whereas the other two found no difference in suicidal ideation or attempt between groups (MI-SafeCope, Cryz et al., 2021; As Safe As Possible (ASAP), Kennard et al., 2018).

One study assessed the effectiveness of CBT-based psychotherapy and found no significant treatment effects on suicidal ideation or behaviours at a 5-year follow-up, compared to the use of sertraline, sertraline and CBT, or pill placebos (Keeton et al., 2019).

Seven studies assessed the effectiveness of psychotherapies utilising combined modalities. Of these, five reported a significant reduction in suicidal ideation pre-test to post-test (Babeva et al., 2020; Bailey et al., 2020; Cloutier et al., 2022; Kennard et al., 2019; McBee-Strayer et al., 2019), and two reported a significant reduction in suicidal behaviour (Babeva et al., 2020; Kenndard et al., 2019). However, an Intensive Outpatient Programme (SPARC) showed no significant difference in suicide risk between intervention and TAU groups at discharge or 1 month follow-up (Zullo et al., 2021). The final study (Yen et al., 2020) recorded suicidal behaviour in an inpatient hospital sample engaged in Skills to Enhance Positivity in Suicidal Adolescents (STEP), but frequency counts of suicidal behaviour were too low for statistical testing.

All three studies examining psychotherapy using 'other' modalities were effective in reducing suicide-related outcomes (Adrian et al., 2022; Ahmadi et al., 2022; Melvin et al., 2019). Adrian et al. (2022) reported a significant decrease in suicidal ideation and suicide risk over the course of Collaborative Assessment and Management of Suicidality for Teens (CAMS-4Teens). Melvin et al. (2019) found a significant reduction in both severity and intensity of suicidal ideation from pre-test to post-test (8 weeks) among participants using the BeyondNow Safety Planning mobile application. Ahmadi et al. (2022) found an improvement in suicidal ideation & behaviour from baseline to day two of treatment in a group engaged with Reminder-Focused Positive Psychiatry and Suicide Prevention (RFPP-S) compared to TAU. However, this effect was no longer significant at 6-month follow-up.

3.2.2 Brief Contact Interventions

Of the six brief contact approach interventions, four were associated with a significant reduction in suicidal ideation (Gryglewicz et al., 2023; Haruvi Catalan et al., 2020; Hill et al., 2023; Sale et al., 2022). These interventions included continuity of care/follow-up care interventions (Gryglewicz et

al., 2023; Sale et al., 2022), an Ultra Brief Crisis Interpersonal Psychotherapy for Suicidal Children and Adolescents (IPT A SCI) and a brief Supporting Grieving Teens Intervention. Continuity of care/follow-up care interventions were also associated with a significant reduction in suicide attempts/behaviour (Gryglewicz et al., 2023; Rengasamy & Sparks., 2019; Sale et al., 2022) and suicide risk (Fontanella et al., 2020). Only one brief contact approach (Alcohol & Suicide Intervention for Suicidal Teens; ASIST) reported no significant treatment effect on suicidal ideation severity in an inpatient hospital sample, in comparison to a TAU group.

3.3 Studies Conducted in Community Settings

22 studies were conducted in community settings. Nine were selective interventions, eight were indicated interventions and six were universal interventions. The majority were psychotherapeutic interventions (n=15), followed by psychoeducational (n=4) and policy (n=3). There were no brief contact interventions.

3.3.1 Psychotherapeutic Interventions

Of the 15 studies with a psychotherapeutic intervention, eight were effective at reducing suicidal ideation, one reduced suicide attempts, and one reduced self-harm. Two studies tested the effectiveness of DBT. McCauley et al. (2018) found that, from baseline to six-month follow up, fewer of the DBT group repeated a suicide attempt, compared to the Individual and Group Supportive Therapy (IGST) group (McCauley et al., 2018). This effect did not extend to 12-month follow-up. Berk et al. (2022a) found that self-harm decreased significantly from baseline to 3 and 6 months in young people whose parents were enrolled in a DBT intervention (with no intervention directly delivered to young people). However, there were no significant effects on youth suicidal ideation.

Of the three studies of CBT psychotherapy interventions (Hill & Pettit., 2019; Slesnick et al., 2020; Wu & Adamsk., 2021), two found a reduction in suicidal ideation among those receiving the intervention, compared to TAU participants (Slesnick et al., 2020; Wu & Adamsk., 2021). On the other hand, Hill and Pettit (2019) found no differences between a CBT-based digital e-modules intervention group and a control group.

Of the two studies investigating Attachment-Based Family Therapy (ABFT), one found reduced suicidal ideation over the course of treatment in a sample of LGBTQ+ youth (Russon et al., 2022). In contrast, Diamond et al. (2019) found no differences in suicidal ideation or suicide attempt between adolescents receiving AFTB and Family Enhanced Nondirective Supportive Therapy (FE-NST).

Two studies tested supportive therapies and found no significant effects for suicidal ideation (Dobias et al., 2021; King et al., 2018) or suicide attempt (King et al., 2018). Six studies investigated psychotherapy using other modalities, five of which were associated with a reduction in suicidal ideation. The interventions included Emotional Intelligence Therapy, Life is Precious (LIP) Program, Safety Plan Mobile Application, Social-emotional Wellbeing Program (SEWB) and Reconnecting to Internal Sensations and Experiences (RISE) Intervention. Conversely, Pachankis et al. (2020) found no significant effect on suicidal ideation in two intervention groups (either self-affirmation writing or expressive writing), compared to a control neutral writing group.

3.3.2 Psychoeducational Approach Interventions

Of the four psychoeducational approach interventions, three assessed the effectiveness of short educational suicide prevention films (Braun et al., 2023; Kirchner et al., 2022; Niederkrotenthaler & Till., 2020). Two of these lowered suicidal ideation in comparison to participants watching neutral videos about maintaining a healthy lifestyle (Braun et al., 2023; Niederkrotenthaler & Till., 2020), while one showed no significant findings(Kirchner et al., 2022).

One study investigated the effectiveness of the Garrett Lee Smith (GLS) Youth Suicide Prevention Program and found that youth suicide mortality rates were significantly lower than expected the year after, and two years after, implementation of the programme, compared to US counties without GLS activities.

3.3.3. Policy Approach Interventions

Three papers explored the effectiveness of Child Access Prevention (CAP) laws (designed to prevent children's access to firearms) within the USA (Hamilton et al., 2018; Kappelman & Fording., 2021; Kivisto et al., 2021). All of the studies found that in states with strict CAP laws there was a decrease in the firearm-related suicide rate in youth compared with before the legislation was implemented, whereas in states with no CAP laws the youth firearm suicide rates increased.

3.4 Studies Conducted in Educational Settings

Fourteen studies were conducted in educational settings. One intervention was delivered in a university setting (Pistorello et al., 2021), one was delivered in both school and in public places in the community (Bounds, et al., 2019), while the remaining 12 were based in schools. Of these 14 studies, seven were universal interventions, three were selective interventions, three were indicated interventions and one was a multi-modal approach intervention. Seven of the interventions were psychotherapeutic, five were educational and two were school policies.

3.4.1 Psychotherapeutic Interventions

Of the seven studies investigating a psychotherapeutic intervention, six were found to be effective in reducing suicidal ideation, two were effective in reducing suicide attempt and one was effective in reducing suicide risk (determined by Inventory of Suicide Orientation-30 (ISO-30)). Of the three studies examining CBT in educational settings (Conforti et al., 2022; Raj et al., 2019; Robinson et al., 2023), two reported a decrease in suicidal ideation (Conforti et al., 2022; Raj et al., 2019) and one reported a decrease in suicide attempt from pre-test to post-test (Conforti et al., 2022). For their selective CBT intervention, Robinson et al. (2023) found an initial increase in suicidal ideation pre- to post-intervention, followed by a decrease in suicidal ideation from post-intervention to 12 months follow-up.

Xavier et al. (2019) found that participants who engaged in a problem-solving (indicated) intervention were no longer at suicide risk post-intervention or six months later, compared to the controls. However, there were no significant differences in suicide attempts (Xavier et al., 2019). One selective intervention, utilising combined psychotherapy modalities (Runaway Intervention Program), reported a decrease in suicidal ideation and suicide attempts from baseline to three and to six months, which was maintained at 12 months (Bounds et al., 2019). Two interventions utilising 'other' psychotherapeutic modalities found reduced suicidal ideation in intervention groups, compared to a control group (Godwin., 2020) and TAU group (Pistorello et al., 2021).

3.4.2 Psychoeducational Approach Interventions

Of the five psychoeducational approach interventions delivered in school settings, three reduced suicidal ideation, one reduced suicide risk (assessed via the Suicide Probability Scale (SPS)), and one reduced the likelihood of a repeated suicide attempt (vs. no SA) at follow-up.

Two studies assessed the effectiveness of Youth Aware of Mental Health Program (YAM). McGillivray et al. (2021) found a significant decrease in suicidal ideation from baseline to three months, and from baseline to six months in a sample of Australian high school students. Barzilay et al. (2019) An RCT investigated the effectiveness of YAM across 10 EU countries, demonstrating a significantly reduced association between repeated suicide attempt at follow-up and the interaction of self-injury and

suicidal ideation at baseline, compared to a control group receiving educational posters containing mental health resources (Barzilay et al., 2019)

One study showed a decrease in suicidal ideation over 1-month in high school students who received a suicide prevention gatekeeper workshop compared to a TAU control group (Baggio et al., 2022). While Manjula et al (2018) found no significant reduction in suicidal ideation in high school students engaged in an Awareness and Education Programme from pre to post-test, they did report a significant reduction in suicide risk.

Finally, a multi-modal substance abuse prevention intervention (Preventure) was associated with a significant decrease in suicidal ideation from baseline to 36-month follow-up in high school students identified as 'high risk' victims of bullying, compared to TAU controls (Kelly et al., 2020).

3.4.3 Policy Approach Interventions

Paschall and Bersamin (2018) found that schools which increased the availability of mental health services at school-based health centres (SBHCs) showed a significant reduction in the likelihood of past year suicidal ideation and suicide attempt compared to schools which did not increase the availability of mental health services at SBHC and schools with no SBHC.

However, Seelman and Walker (2018) found that the presence of state anti-bullying laws did not lower the likelihood of suicidal ideation or suicide attempt among LBGQ high school students.

3.5 Studies Conducted in Workplace Settings

Two studies were conducted in workplace settings, both involving active-duty military personnel. One study was an indicated brief contact intervention (Comtois et al., 2019), while the other was selective CBT psychotherapy (Wyman et al., 2020).

3.5.1 Psychotherapy Approach Interventions

Wyman et al. (2019) reported lower suicidal ideation severity at one month follow-up in a group of military personnel engaged in Wingman-Connect (military adaption of Sources of Strength Intervention), compared to control participants engaging in Stress Management Training. This effect was no longer significant at six-month follow-up.

3.5.2 Brief Contact Approach Interventions

Comtois et al (2019) found that those receiving the Caring Contacts text messaging intervention had decreased odds of reporting suicidal ideation and of reporting one or more suicide attempts at 12-month follow-up, compared to a TAU group.

Discussion

This rapid review aimed to identify which interventions, within which contextual settings, are effective in preventing suicide-related outcomes among young people. Findings from a total of 66 studies have been synthesised. Studies were conducted across a range of settings and a variety of different types of interventions was tested.

It is encouraging that such a wide range of research into suicide prevention interventions in young people has been published in the last five years (2018 to 2023). This reflects the increasing recognition that this is an important area of research. We have summarised the key findings of this rapid review in Table 2 below.

Table 2. Summary of key findings

Key Findings

Clinical Settings

- A variety of psychotherapy modalities were effective in reducing suicide-related outcomes in clinical settings. In particular: DBT, family-focused therapy and psychotherapy utilising multiple modalities within a single intervention were effective.
- Brief contact interventions across clinical settings were effective in reducing suicide-related outcomes. Specifically, continuity of care/follow-up care interventions were associated with reduced suicidal ideation and attempt.

Community Settings

- Psychotherapeutic interventions, in particular DBT and CBT, were effective in reducing suicide-related outcomes in community settings.
- The effectiveness of psychoeducational approach interventions was mixed in community settings.

Educational Settings

- Psychoeducational interventions were effective in reducing suicide-related outcomes among educational settings.

Workplace Settings

- Studies conducted in workplace settings were limited.
- One brief contact intervention was effective in reducing suicide-related outcomes in a military setting.

Conclusions

- Findings are consistent with the comprehensive review published in 2018 (Robinson et al., 2018)
- Most of the studies reported on an outcome of suicidal ideation. Studies investigating the effectiveness of interventions in preventing suicide deaths are limited.
- Future research exploring the effectiveness of interventions in samples at particularly elevated risk of suicide-related outcomes is needed.
- No studies were conducted in Scotland (and only one study was conducted in the UK), limiting the generalisability of findings to a Scottish/UK context.
- The growth in research over time highlights the importance of suicide prevention efforts targeted specifically at the younger population

Our findings largely echo the results reported in Robinson et al. (2018). For example, we found a variety of interventions were effective in reducing suicide-related outcomes in clinical, community, educational and workplace settings. The settings were consistent with the settings identified in Robinson et al. (2018). Moreover, psychotherapeutic interventions, including DBT, CBT, family-therapy and combined modalities, were effective across all identified settings. However, no single therapeutic approach was associated with a significant reduction in all types of suicide-related outcomes (e.g. suicidal ideation, suicide attempt, suicide death) in all settings. This demonstrates that a 'one size fits all' approach is not appropriate: the unique differences in samples, settings and outcomes should be considered when deciding on which interventions to employ (Jobes & Chalker., 2019).

Robinson et al. (2018) noted the effectiveness of brief contact interventions in clinical settings. Our findings were consistent with this. Particularly, continuity of care/follow-up care interventions were shown to reduce suicidal ideation and behaviours. Moreover, our finding that psychoeducation in school settings was effective in reducing suicide-related outcomes aligned with existing literature (Breet et al., 2021; Robinson et al., 2018). Psychoeducational interventions were similarly effective in community settings, but there were fewer interventions of this type investigated in this setting.

Robinson et al. (2018) recommended that suicide prevention efforts should be adapted to be youth-specific, rather than using existing interventions developed for adults with a younger population. There has been progress in this respect over the last six years. For example, 43 of the included interventions were developed specifically for adolescents. Furthermore, eleven of the studies included in our review were delivered via digital methods and ten used a hybrid method of delivery. Although this may reflect the changing global context due to the COVID-19 pandemic, it may also be a recognition that the latest technology provides a useful platform for improving health behaviours for those in younger age groups, as shown in other areas of public health (e.g., Lappan, Yeh, & Leung., 2015). Although many of the interventions were developed for adolescents, few reported co-design with young people. Input from young people with lived experience of suicide-related outcomes is strongly encouraged in future design of interventions targeted at this age group.

4.1 Limitations

Several limitations should be noted when interpreting the findings of this review. First, as this was a rapid review, under time constraints, it was not possible to conduct a quality assessment of the included studies. As a result, we have not analysed the level of bias of the extant evidence. For an RCT, examples of bias may be the lack of blinding of participants or the allocation sequence of groups not being truly random. For other study designs, there may be bias in the selection process or in the measurement of confounding variables. A meta-analysis was also not possible, limiting the ability to make direct comparisons between our findings and the meta-analytic findings of Robinson et al., (2018).

Second, only one of the studies was based in the UK and none was conducted in Scotland. Therefore, the generalisability of these findings to the Scottish/UK population, taking into account cultural, social and economic differences between Scotland/UK and other countries, cannot be assumed. Only five studies investigated policy, and three of these were related to firearm protection. Policies focused on restriction of firearms are not as relevant in the Scottish Context.

Third, we did not include qualitative papers in our review. Thus, we did not gain any insight into the reasons why interventions were successful or unsuccessful in preventing suicide-related outcomes. Moreover, none of the studies reported on the therapeutic alliance. This is a particularly relevant limitation for the psychotherapy studies, which were the majority (n = 44).

Future research is needed to explore the effectiveness of interventions in samples at particularly elevated risk of suicide-related outcomes. For example, care-experienced young people are at higher risk (Evans et al., 2017), yet only one study recruited from this sample. Moreover, no studies investigated suicide prevention interventions within the youth prison population. Finally, only four studies recruited from the LGBTQ+ population. This limitation was highlighted in Robinson et al. (2018) but is clearly yet to be addressed in the wider literature.

1.3 Conclusions

This rapid review identified a number of effective suicide prevention interventions, within four different contextual settings. The findings are consistent with previous comprehensive systematic reviews in this area. We found that a variety of psychotherapeutic modalities were effective in reducing suicide-related outcomes in clinical, community, educational and workplace settings. The findings for psychoeducational interventions were promising in educational settings, but evidence was limited in other settings. Brief contact interventions were effective in reducing suicidal ideation across clinical and workplace settings. Many of the interventions were adapted specifically for youth, which is an positive development for the field. However, none of the included studies recruited from a Scottish population, which limits the relevance of findings to a Scottish context. Future research

should focus on the effectiveness of interventions targeting children and young people at particularly elevated risk of suicide-related outcomes.

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Appendices

Appendix 1. Search Strategy

Search date: 28 November 2023

Search: PsycINFO

Search line	Searches	Number of papers
S1	DE "Mental Health Programs" OR DE "Treatment" OR DE "Suicide Prevention" OR DE "Intervention" OR DE "School Based Intervention" OR DE "Workplace Intervention" OR DE "Family Intervention" OR DE "Preventive Mental Health Services" OR DE "Group Intervention" OR DE "Crisis Intervention" OR DE "Psychological First Aid" OR DE "Hot Line Services" OR DE "Digital Interventions" OR DE "Psychosocial Interventions" OR DE "Brief Interventions" OR DE "Support Groups" OR DE "Group Counseling" OR DE "Peer Counseling" OR DE "Counseling" OR DE "School Counseling" OR DE "Community Counseling" OR DE "Online Therapy" OR DE "Psychoeducation" OR DE "Community Mental Health Training" OR DE "Support Groups" OR DE "Supportive Psychotherapy" OR DE "Community Mental Health Services"	286,219
S2	DE "Suicide" OR DE "Attempted Suicide" OR DE "Youth Suicide" OR DE "Suicidality" OR DE "Suicidal Behavior" OR DE "Suicidal Ideation"	52,022
S3	S1 AND S2	8,475
S5	Date restriction: 2017 to 2024	2,991
S6	Language restriction: English only	2,915
S7	Age restriction: Narrow by subject age: - school age (6-12 yrs) Narrow by subject age: - adolescence (13-17 yrs) Narrow by subject age: - Young adulthood (18-29 yrs)	1,023

Search: CINHAL

Search line	Searches	Number of papers
S1	(MH "Suicide") OR (MH "Suicide, Attempted") OR (MH "Suicidal Ideation")	30,840
S2	(MH "Support, Psychosocial") OR (MH "Peer Counseling") OR (MH "Community Support") OR (MH "Psychoeducation") OR (MH "Suicide Prevention") (MH "Internet-Based Intervention") OR (MH "Psychosocial Intervention") OR (MH "Early Intervention") OR (MH "Crisis Intervention")	121,218

S3	(MH "Adolescence") OR (MH "Young Adult") OR (MH "Child")	1,021,201
S4	S1 AND S2 AND S3	718
S5	Date restriction: 2017 to 2024	319
S6	Language restriction: English only	312

Search: Medline

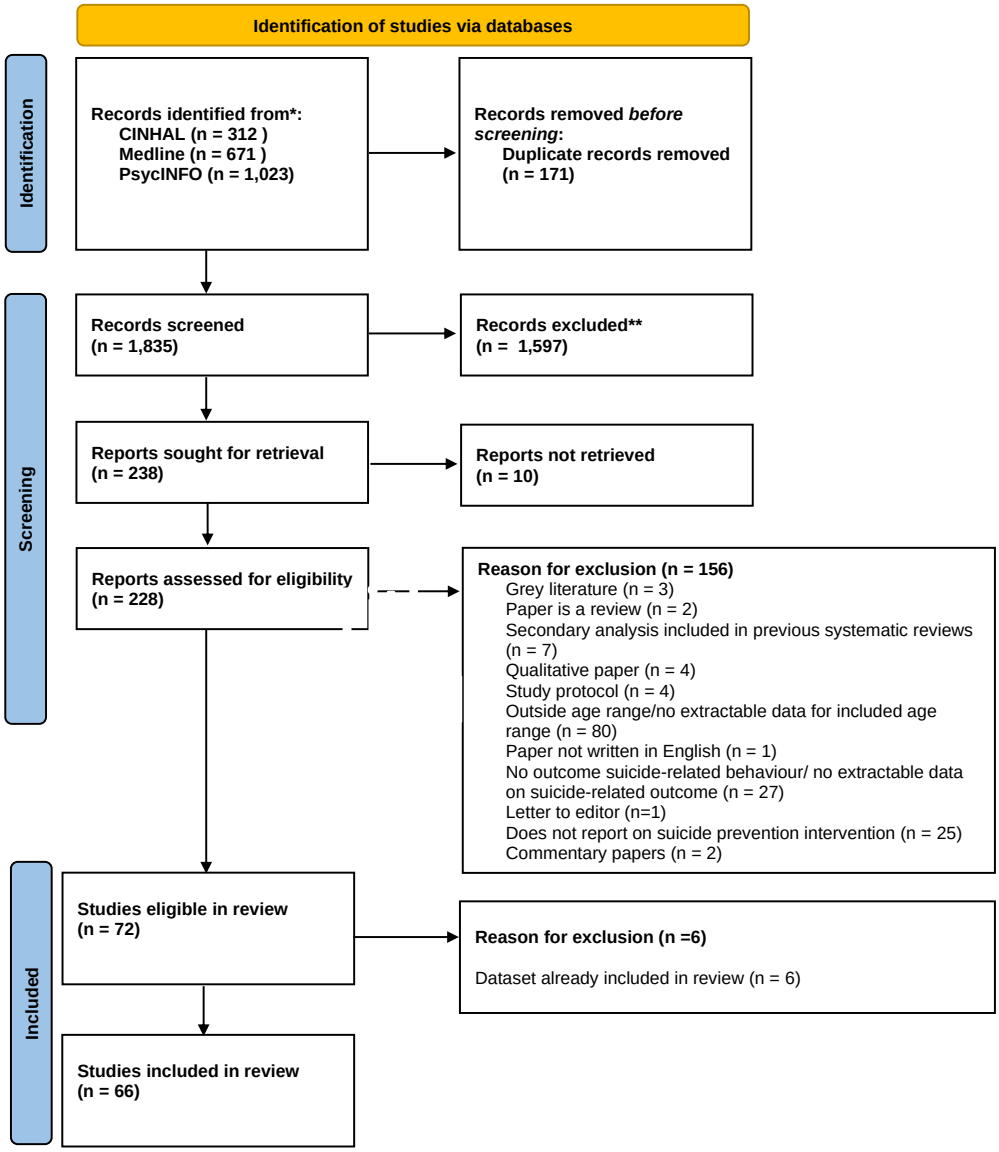
Search line	Searches	Number of papers
S1	(MH "Suicide") OR (MH "Suicide, Completed") OR (MH "Suicide, Attempted") OR (MH "Suicidal Ideation") OR (MH "Self-Injurious Behavior")	72,102
S2	(MH "Counseling") OR(MH "Community Support") OR (MH "Psychosocial Support Systems") OR (MH "Suicide Prevention") OR (MH "Psychosocial Intervention") OR (MH "Crisis Intervention") OR (MH "Internet-Based Intervention")	59,619
S3	S1 AND S2	8,266
S4	(MH "Child") OR (MH "Young Adult") OR (MH "Adolescent")	3,624,866
S4	S1 AND S2 AND S3	3,097
S5	Date restriction: 2017 to 2024	701
S6	Language restriction: English only	671

Appendix 2. Intervention Types

Intervention Type	Description
Policy	Deliberate system of guidelines or laws established to reduce suicide-related outcomes directly or by proxy.
Educational	Interventions delivering psychoeducation about suicide-related outcomes, mental health more generally, signs or symptoms to be aware of and advice on how to effectively respond.
Brief Contact	Intervention which either focused on maintaining contact or facilitating re-engagement with services; or interventions delivered within a very brief period.
Psychotherapy	Established psychotherapeutic approaches with theoretical or philosophical background.
Dialectal Behaviour Therapy (DBT)	DBT is a cognitive-behavioural treatment helping people to gain stronger coping capacities. DBT usually involved individual psychotherapy, along with group skills training and therapist consultation.
Cognitive Behavioural Therapy (CBT)	CBT works on the assumption that thoughts, feelings, physical sensations, and behaviours are connected. CBT attempts to identify and alter a core behaviour pattern, once the central feature is changed then maladaptive thoughts, symptoms and physical sensations will follow (Hazlett-Stevens et al., 2002).
Supportive Therapy	Draws from a range of modalities, focused on providing emotional support, encouragement, and validation.
Family Therapy	Psychotherapy with a basis in improving communication and relationships within families.
Problem-Solving Therapy	Problem-solving therapy aims to help people identify problems, generate solutions, and implement these solutions.
Other	Therapeutic modalities which do not fit into the categories already described
Combined	Where interventions have been developed adopting several modes of psychotherapy

*Definitions consistent with those used in Robinson et al. (2018).

Appendix 3. PRISMA diagram.



Appendix 4. Study Summary Tables.

Table A1. Clinical Settings.

Study; country	Study design, Sample Summary	Intervention Description	Comparison Condition, Comparison Sample Summary	Main Study Findings
Adrian et al. (2022); USA	Quasi-experimental; inpatients & outpatients in psychiatric services; M = 15.31 (*SD* = 1.26); F= 15 (68.2%).	CAMS-4Teens, indicated, psychotherapy: other; up to 16 60-minute sessions, in-person delivery by clinicians	N/A	Suicidal ideation significantly decreased (t = 3.33, p = .005, d = .67) Suicide risk significantly decreased (b = -.008, SE = .002, p = .001)
Ahmadi et al. (2022); USA	Cohort study; Youth with PTSD; M = 13 (SD = 2); F = 28 (56%)	RFPP-S; indicated, psychotherapy: other ;10 minutes twice daily for 2 consecutive days; NR	TAU; M = 13 (SD = 2); F = 87 (58%)	Significant improvements in suicidal ideation & behaviour from baseline to day 2 of treatment (effect size = 1.8, p=0.001). Suicidal ideation & behaviour at 6-month follow up: NS
Asarnow et al. (2021); USA	RCT; psychiatry inpatient sample; Whole sample: M= 14.89 (SD = 1.47; F = 173 (95%)	DBT; indicated, psychotherapy: DBT; 6 months; delivered in-person by clinicians	IGSP; NR.	Self-harm remission rate significantly higher in DBT group compared to IGST for treatment period (0-6 months) [$\chi 2$ (1) = 5.64, p = .018] and follow-up period (6-12 months) [$\chi 2$ (1) = 6.21, p = .013]
Babeva et al. (2020); USA	Quasi-experimental; outpatients in psychiatric services; M = 15.19 (SD = 1.62); F = 45 (90%)	SAFETY; indicated; psychotherapy: combined; 12 weeks; delivered in-person by therapists	N/A	Suicide attempt significantly decreased (p <0.05) Significant improvement suicidal ideation (p<0.001)

Bailey et al. (2020); Australia	Quasi-experimental ; outpatients in psychiatric services; M = 21.7 (SD = 2.7); f = 11 (55%)	Affinity; indicated; psychotherapy: combined; digital online platform	N/A	Suicidal ideation decreased between baseline and follow-up 8 weeks later (d = -0.57, p = 0.033)
Berk et al. (2020); USA	Quasi-experimental; general population with recent suicidal or self-harm behaviour; M = 14.7 (SD = NR); F = 5 (83%)	DBT, indicated; psychotherapy: DBT; in-person delivery by clinician	N/A	Significant decrease in suicide attempt (t = -2.00, p< 0.05), Significant decrease in suicidal ideation (t = 5.31, p <0.01)
Cloutier et al. (2022); Canada	Quasi-experimental; urgent care outpatients or outpatients in psychiatric clinic; M = 14.5 (1.0); F = 30 (96.8%)	BRAVA; indicated; psychotherapy: combined; 6 weekly 90 minute sessions; delivered by clinicians	N/A	Suicidal ideation significantly reduced from pre-treatment to post-treatment (t = 4.58, p<0.001, d = 0.83, 95% CI: 10.01-26.12)
Czyz et al. (2019); USA	RCT; inpatient hospital sample; M = 15.42 (sd = 1.36); F = 28 (78.8%)	MI-SafeCope Intervention; indicated; psychotherapy: MI; NR; delivered by counsellors	TAU; NR	Frequency of suicidal ideation: NS Duration of suicidal ideation: NS Intervention group reported significantly higher likelihood of suicide ideation (OR = 1.62, p - .024) than TAU
Czyz et al. (2021); USA	RCT; inpatient hospital sample; Full sample M = 15.16 (SD = 1.35; Full sample F = 54 (67.5%)	MI-SafeCope; indicated; psychotherapy: MI; NR; delivered by counsellors	Phase 1 MS-SP; Phase 2 no call condition; NR	Suicidal ideation severity: NS Suicide attempt: NS Suicidal behaviour (attempt, aborted or interrupted attempt): NS
Fontanella et al. (2020); USA	Cohort study; inpatient hospital sample; NR; NR	Post discharge follow-up 7 days after hospitalisation	N/A	Follow-up care within 7 days was associated with a 56% lower risk of suicide

		(outpatient mental health care); indicated; brief care NR; NR		(adjusted RR, 0.44; 95% CI, 0.23-0.83; P = .01).
Gillespie et al. (2019); Ireland	Quasi-experimental; outpatients at community mental health clinic; M = 15.62 (SD = 121); F = 58 (85%)	24 weeks DBT-A; clinical setting; indicated; psychotherapy: DBT 24 weeks; delivered by clinicians	16 weeks DBT-A; M = 15.72 (SD = 1.06); F = 71 (85%)	Significantly greater reductions in suicidal ideation in the 24-week group, compared to the 16-week group (p = 0.03)
Gryglewicz et al. (2023); USA	Cohort study; inpatient hospital sample; M = 14.6 (SD = 1.8); F =846 (75.2%)	LINK; indicated; brief contact; up to 90 days; delivered by trained researchers in-person or by telephone	N/A	Significant reduction in suicidal ideation over time (from baseline to 30 days) b = -0.84, [95% CI -.92, -.77], p<0.001 Significant reduction in suicide attempts over time (from baseline to 30 days), b = 0.46, [95% CI .37,.57], p<0.001
Haruvi Catalan et al. (2020); Israel	Quasi-experimental; outpatients at depression and suicidal behaviour clinic; Full sample (M = 13.44, SD = 2.45); F = 16 (61%)	IPT-A-SCI; indicated; combined; five weekly in-person sessions followed by monthly emails over 5 months; delivered by therapists	TAU; WL; NR; NR	Significant reduction in suicidal ideation between initial assessment and posttreatment compared to TAU and WL conditions (F(4, 46) = 3.34, p < 0.05)
Hill et al. (2023); USA	Quasi-experimental; outpatients at grief/trauma clinic; M = 14.44 (SD = 1.56); F = 28 (87.5%)	Supporting Grieving Teens Intervention; selective; brief contact; 2 sessions, 30-40 mins each; digital – web-based platform with animated videos and text prompts	N/A	There was a significant reduction in suicidal ideation from baseline to follow-up (F (2.70, 83.57) = 3.18, p = 0.03, η2 = 0.090
Keeton et al. (2019); USA	RCT; outpatients at community and primary care clinics; school students and general population with a	CBT; selective: psychotherapy: CBT; 12 weeks; NR	Sertraline; CBT & sertraline; pill placebo; NR; NR	Suicidal ideation and behaviour: NS

	primary diagnosis of SAD, SoP or GAD; M = 17 (SD = NR); F = NR			
Kennard et al. (2019); USA	Quasi-experimental; inpatients, outpatients and those presenting to ED); M = 14.90 (SD = 1.37); F = 291 (79.95%)	Intensive Outpatient Program; indicated; psychotherapy: combined; 3 hour group therapy twice weekly for 4-6 weeks ; delivered by clinical staff	N/A	Improved suicidal ideation and behaviour at time of discharge from intervention (statistic NR)
Kennard et al. (2018); USA	RCT; hospital inpatient sample; Full sample M = 15.1 (SD 1.5); F = 59 (89.4%)	ASAP mobile app intervention; indicated; psychotherapy: MI; NR; delivered via a smartphone app	TAU; NR	Suicidal ideation: NS Suicide attempt: NS
McBee-Strayer et al. (2019); USA	Quasi-experimental; inpatient hospital sample; M = 15.1 (SD = 1.5); F = 43 (86%)	Intensive Crisis Intervention; indicated; psychotherapy: combined; NR; delivered by crisis clinicians in-person	N/A	Significantly lower suicidal ideation at 30 days (M = 20.9, SD = 13.5) and 3 months (M = 20.1, SD = 12.8) than at baseline (M = 54.3, SD = 12.9; $p < .0001$). Large effect size (Cohen's d = 2.2). Suicide attempt: NR
McManama et al. (2018); USA	RCT; inpatient hospital sample; M = 15.96 (SD = 0.89); F = 21 (84%)	ASIST; indicated; brief contact; 60-90 min individual session and 20-30 min family session; delivered by clinicians in-person	TAU; M = 15.64 (SD = 0.99); F = 19 (76%)	Suicidal ideation: NS
Mehlum et al. (2019);	RCT; outpatient sample; Whole sample: M = 18.79	DBT-A; indicated; psychotherapy; DBT;	EUC; NR; NR	Suicidal ideation: NS at 1.6 years follow-up

Norway	(SD = 1.61); Full sample. F = 63 (90%)	delivered for 19 weeks; delivered by therapists in-person and over the phone		
Melvin et al. (2019); Australia	Quasi-experimental; general population; M = 19.81 (6.02); F = 24 (66.7%)	BeyondNow Safety Planning Mobile Application; indicated; psychotherapy: other; 8 weeks; delivered digitally via mobile application	N/A	Significant reductions in severity of suicidal ideation from pre-test to post-test (t = -.-3, =<.001) Significant reductions in intensity of suicidal ideation (t = -0.03, p< 0.05) from pre-test to post-test
Miklowitz et al. (2020); USA	RCT; general population meeting lifetime criteria for unspecified BD or MDD; M = 13.2 (SD = 2.5) ; F = 45 (68.2%)	Family-Focused Therapy; Selective; psychotherapy: family-therapy; 12 sixty minute sessions; delivered in-person by clinicians	EC; M = 13.2 (SD = 2.5); F = 45 (68.2%)	Significant decrease of suicidal ideation from baseline to follow-up in FFT group, compared to EC group (F(1,205)=8.68, p = 0.004).
Rengasamy & Sparks. (2019); USA	Quasi-experimental; inpatient hospital sample; M = 15 (SD = 1.6); F = 48 (67%)	Multiple Calls Intervention; indicated; brief contact; 90 days (telephone call 1,7,13,30,60 and 90 days post discharge); delivered by trained clinicians over the telephone	Single Call Intervention (SCI); M = 15.1 (SD = 1.6); F = 51 (73%)	Participants in the MCI had fewer incidents of suicidal behaviour than participants in the SCI (OR = 0.25, 95% CI: 0.07-0.89, P = 0.032)
Sale et al. (2022); USA	Quasi-experimental; inpatient, school students & general population; M = NR (51.9% of the sample were between ages 14-17;	Continuity of Care Model; indicated; brief contact; delivered over 3-7 months; delivered by community mental health providers in-person and	N/A	Significant decrease in suicide attempts over time ((F[1.61, 561.01] = 41.23, p < .001, partial η2 = 0.106). Significant decrease in suicidal ideation over time ([χ2(2) = 191.4, p < .001].

	F = 237 (62.7%)	via postcards, emails or texts		
Santamarina-Perez et al. (2020); Spain	RCT ; psychiatric outpatient sample; M = 15.3 (SD = 1.2); F = 16 (88.9%)	DBT-A; indicated; psychotherapy: DBT; delivered over 16 weeks; delivered by trained therapists in DBT	TAU + group sessions; M = 15.2 (SD = 1.5); F = 15 (88.2%)	Suicidal ideation: NS Suicide attempt: NR
van der Spek et al. (2023); Netherlands	Quasi-experimental; mental health clinic outpatients. M = 17.1 (SD = NR); F = NR (74.2%)	ABFT; indicated; psychotherapy: family-therapy; up to 16 weeks; delivered by trained therapists via online video calling or face-to-face	N/A	Suicidal ideation significantly decreased postintervention compared to baseline ([t(57.86) = 3.02, p = .004)
Yen et al. (2020); USA	RCT; inpatient hospital sample; M = 15.69 (SD = 1.72); F = 14 (53.8%)	STEP; indicated; psychotherapy: combined; 3 individual sessions, 1 family session (exact time frame NR); 1 month of remote intervention; delivered by trained researcher	ETAU; M = 15.58 (SD = 1.21 ; F = 17 (65.4%)	Over 6 months of follow up, 5 participants in STEP condition and 10 participants in ETAU condition had a suicide event (statistical test NR).
Zullo et al. (2019); USA	Quasi-experimental; outpatient at psychiatric services; M = 14.98 (SD = 1.66); f = 45 (72.6%)	SPARC IOP; indicated; psychotherapy: combined; NR; In-person therapist led group sessions	TAU; M = 15 (SD = 1.59); F = 45 (73.8%)	Suicide risk at discharge: NS Suicide risk at 1-month post discharge: NS

ABFT = Attachment Based Family Therapy, ASAP = As Safe As Possible, ASIST = Alcohol and Suicide Intervention for Suicidal Teen, BRAVA = Building Resilience and Attachment in Vulnerable Adolescents, CAMHS-4-Teens = Collaborative Assessment and Management of Suicidality for teens; DBT= Dialectical Behaviour Therapy; DBT-A = Dialectical Behaviour Therapy for Adolescents, EU = Enhanced Care, EUC = Enhanced Usual Care, ETAU = Enhanced Treatment as Usual, IGSP = Individual and Group Supportive Therapy, IOP = Intensive Outpatient Program, IPT-A-SCI = Ultra Brief Interpersonal Psychotherapy for Suicidal Children and Adolescents, LINC = Linking Individuals Needing Care; MCI = Multiple Calls Intervention, RFPP-S = Reminder-Focused Positive Psychiatry and

Suicide Prevention, SPARC = Suicide Prevention and Resilience, STEP = Skills to Enhance Positivity in Suicidal Adolescents, TAU = treatment as usual. NR = not reported, NS = not statistically significant.

*If exact intervention name is not reported, we have provided a brief description of the intervention.

Table A2. Educational Settings

Study; country	Study design, Sample Summary	Intervention Description	Comparison Condition, Comparison Sample Summary	Main Study Findings
Baggio et al. (2022); Switzerland	Quasi-experimental; high school students; M = 15.62 (SD = NR); F= 155 (56.8%)	Name NR; universal; educational; 90 minutes; in-person delivery	Control group no intervention; M = 14.34 (SD = NR); f = 53 (53%)	Suicide ideation significantly decreased over time b = -2.32, 95% CI -4.25;- .39, *p*= 0.019
Barzilay et al. (2019); 10 EU countries	RCT; high school students; M= 14.8 (SD = 0.8); F= 6,555 (59%)	YAM; universal; educational; 4 weeks; classroom workshop	Control group no intervention; high school students; NR; NR	Significantly reduced association between self-injury and suicidal ideation at baseline and repeated suicide attempt at follow-up [$\chi 2(1) = 3.92$, p = .048].
Bounds et al. (2019); USA	Quasi-experimental; general population recently runaway from home and history of extra-familial sexual assault or sexual exploitation; M = 14.84 (SD=1.34) ; F = 348 (96.1%)	Runaway Intervention Program; selective; psychotherapy; 12 months; delivered by nurse practitioners	N/A	Suicidal ideation and suicide attempt decreased significantly from baseline to 3 and 6 months and maintained at 12 months (p<0.001).

Conforti et al. (2020); Canada	Quasi-experimental; high school student; M = NR; F = 50 (64%)	Harry Potter based Cognitive Behavioural Therapy Skills Curriculum; universal; psychotherapy: CBT; 3 months; delivered by teachers during school curriculum	N/A	Suicide attempt decreased from pre-test to post-test (t = 2.17, df = 77, p <0.03) Suicidal ideation decreased from pre-test to post-test (t = 2.55, df = 77, p<0.01)
Godwin. (2020); USA	Cohort; school students; NR; NR	Fast Track; selective; psychotherapy: other; NR; NR	control group: no intervention; NR; NR	Significant decrease in suicidal ideation from ages 15 to 25, in intervention group, compared with control group (OR = 0.549; CI = 0.365, 0.828). Suicide attempt/self-harm: NS
Kelly et al. (2020); Australia	RCT: school students; M = 13.34 (0.49); F = 212 (19.5%)	Preventure; multi-modal: educational; 2 90 minute group sessions, 1 week apart; delivered by trained psychologists	TAU (drug education as usual); M = 13.32 (0.47); F = 720 (65.4%)	Those who were high risk victims in intervention group significantly decreased suicidal ideation from baseline to 36 months compared to control group (b = -0.130, CI = -0.225 to -0.034, p<0.01)
Manjula et al. (2018); India	Quasi-experimental; high school and college students; M = 15.35 (SD = NR); F = 204 (54%)	Suicide awareness and education program; universal; 2-2.5 hour workshop (delivered over 1-2 sessions); delivered in classrooms by researchers	N/A	suicide risk significantly decreased from pre-test to post-test (t = 1.98, p = 0.047) Suicidal ideation: NR
McGillivray et al. (2021); Australia	Quasi-experimental; high school students; M = 14.4 (SD = 0.56); F = 313 (56.3%)	YAM; universal; educational; five classroom sessions delivered over 3 weeks; delivered in-person by trained adults	N/A	Significant decrease in suicidal ideation scores over time F(2, 329.36)=8.45, p<0.001. Mean suicidal ideation score reduced significantly from baseline to 3-month post-intervention (p<0.001) and from baseline to follow-up (p<0.001)

				Suicidal ideation 3-month follow-up to 6-month follow-up: NS Suicide attempt: NR
Paschall & Bersamin (2018); USA	Repeated cross-sectional; middle school & high school students; Full sample M = 15.2 (SD = 1.6); Full sample F =8,930 (51.6%)	Increased availability to mental health services at SBHC; selective; policy; NR; NR	Middle school & high school students without increased availability to mental health services at SBHC, and non SBHC schools; NR; NR	Significant reduction in suicidal ideation in schools that increased mental health services within SBHC, compared to non-SBHC schools or schools with SBHC who did not increase mental health services (OR = 0.84, 95% CI = 0.74 to 0.95, p<0.01) Significant reduction in suicide attempt in schools that increased mental health services within SBHC, compared to non-SBHC schools or schools with SBHC who did not increase mental health services (OR = 0.82, 95% CI = 0.70-0.96, p<0.01),
Pistorello et al. (2021); USA	RCT; university students; M = 19.48 (SD = 1.48); F = 21 (63.6%)	CAMS; indicated; psychotherapy: other; 4-8 weeks; delivered in-person by trained counsellors	TAU; M = 19.97 (SD = 1.97); F = 21 (72.4%)	Suicidal ideation across time significantly reduced for those in the CAMS group, compared to the TAU group (, t(60) = 2.10, p = .040, d = 0.54 (CI: 0.03–1.05).
Raj et al. (2019); India	Quasi-experimental; school students; M = 14 (SD = NR); F = 15 (50%)	Mindfulness based cognitive therapy; indicated; psychotherapy: CBT; 12 sessions delivered over 16 weeks; delivered in-person by Clinical Psychologist	N/A	Suicidal ideation decreased from pre-test to post-test (t = 44.81, df = 29, p<0.001.)
Robinson et al. (2023); USA	RCT; School students; Full sample M = 14.5 (SD = 0.59);	A-CWS; selective: psychotherapy: CBT;	Standard care; NR; NR	Ideation increased from baseline to postintervention and then decreased from postintervention to 12 months

	Full sample F = 230 (56%)	45 minute weekly sessions (for at least 12 sessions); Delivered by trained facilitator (master-level clinicians)		postintervention and to levels less than at baseline (statistic NR)
Seelman & Walker (2018); USA	Quasi-experimental; LGBQ high school students; NR; NR	Presence of general or enumerated school state ant-bullying laws; universal; policy; N/A	No general or enumerated school state ant-bullying laws; NR	Suicidal ideation: NS Suicide attempt: NS
Xavier et al. (2019); Brazil	RCT; school students; M = 17.3 (SD = 1.9); F = 32 (64%)	Problem-solving intervention; indicated; psychotherapy: problem-solving; five weeks (2 hour weekly sessions); delivered by Clinical Psychologists in person	TAU; school students; M = 17 (SD = 0.9); F = 28 (56%)	Participants in the intervention group were no longer a suicide risk compared to the controls postintervention ($X2(1) = 92.3$, $p < .001$) and at 6 month follow up ($X2(1) = 92.3$, $p<0.001$) Suicide attempt: NS

Adapted-Coping With Stress (A-CWS), CAMS = Collaborative Assessment and Management of Suicidality (CAMS), CBT = Cognitive Behavioural Therapy, SBHC = School-based health centres, TAU = treatment as usual, YAM = Youth Aware of Mental Health Program. NR = not reported, NS = not statistically significant.

Table A3. Community Settings

Study; country	Study design, Sample Summary	Intervention Description	Comparison Condition, Comparison Sample Summary	Main Study Findings
Berk et al. (2022)a; USA	Quasi-experimental; general population; M = 14.7 (SD = NR ; F = 7 (70%)	DBT- Based Parenting Intervention; indicated; psychotherapy: DBT; 3 months; 8-10 individual parent session (no	N/A	Self-harm decreased significantly from baseline to 3 months ($p = 0.036$) and baseline to 6 months ($p = 0.014$). Suicide attempt: NS

		intervention direct to young person)		Suicidal ideation: NS
Bonet et al. (2020); Spain	Quasi-experimental; adolescents in residential care; M = 13.74 (1.66) ; F = 5 (26.32%)	Emotional Intelligence Therapy; selective; psychotherapy; 16 weekly, 90 minute sessions; delivered by therapist in person	N/A	Suicidal ideation significantly reduced from pre-treatment to post-treatment ((F= 9.15; p <.01; η2 = .17)
Braun et al. (2023); Austria	RCT; general population; M = 17.99 (SD = 1.21); F = 114 (77.03%)	Short educational film featuring young individual with personal experience of suicidal crisis; universal; educational; 4.51 minutes; digital video	Control video (how to maintain a healthy lifestyle); M = 17.91 (SD = 1.18); F = 111 (73.51%)	Suicidal ideation significantly lower immediately after intervention in the intervention group compared with control group MDif=−0.09 [95% CI −0.15 to −0.03], ηp2=0.03). 4- week follow-up; NS
Diamond et al. (2019); USA	RCT; ipatient, outpatient, general population, school students; Full sample Full sample M = 14.87 (SD = 1.68); F = 55 (83.3%)	ABFT; indicated; psychotherapy: family-focused; 16 weeks; delivered by trained community therapists	FE-NST; NR; F = 52 (82.5%)	Suicide ideation: NS Suicide attempt : NS
Dobias et al. (2021); USA	RCT; general population; M = 14.92 (SD = 0.98) ; F= 189 (66.08%)	Project SAVE; indicated; psychotherapy: DBT; 30 minute; self-administered web-based program	Control group (engaged in Supportive Therapy 'Share Your Feelings'); M = 14.97 (SD = 0.99); F = 189 (66.67%)	Suicidal ideation: NS
Godoy Garraza et al. (2019); USA	Quasi-experimental; general population adolescents who died by suicide;	GLS Suicide Prevention Program; universal; educational; NR; NR	Counties without GLS program; NR; NR	Suicidal ideation significantly lower 1 year (p-0.029) and 2-year after (p=0.010) implementation of GLS activities, compared to counties without GLS

	M = NR (SD = NR), Age range 10 -24; F = NR			
Hamilton et al. (2018); USA	Cross-sectional; general population; M = NR (SD = NR); F = 32 (15.4%)	CAP firearm law; universal; policy; N/A	N/A	Among states with strong CAP laws, the incident rate of self-inflicted firearm injury decreased by 54% compared with states with no CAP laws (IRR, 0.46; 95% CI, 0.26-0.79) Among states with weak CAP laws, the incident rate of self-inflicted firearm injury were associated with an increase of 82% compared to states with no CAP laws (IRR, 1,82; 95% CI, 1.03-3.23)
Hill & Pattit. (2019); USA	RCT: general population; M = 16.67 (SD = 1.70) ; f = 55 (68.8%)	LEAP; selective; psychotherapy: CBT; 2 online module, 20-30 mins completed 1 week apart; Digital - web based online modules	TAU; NR	Suicidal ideation: NS
Humensky et al. (2017); USA	Cohort; general population; M = 14.9 (SD = 2.3); F = 107 (100%)	LIP Program; selective; psychotherapy; other; drop in sessions (no set length); delivered by community workers in-person	N/A	Suicidal ideation decreased by 1/5 of a point per month of program enrolments for an average or 2.3 points per years of enrolment (p = 0.05).
Jeong et al. (2020); South Korea	Quasi-experimental; suicide attempt survivors who were currently engaged or have been engaged with mental health services; NR; F = 3 (100%)	Safety Planning Mobile Application (Brake in My Mind); indicated; psychotherapy: other; NR; self-delivered using mobile application on own devices	N/A	Decrease in suicide intention score from baseline, immediately after using app and 7 days later (statistical analysis NR).

Kappelman & Fording. (2021); USA	Cohort; general population; M = NR (SD = NR) Age 20-24 years; F = NR	CAP Law and Minimum Age Laws; universal; policy; NR	N/A	States with minimum age 21 law (purchase) had significantly lower firearm suicide, compared to states without this law ($p < 0.001$). States with minimum age 21 law (possession) had significantly lower firearm suicide, compared to states without this law ($p < 0.001$). States adopting strict CAP laws significantly reduced firearm suicide rate compared to states without the law ($p<0.10$). Weak CAP laws: NS
King et al. (2018); USA	RCT; youths presenting to ED or urgent care; Full sample M = 13.5 (SD = 1.1); Full sample F = 145 (66.5%)	Let's CONNECT; selective; psychotherapy: supportive therapy; delivered over 6 months; delivered in-person within the community by trained adult mentors	Control group: no intervention; NR; NR	Suicidal ideation: NS Suicidal behaviour: NS
Kirchner et al. (2022); Germany & Austria	RCT; LGBTQ+ general population; M = 18.96 (SD = 2.24); F = 122 (50.4%)	"It Gets Better" Suicide Prevention Video; selective; educational; 10 minute for two videos; delivered on-site and online	Control group allocated to watch videos on healthy lifestyle; M = 19.16 (SD = 2.25); F = 131 (54.4%)	Suicidal ideation: NS
Kivisto et al. (2021); USA	Repeated cross-sectional; general population who died by firearm suicide;	CAP firearm laws; universal; policy; NR	N/A	Significant decrease in adolescent firearm suicide associated with law that a safety lock is required for handguns sold by all dealers was linked (exact statistic NR)

	M = NR (SD = NR) Age 14-18 years; F = NR			Significant decrease in adolescent firearm suicide associated with law that safety locks meet state-specified standard (CI = 0.0% - 53.8%, P=0.05) Significant decrease in adolescent firearm suicide associated with law criminal liability regardless of whether gun is loaded or unloaded (exact statistic NR)
McCauley et al. (2018); USA	RCT; clinical sample (ED, inpatient, outpatient) & general population (community programs); M = 14.77 (SD= 1.50); F = 82 (95.30%)	DBT; indicated; psychotherapy: DBT; 6 months; delivered by trained therapists in DBT	IGST; M = 15.04 (SD = 1.43); F = 81 (94.19%)	Repeat suicide attempt significantly lower in DBT group than IGST group at end of active treatment (OR = 0.30 95% CI = 0.10-0.91, P <0.05); 12 month follow-up: NS
Niederkrotenthaler & Till. (2020); Germany	RCT; general population with suicidal ideation/attempt history and at least two symptoms of MDD; M = 19.7 (SD = 1.9); F = 76 (93.8%)	Short suicide prevention video; indicated; educational; 5 minutes; digital video	Control: short neutral video; M = 20.0 (SD = 2.1); F = 72 (93.5%)	No significant main effect for study group ($F(1,110) = 0.63$, $P = .43$, $\eta p 2 = .006$)
Pachankis et al. (2020); USA	RCT; LGBTQ general population; Expressive writing group: M = 23.47 (2.88); self-affirmation writing group: M = 23.42 (3.25); Expressive writing group: F = 26 (72.20%); self-affirmation group: F= 26 (72.20%)	Two interventions: Self-affirmation writing intervention and expressive writing intervention; selective; psychotherapy: other; 3 20 minute sessions across 3 consecutive days; Online self-delivered	Control group (completion of a neutral writing course) LGBTQ general population; M = 24.14 (SD = 3.24); F = 25 (69.40%)	Suicidal ideation Expressive writing vs control: NS Self-affirmation vs control: NS

Russon et al. (2022); USA	Quasi-experimental; LGBTQ+ general population youth; M = 18.2 (SD = NR); F = NR	ABFT; indicated; psychotherapy: family-therapy; delivered over 16 weeks; delivered by ABFT trained therapist	N/A	Significant decreases in suicidal ideation over the course of the treatment (β = -12.16, t(10) = -3.14, p < .01)
Skerrett et al. (2018); Australia	Quasi-experimental; Aboriginal and Torres Strait Islander Young People. M = 15.13 (SD = 2.37); F = 55 (41.3%)	SEWB program; selective; psychotherapy: other; NR; Delivered by a same-sex facilitator from the local indigenous community	N/A	Significant reduction in suicidal ideation from pre-test to post-test (t(36) = 2.79, p=0.008). Suicidal ideation 2-month follow-up; NS Suicide: NS
Slesnick et al. (2020); USA	RCT; homeless young people. Full sample M = 20.99 (SD=1.96); F = 61 (40.7%)	CTSP; selective; psychotherapy: CBT; 10 (50 minute) sessions weekly or bi-weekly with option of 9 additional sessions. Provided over 6 months; delivered by trained therapists in person	TAU; NR; NR	Significant decline in suicidal ideation (B = − 5.52, SE = 0.21, z = − 26.51, p < 0.001). CTSP + TAU group showed a faster decline in suicidal ideation than those in the TAU condition (B = − 0.85, SE = 0.43, z = -− 2.01, p < 0.05).
Smith et al. (2021); USA	Quasi-experimental; general population. M = 23.4 (SD = 5.6); F = 26 (81.3%)	RISE; selective; psychotherapy: other; 4 30-45 minute self-delivered sessions	N/A	reduction in suicidal ideation from pre to posttreatment (d = 0.61, p = 0.01)
Wu & Adamsk (2021); China	Cohort; university students; Full sample Full sample M=19.56 (SD = 1.36); experimental group F = 16 (43%)	CBT; indicated; psychotherapy: CBT; 1 session a week for 8 weeks ; delivered by trained psychotherapists in person	Control group (no treatment); NR; F = 20 (54%)	Suicidal ideation in the intervention group during treatment and after treatment were significantly lower than those in the control group (p<0.05)

ABFT = Attachment-Based Family Therapy, CAP = Child Access Prevention, CTSP = Cognitive Therapy for Suicide Prevention, CBT = Cognitive Behavioural Therapy, DBT = Dialectical Behavioural Therapy, IGSP = Individual and Group Supportive Therapy, LEAP = Learn, Explore, Assess & Plan, LIP = Life is Precious, GLS = Garrett Lee Smith, Project SAVE = Stop Adolescent Violence Everywhere, RISE = Reconnecting to Internal Sensations and Experiences, SEWB = Social-emotional wellbeing program, TAU = treatment as usual. NR = not reported, NS = not statistically significant.

Table A4. Workplace Settings

Study; country	Study design, Sample Summary	Intervention Description	Comparison Condition, Comparison Sample Summary	Main Study Findings
Comtois et al. (2019); USA	RCT; military population; M = 25.6 (sd = 6.3) ; f = 54 (16.5%)	Caring Contact; indicated; brief; delivered via text messages	TAU; M = 24.8 (sd = 5.8); f = 64 (19.5%)	Significantly decrease in odds of reporting suicide ideation since baseline (0.56 95% CI [0.33-0.95) P =.0.03) Significant decrease in odds reporting 1 or more suicide attempt since baseline (OR = 0.52, 95% CI [0.29-0.92] P=0.03)
Wyman et al. (2020); USA	RCT; Airforce personnel; Full sample. M = 20.9 (SD = 3.1); F = 263 (17.7%)	Wingman-Connect; selective; psychotherapy: CBT; 3 90-120 minute blocks over 3 consecutive days; delivered by trainers from a variety of roles	Control receiving Stress Management Training; NR; NR	Lower suicidal ideation severity within intervention group compared to control at one month follow-up (ES, −0.23; 95% CI, −39 to −0.09; P = .001). Suicidal ideation at 6 month follow up: NS

NR = not reported, NS = not statistically significant. TAU = treatment as usual.

Cite this report as: Loney, K. J., McClelland, H., O'Connor, R. C., & Platt, S. (2024). *A Rapid Review of the Effectiveness of Interventions for Reducing Suicide Risk in Young People Within Different Settings.* [Unpublished manuscript].