Brief interventions and contacts after suicide attempt: A meta-analysis

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Analysis

Additional Declarations: There is **NO** Competing Interest.

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Following a suicide attempt, only a third of people receive outpatient treatment. This highlights the need to rethink our approach to treatment, to include the consideration of low-threshold brief interventions and contacts. Therefore, in this study, we investigated the extent to which such brief interventions and contacts (BICs) are effective. PubMed, Cochrane, Embase, ProQuest, and PsycINFO were searched by independent researchers according to the PRISMA guidelines. This meta-analysis included randomized clinical trials (RCTs) that tested BIC in adults after a suicide attempt. It examined the effectiveness of BIC on (1) re-attempts at follow-up, (2) self-harm at follow-up, (3) suicidal ideation at follow-up, and (4) linkage to mental health services at follow-up. The findings from 54 RCTs confirmed that BICs are effective: (1) Re-attempts at the follow-up phase were significantly reduced in the BIC group compared with control (-0.35, 95% CI: -0.54, −0.15). (2) There was no difference between the groups in the recurrence of self-harm and (3) in the severity of suicidal ideation at follow-up. (4) The linkage to mental health services at follow-up was significantly higher in the BIC group compared with control (0.60, 95% CI: 0.05, 1.15). In this largest meta-analysis to date, there are clear implications for clinical practice: BICs, often consisting of only one session, are effective in reducing the recurrence of suicide attempts and can be used to help people find a connection to the mental healthcare system after a suicide attempt. Thus, these interventions should be integrated into suicide prevention strategies.

Keywords: brief interventions and contacts, suicide attempt, suicidal thoughts and behaviors, randomized controlled trials, systematic review, meta-analysis.

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Introduction

Worldwide, there are 720,000 death by suicide every year (WHO, 2024). Each one profoundly affects relatives and friends and impacts the healthcare system and the economy (Gvion & Apter, 2012). Thus, organizations such as the World Health Organization (WHO) (2019) have called for suicide prevention to be prioritized with increased access to health care and improved quality of care.

A window of opportunity

Increasing access to health care for this population is crucial for two reasons. First, 80% of people who died by suicide had contact with primary and mental health care services in the year before their death, and 44% in the month before (Stene-Larsen & Reneflot, 2019). This contact with health care services before their deaths can be a window of opportunity in which suicide prevention efforts could be increased to detect suicidal thoughts and behaviors (STBs) and link at-risk individuals to the appropriate treatment programs. Second, once patients are in treatment, an additional challenge is low treatment adherence. Only 35% keep an outpatient appointment within seven days of hospital discharge and 55% within 30 days (Olfson et al., 2010; Smith et al., 2017). What is more, getting the appropriate treatment after a suicide attempt is crucial. Individuals with a history of suicide attempts have a 66 higher chance of making another suicide attempt compared with individuals with no such history (Hawton et al., 2003). This emphasizes on good coordination of ongoing care. In other words, interventions are needed that are easily accessible, feasible, acceptable to patients,

and assisted in making appointments with health care professionals.

The WHO has also highlighted the need to improve the quality of care, considering that despite a marked increase in the number of available prevention interventions for STBs, their efficacy has remained modest over the last fifty years, and even smaller in younger at-risk populations (Fox et al., 2020). Moreover, traditional psychotherapeutic interventions of 15 sessions and more, often with long waiting lists, might simply not be adequate for this population. The question arises, what unique needs might individuals in the aftermath of a suicide attempt have?

A high-risk group with unique needs

First, the time, particularly the first days and weeks immediately after a hospital-treated attempt, is a high-risk period for re-attempt and suicide death. Second, low-threshold, brief, and effective interventions are needed with short waiting times. Third, interventions should include elements such as coordination of care and help link patients into the healthcare system to ensure they get the support they need. Last, interventions should offer help quickly to keep patients safe. Brief interventions and contacts could offer just that. They include (1) brief interventions consisting of brief psychotherapy sessions, either face-to-face or online, or (2) brief contacts consisting of telephone calls, postcards, letters, and crisis or emergency cards (also referred to as 'green cards'). They can be as brief as 1-4 sessions (ultra-brief suicide-specific interventions) or take 6-12 sessions (brief suicide-specific interventions) (Stanley et al., 2023). These can be delivered by clinicians or non-clinicians, i.e., people trained in suicide prevention techniques such as Applied Suicide Intervention Skills Training (ASIST; (LivingWorks, n.d.)). Despite their short nature, brief interventions and contacts seem to promote longer-lasting contact with the health care system, encourage help-seeking in times of crises, and offer

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timely interventions (A. J. Milner et al., 2015).

The emergence of brief interventions and contacts

One of the first trials that tested brief contacts for the prevention of suicidal behavior was by Motto and Bostrom (2001). Patients after suicide attempt who refused ongoing care received four or more letters a year over five years compared with a control group who did not receive letters. Strikingly, the patients who received letters had a significantly lower suicide rate compared with the control group. Although these findings were encouraging, a meta-analysis on brief contacts, including letters, green cards, telephone calls, and postcards by Milner and colleagues (2015) did not find evidence that self-harm or suicide attempts were reduced, but their frequency was. This is in line with another much smaller (N = 5) meta-analysis that found no evidence for an effect of telephone contact interventions on suicide attempts or completed suicides or crisis cards on self-harm (Noh et al., 2016). However, the most recent meta-analysis (Azizi et al., 2023) on brief contact interventions found a significant reduction of suicide attempts compared with control. One potential limitation of this meta-analysis was that it included brief psychosocial interventions despite their pre-defined focus on brief *contact* interventions. Thus, their finding might be more general for both brief interventions and contacts. As one of the major advances in the field of brief interventions, the development of the "Safety Planning Intervention" (Stanley et al., 2018; Stanley & Brown, 2012) is worth mentioning as it has become best practice by the Suicide Prevention Resource Center/ American Foundation for Suicide Prevention Best Practices Registry for Suicide Prevention (www.sprc.org). Barbara Stanley and Gregory Brown (2012) developed this single-session, stand-alone intervention for acute care settings. It consists of (1) identifying warning signs of an impending suicidal crisis; (2) employing inter-

nal coping strategies; (3) distraction from suicidal thoughts by utilizing social contacts; (4) resolving the crisis with the help of family members or friends; (5) contacting mental health professionals or agencies; and (6) reducing access to lethal means. Doupnik and colleagues (2020) assessed in a meta-analysis the efficacy of brief interventions and found that even with one session, there was a significant reduction in suicide re-attempts and depressive symptoms, and an increase in the linkage to follow-up care. This is consistent with the latest Cochrane review on interventions for self-harm (K. G. Witt et al., 2021) that found a positive effect for brief cognitive-behavioral therapy (CBT)-based interventions. Yet, there was little to no effect of other brief interventions such as remote contact interventions, on the repetition of self-harm by the post-intervention assessment except for a postcard intervention.

Potential components of change

Despite the promising evidence, it remains unclear which elements of brief interventions and contacts are the most effective. Milner and colleagues (2016) addressed this question in a review of 16 trials and found available social support (i.e., connectedness and being heard) and improved suicide prevention literacy (i.e., knowledge about risk and protective factors, sources for help) might be the most likely mechanisms underpinning these interventions. Other reviews highlighted components such as safety planning, psychoeducation (Doupnik et al., 2020; McCabe et al., 2018), early therapeutic engagement (McCabe et al., 2018), follow-up contact for a minimum of 12 months (McCabe et al., 2018), and care coordination (Doupnik et al., 2020). For the population of individuals with borderline personality disorder, Spong and colleagues (2021) found that Borderline symptom reduction was greatest if additional support was part of the intervention.

Compared with traditional psychotherapeutic interventions, short and cost-effective brief inter-

ventions and contacts seem to be just as efficacious as long, expensive, and difficult-to-access interventions (Fox et al., 2020). However, to date, it remains unclear which components of brief interventions and contacts are most beneficial, who benefits the most, or how such interventions should be implemented. These questions remain largely unanswered by prior research Furthermore, previous reviews have been limited in their focus on specific intervention types that were assessed (i.e., only brief contact, limited number of sessions), the population that was considered, or the outcomes that were assessed. Therefore, this review aims to give an overview of the existing literature on brief interventions and contacts for adults (on average 18 years or older) after a suicide attempt and evaluate their efficacy compared with a control condition (i.e., treatment as usual, care as usual, active comparator, routine care, enhanced routine care). We meta-analyzed the existing evidence of randomized controlled trials (RCTs) and considered five outcomes crucial for this population and suicide prevention efforts: (1) 'suicide re-attempts at follow-up', (2) 'suicidal ideation at follow-up', (3) 'non-suicidal self-injury (NSSI) at follow-up', (4) 'self-harm at follow-up', (5) 'linkage to mental health service at follow-up'. Thus, this review updates and extends previous findings by affording a more comprehensive evaluation of the available evidence for brief interventions and contacts.

Methods

For this systematic review and meta-analysis, we adhered to the current Preferred Reporting Items for Systematic Reviews and Meta Analyses guidelines (PRISMA-P; Page et al. (2021)) and followed the key suggestions of the Cochrane Handbook for Systematic Reviews of Interventions (J. P. Higgins et al., 2024).

Study selection criteria

We included RCTs that investigated specific brief psychosocial interventions for adults after suicide attempt. RCTs were eligible if they were published in the English language and peer-reviewed journals.

Participants. We included participants of all ethnicities and both sexes who were, on average 18 years or older and who sought treatment after a suicide attempt. We excluded RCTs in which participants reported suicidal ideation only (i.e., without a history of suicide attempts). We defined 'suicide attempt' according to Silverman and colleagues (2007) as a "self-inflicted, potentially injurious behavior with a nonfatal outcome for which there is evidence (either explicit or implicit) of intent to die.".

Interventions. Brief interventions were defined as structured, time-limited approaches addressing suicide risk. These included (1) ultra-brief interventions of 1–4 sessions and (2) brief interventions of 6–12 sessions (Stanley et al., 2023), involving either in-person or online psychotherapy or brief contacts like phone calls, postcards, or crisis cards. Delivered by clinicians or trained non-clinicians using techniques such as Applied Suicide Intervention Skills Training (ASIST), these interventions promoted healthcare engagement, crisis help-seeking, and timely support. Based on prior reviews, we defined four categories with the following grouping:
(1) Brief interventions: i.e., psychotherapy-based interventions, safety planning, and psychoeducation. (2) Remote contact interventions: i.e., letters, green cards, postcards, telephone calls, emergency cards, and crisis cards. (3) Multimodal interventions: i.e., brief interventions that also included elements of brief contacts. (4) Other: i.e., psychoeducation, maintenance of contact.

Comparators. As the main comparator, we expected treatment as usual (TAU). We defined TAU based on Witt and colleagues' (2021) definition as

routine care that would have been offered to the patient had they not been enrolled in the study. We also included active comparison interventions.

Outcome measures. We examined five primary outcomes in this review: (1) 'suicide re-attempts at follow-up', (2) 'suicidal ideation at follow-up', (3) 'NSSI at follow-up', (4) 'self-harm at follow-up', and (5) 'linkage to mental health service at follow-up', i.e., the linkage to a mental health care institution *versus* rehospitalization.

Search strategy

Based on an initial scoping search, we developed the final set of keywords, Mesh terms, and phrases that we needed for a comprehensive search for this review. Trained researchers and assistants (AMB, MM, SM, AP, CR) searched the electronic databases MEDLINE, Cochrane, Embase, ProQuest, and PsycINFO with a combination of the following terms: *crisis intervention*, *brief interventions and contact*, *crisis therapy*, *crisis counseling*, *suicid+*, *suicidal behavior*, *suicide attempts*, *self-harm*, *Self-Injurious Behavior*, *Self-Injurious Behavior/prevention and control*, *Self-Injurious Behavior/therapy*, and *randomized controlled trial* (see the Supplementary Table 1 for the complete search history for MEDLINE). The search was completed on October 12th, 2024.

In addition, we searched the reference lists of relevant studies and prior reviews with a focus on brief interventions and contacts in adults after suicide attempt for additional articles (Azizi et al., 2023; Doupnik et al., 2020; Inagaki et al., 2019; A. J. Milner et al., 2015; Noh et al., 2016; Nuij et al., 2021; Stanley et al., 2023; K. G. Witt et al., 2021).

Study selection

The independent searches of AMB, MM, SM, AP, and CR were compared by the first author SH, and discrepancies were resolved through discussion. Duplicate records were removed, and multi-

ple reports of the same trial were consolidated to ensure that each trial, rather than individual reports, served as the unit of analysis in the review. The results of the process of trial inclusion is documented according to the PRISMA guidelines and presented in the respective flow chart.

Data extraction

All the relevant data was extracted from the included RCTs by the first author (SH) and one of either AMB, SM, AP, CR, or LK independently. In cases of missing data or incomplete data, we contacted the corresponding authors of the study for additional information. The extracted data was compared by the first author, SH, and discrepancies were resolved in discussion with SH.

We extracted the following data: 1. General information: name of the first author, title, year of publication, trial design, country of data collection, study aims, key message/conclusion; 2. Participants: description of the population, the method used in the suicide attempt, clinical vs. non-clinical, inclusion criteria, diagnosis, assessment instrument, number randomized, number analyzed, sex composition, age; 3. Intervention(s): intervention type and format, number of sessions, follow-up (period and frequency); 4. Comparator: type and format, number of sessions, follow-up (period and frequency); 5. Outcome(s): type of primary and secondary outcome(s), raw data for the outcome of interest, and time points of outcome assessment.

For the primary endpoint, we selected the assessment time point specified for the primary outcome. In cases of multiple reported time points (i.e., multiple follow-ups), without the specification of which one was associated with the primary outcome, we extracted the data of the one closest to the completion of the intervention. The reason being that the focus of this review was to determine the efficacy of brief interventions and contacts and thus the outcomes measured at the

end of the treatment period (post-intervention) seemed most appropriate.

Assessment of risk of bias

To assess whether there was a bias in the included studies the first author (SH) and a co-author (MM) assessed the risk of bias in all studies using the Cochrane Risk of Bias tool, version 2 (RoB 2) (Sterne et al., 2019) on the following criteria: 1. Bias in the randomization process; 2. Deviations from the intended intervention (assignment to intervention); 3. Missing outcome data; 4. Bias in the measurement of the outcome; 5. Bias in the selection of the reported results.

The two authors independently assessed the studies' risk of bias on a scale from 'low risk', 'high risk' to 'some concerns'. Afterward, they compared their ratings and resolved discrepancies by discussion. The results are presented in the main text and a detailed plot is presented in the supplement (Supplementary Figure 2).

Data preprocessing

Measures of interest. The primary outcomes 'suicide re-attempts at follow-up', 'NSSI at follow-up', and 'linkage to mental health service at follow-up', we expected to be assessed as categorical outcomes such as the number of suicide re-attempts at the end of the follow-up phase or the number of participants who successfully linked to mental health services at the end of the follow-up phase. Therefore, we extracted the raw event numbers for these outcome measures using the summary odds ratio (OR) and the respective 95% confidence interval (CI). The the outcomes 'suicidal ideation at follow-up' and 'self-harm at follow-up', we expected to assess these as continuous outcomes such that the severity of suicidal ideation was measured on a psychometric scale. Therefore, we extracted the raw scores on the respective validated scales. However, in most cases 'self-harm'

was reported as a proportion, i.e., the number of participants who self-harmed during the follow-up phase. Therefore, we extracted the raw event numbers for this outcome measure.

For the analysis, we calculated pooled odds ratios (*OR*s) for the categorical outcomes, and standardized mean differences (*SMD*s) for the continuous outcome (Deeks et al., 2019).

Studies with multiple treatment arms. Five studies (Armitage et al., 2016; Niederkrotenthaler & Till, 2020; Stewart et al., 2009; Vaiva et al., 2006; Wei et al., 2013) compared more than one intervention to the control group which resulted in multiple treatment arms. For three studies (Niederkrotenthaler & Till, 2020; Stewart et al., 2009; Vaiva et al., 2006), it was possible to use the recommended approach (T. Higgins Julian PT & VA, 2023) and combine data from the two intervention arms given their similarity. Yet, this was not the case for one (Wei et al., 2013). Therefore, we split the shared group, the control group, which allowed us to include each pair-wise comparison separately, but with the shared control group divided evenly among the comparisons (T. Higgins Julian PT & VA, 2023). Data from one study (Armitage et al., 2016) could not be included in the meta-analysis because the data on re-attempted suicide could not be distinguished from data on suicidal ideations.

Studies with multiple reports. In cases where multiple reports were published from the same study, i.e., reporting on the identical cohort, we included the study that reported on the primary outcome.

Studies with Zelen design. For the studies that used a Zelen design (Arvilommi et al., 2022; Carter et al., 2005, 2013; Gysin-Maillart et al., 2016; Hatcher et al., 2015, 2016), we extracted data from all randomized participants were reported (vs. only from the participants who consented *after* randomization) to preserve randomization (Zelen, 1979).

Studies with adjusted effect sizes. In cases where unadjusted and adjusted effect sizes were reported, we extracted only unadjusted effect sizes.

Statistical analysis

Pre-registered subgroup analyses. For the meta-analyses, we considered 54 data sets that contributed between one and three outcomes to the analyses. For the categorical outcomes 'suicide re-attempts at follow-up', 'NSSI at follow-up', and 'linkage to mental health service at follow-up', we calculated pooled *OR*s. For the continuous outcomes of 'suicidal ideation at follow-up' and 'self-harm at follow-up', we calculated *SMD*s and log transformed them to yield Hedges' *g* (Viechtbauer & Cheung, 2010). We then fit one random-effect model each to these data.

Heterogeneity. We estimated the amount of heterogeneity (i.e., τ^2) using the restricted maximum-likelihood estimator (Viechtbauer, 2005). Additionally, we calculated the *Q*-test (Cochran, 1954) and I^2 statistic (Deeks et al., 2019). The I^2 statistic is a commonly used test that represents the proportion of observed variance that cannot be attributed to sampling error (Borenstein et al., 2017; J. P. Higgins et al., 2003). As such, it shows how much the individual studies estimates' confidence intervals (CIs) overlap with one another. Thus, a low I^2 indicates significant overlap of CIs, and *vice versa*. Deeks (2019) suggests that 0% to 40% is unimportant, 30% to 60% moderate, 50% to 90% substantial, and 75% to 100% considerable heterogeneity. In cases of substantial heterogeneity, we performed subgroup analyses.

Small study effects and potential biases checks. To examine potential *small-study effects*, including publication bias, we used the Peter regression test for the categorical outcomes and the Egger test for the continuous outcomes. To identify outliers, we used studentized residuals

and Cook's distances (Viechtbauer, 2010a). Outliers are shown by a Cook's distance larger than the median plus six times the interquartile range of the Cook's distances. Further, we used funnel plots to examine inconsistencies of results and checked their asymmetry with the rank correlation test (Begg & Mazumdar, 1994) and the regression test (Sterne & Egger, 2005) using the standard error of the observed outcomes as predictors.

Post-hoc analyses. We performed post-hoc meta-regression analyses using mixed-effects models to address the question of whether the intervention type (i.e., brief interventions, remote contact interventions, multimodal interventions, or others) or the studied population (emergency department patients, inpatients, outpatients, general population, students, or soldiers/veterans) was predictive of the outcome. Statistical significance of the meta-regression coefficients was assessed via z-tests and 95% confidence intervals. Residual heterogeneity was evaluated using Cochran's Q test and the I^2 statistic.

Sensitivity analyses. In cases of substantial heterogeneity (i.e., 75% or more), we investigated the sources of this between-study heterogeneity, identified the studies that contributed to it, and repeated the meta-analysis with those studies removed. Further, we computed the meta-analyses (of *OR*s and *SMD*s) with the 'high risk' rated studies removed to check for the robustness of the results.

Data and code availability

This paper was written with markdown using RStudio (version 1.4.1106; RStudio Team (2020)) and the following R packages: rmarkdown (version r 2.28) (Allaire et al., 2023); knitr (version r 1.48) (Xie, 2014), papaja (version r 0.1.2.9000) (Aust & Barth, 2022), and robvis (version r 0.3.0) (McGuinness, 2019). The meta-analyses were done with the R package metafor (version r 4.6.0)

(Viechtbauer, 2010b). All data and code are freely available online to ensure reproducibility (https://osf.io/brgm7/). This review was preregistered at PROSPERO International Prospective Register of Systematic Reviews (CRD42022271143).

Results

Descriptive statistics

With the initial search, we identified 1509 studies. Of those, 54 remained that fulfilled eligibility criteria and for which full text was accessible (Figure 1). The studies were published between 1981 and 2024 and conducted across the whole world: 19 (36%) in Europe (Arvilommi et al., 2022; Bennewith et al., 2002; Cedereke et al., 2002; 1999; M. O. Evans et al., 1999; Gysin-Maillart et al., 2016; Kapur et al., 2013; McAuliffe et al., 2014; Morgan et al., 1993; Mouaffak et al., 2015; Niederkrotenthaler & Till, 2020; R. C. O'Connor et al., 2017, 2022; Salkovskis et al., 1990; Vaiva et al., 2006, 2018; Van Der Sande et al., 1997; Van Heeringen et al., 1995; Westling et al., 2019), 15 (28%) in America (Brown et al., 2005; Comtois et al., 2019; Conner et al., 2021; Currier et al., 2010; Depp et al., 2023; Diefenbach et al., 2024; Ilgen et al., 2022; Interian et al., 2021; LaCroix et al., 2018; Liberman & Eckman, 1981; Motto & Bostrom, 2001; S. S. O'Connor et al., 2015, 2020; Rudd et al., 2015; Weinberg et al., 2006"), 9 (17%) in Asia (Armitage et al., 2016; Chen et al., 2013; Lin et al., 2019; Marasinghe et al., 2012; Matsubara et al., 2019; Shu et al., 2022; Sreedaran et al., 2021; Wang et al., 2016; Wei et al., 2013), 3 (6%) in middle eastern countries (Malakouti et al., 2021; Mousavi et al., 2014, 2016), and 6 (11%) in Australia and New Zealand (Beautrais et al., 2010; Carter et al., 2005, 2013; Hatcher et al., 2015, 2016; Stewart et al., 2009). One study was conducted in multiple countries (Fleischmann et al., 2008).

Population. Of the 18124 investigated participants, over half were female (10498, 58%; Table 1). However, in most trials, only the binary categories 'male' and 'female' were reported. Trial participants were, on average, 34.16 years of age (*SD* = 7.07). Most trials assessed a clinical population (48 trials) that was recruited from an emergency department. Clinical diagnosis was assessed in 23 trials. The most common diagnoses were major depression (30%), other mood disorders (35%), and personality disorders (13%). All participants had at least one suicide attempt. 24 trials reported on the method of the index suicide attempt and found that self-poisoning was the most frequent method (75%) (Beautrais et al., 2010; Bennewith et al., 2002; Brown et al., 2005; Carter et al., 2005, 2013; Comtois et al., 2019; Diefenbach et al., 2024; Fleischmann et al., 2008; Gysin-Maillart et al., 2016; Hatcher et al., 2015, 2016; Liberman & Eckman, 1981; Malakouti et al., 2021; McAuliffe et al., 2014; Morgan et al., 1993; Mouaffak et al., 2015; Mousavi et al., 2014; R. C. O'Connor et al., 2017; Vaiva et al., 2006, 2018; Van Der Sande et al., 1997; Van Heeringen et al., 1995; Wang et al., 2016). For more details on the population, see Table 1.

[Table 1 here]

Intervention. The included trials can be grouped into the following categories: (1) 'Brief interventions', (2) 'remote contact interventions', (3) 'multimodal interventions', and (4) 'others' (Table 2).

[Table 2 here]

19 trials investigated brief interventions (Armitage et al., 2016; Brown et al., 2005; Depp et al., 2023; Diefenbach et al., 2024; K. Evans et al., 1999; Interian et al., 2021; LaCroix et al., 2018; Lin et al., 2019; McAuliffe et al., 2014; R. C. O'Connor et al., 2017, 2022; S. S. O'Connor et al., 2015, 2020; Rudd et al., 2015; Salkovskis et al., 1990; Shu et al., 2022; Stewart et al., 2009; Wei et al., 2013; Weinberg et al., 2006) that comprised CBT sessions, safety planning, mindfulness, and psychoeducation components 20 trials investigated remote contact interventions (Beautrais et al., 2010; Bennewith et al., 2002; Carter et al., 2005, 2013; Cedereke et al., 2002; Chen et al., 2013; Com-

PRISMA 2020 flow diagram for updated systematic reviews which included searches of databases, registers and other sources
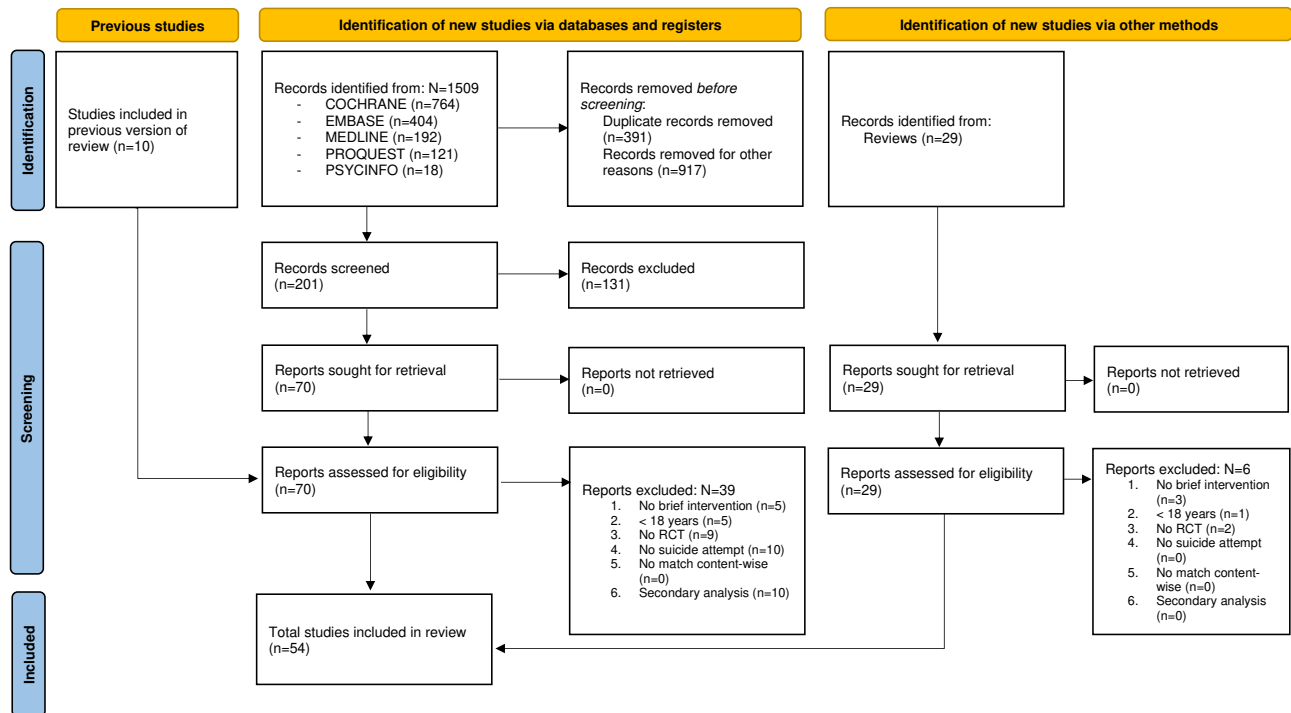
Figure 1. PRISMA Flow Diagram. Initially, 1509 records were identified through database searching. After the removal of duplicates, the remaining 201 records were screened, which led to the exclusion of further 131 records. We assessed 98 full-text articles for eligibility, of which 45 failed to meet inclusion criteria. This left 54 studies that met all inclusion criteria and that were considered in the review.

tois et al., 2019; M. O. Evans et al., 1999; Kapur et al., 2013; Marasinghe et al., 2012; Matsubara et al., 2019; Morgan et al., 1993; Motto & Bostrom, 2001; Mouaffak et al., 2015; Mousavi et al., 2014, 2016; Sreedaran et al., 2021; Vaiva et al., 2006, 2018; Wang et al., 2016) that comprised interventions such as letters, green cards, postcards, telephone calls, emergency cards, and crisis cards. 5 trials investigated multimodal interventions (Arvilommi et al., 2022; Conner et al., 2021; Gysin-Maillart et al., 2016; Hatcher et al., 2015, 2016) that comprised a combination of a brief intervention with additional elements of brief contacts. 10 trials investigated other forms of brief

interventions and contacts (Amadéo et al., 2015; Currier et al., 2010; Fleischmann et al., 2008; Ilgen et al., 2022; Liberman & Eckman, 1981; Malakouti et al., 2021; Niederkrotenthaler & Till, 2020; Van Der Sande et al., 1997; Van Heeringen et al., 1995; Westling et al., 2019) such as psychoeducation and maintenance of contact (see also Supplementary Figure 3).

The average length of the brief interventions was 5.86 sessions (range 1- 12) with a duration of 66.17 minutes on average per session. The remote contact interventions had an average of 5.79 contacts (range 1- 24). The multimodal interventions consisted of an intervention with an average of 4 ses-

sions (range 3- 5) that took on average 75 minutes and remote contacts with an average of 7 contacts (range 6- 8). The interventions in the group 'other' had an average of 8.25 contacts (range 1- 14). 2 trials used digital technologies for the delivery of the intervention such as audio phone messages for the delivery of mediation and problem-solving instructions (Marasinghe et al., 2012) and ecological momentary assessments for the reinforcement of the intervention's content (Depp et al., 2023).

All trials had at least one brief follow-up contact with professionals over a longer period (Table 2; average amount of follow-ups: 2.39), with most studies assessing the time of 12 months after the index suicide attempt. For more details on the interventions, see Table 2.

Comparator. Nearly half of the trials used TAU (48%; 26) as a comparator. The rest of the trials used either some other form of standard treatment (i.e., CAU, standard care, discharge as usual) (10 trials), active comparator (8 trials) (i.e., another psychotherapeutic intervention or comparable intervention), enhanced care as usual (2 trials), or pharmaco treatment (1 trial). Several trials gave no information on the comparator except that no intervention had been performed (6 trials).

Outcomes. The included trials assessed the effect of brief interventions and contacts on two or more of our primary outcomes. For most trials (36 trials) reducing further suicide attempts was the primary outcome measure (Arvilommi et al., 2022; Brown et al., 2005; Carter et al., 2005; Cedereke et al., 2002; Chen et al., 2013; Comtois et al., 2019; Conner et al., 2021; Diefenbach et al., 2024; 1999; M. O. Evans et al., 1999; Gysin-Maillart et al., 2016; Ilgen et al., 2022; Interian et al., 2021; LaCroix et al., 2018; Liberman & Eckman, 1981; Lin et al., 2019; Malakouti et al., 2021; Matsubara et al., 2019; McAuliffe et al., 2014; Morgan et al., 1993; Motto & Bostrom, 2001; Mouaffak et al., 2015; Mousavi et al., 2014, 2016; S. S. O'Connor et al., 2020; Rudd et al., 2015; Salkovskis et al., 1990; Stewart et al., 2009; Vaiva et al., 2006, 2018; Van

Der Sande et al., 1997; Van Heeringen et al., 1995; Wang et al., 2016; Wei et al., 2013; Westling et al., 2019). Less frequent or a secondary aim was to decrease suicidal thoughts (21 trials) (Arvilommi et al., 2022; Brown et al., 2005; Cedereke et al., 2002; Comtois et al., 2019; Conner et al., 2021; Depp et al., 2023; Diefenbach et al., 2024; Gysin-Maillart et al., 2016; Interian et al., 2021; LaCroix et al., 2018; Liberman & Eckman, 1981; Marasinghe et al., 2012; McAuliffe et al., 2014; Mousavi et al., 2014; S. S. O'Connor et al., 2015; Rudd et al., 2015; Salkovskis et al., 1990; Stewart et al., 2009; Wei et al., 2013; Weinberg et al., 2006), self-harm (10 trials) (Amadéo et al., 2015; Armitage et al., 2016; Beautrais et al., 2010; Bennewith et al., 2002; Carter et al., 2013; Hatcher et al., 2015, 2016; Kapur et al., 2013; McAuliffe et al., 2014; R. C. O'Connor et al., 2017; Weinberg et al., 2006), and building up motivation to increase linkage to mental health services (13 trials) (Cedereke et al., 2002; Currier et al., 2010; Hatcher et al., 2015, 2016; Ilgen et al., 2022; Kapur et al., 2013; Malakouti et al., 2021; Matsubara et al., 2019; Morgan et al., 1993; Mouaffak et al., 2015; S. S. O'Connor et al., 2020; Vaiva et al., 2006; Van Heeringen et al., 1995). Only one trial assessed NSSI as an outcome (Westling et al., 2019). of the included trials, 5 reported on none of our outcomes, but instead on suicide deaths (Fleischmann et al., 2008), suicide risk as measured with the Survival and Coping Beliefs subscale and suicide-prevention-related knowledge (Niederkrotenthaler & Till, 2020), number of readmissions to hospital after a self-harm episode (R. C. O'Connor et al., 2022), changes in functional connectivity (Shu et al., 2022), and acceptability of the intervention (Sreedaran et al., 2021).

Synthesize of evidence

(1) Brief interventions. 19 trials investigated brief interventions (Armitage et al., 2016; Brown et al., 2005; Depp et al., 2023; Diefenbach et al., 2024; K. Evans et al., 1999; Interian et al., 2021; LaCroix et al., 2018; Lin et al., 2019; McAuliffe

et al., 2014; R. C. O'Connor et al., 2017, 2022; S. S. O'Connor et al., 2015, 2020; Rudd et al., 2015; Salkovskis et al., 1990; Shu et al., 2022; Stewart et al., 2009; Wei et al., 2013; Weinberg et al., 2006) that included psychotherapy-based components such as cognitive behavioral therapy, safety planning, forming implementation intentions, mindfulness, and psychoeducation. Brief therapeutic interventions can be broadly grouped into two categories: (1) primary interventions and (2) secondary interventions. While (1) primary interventions target STBs directly, (2) secondary interventions target related psychopathology and, as a secondary effect, aim at decreasing STBs. Within the first category were forming implementation intentions (Armitage et al., 2016), brief CBT programs (Brown et al., 2005; Depp et al., 2023; Diefenbach et al., 2024; M. O. Evans et al., 1999; LaCroix et al., 2018; Rudd et al., 2015; Shu et al., 2022; Wei et al., 2013); DBT-based programs (Lin et al., 2019); programs that combined both CBT and DBT (Weinberg et al., 2006), programs that promoted early engagement and strengthening of protective factors (S. S. O'Connor et al., 2015, 2020), management of self-harm (R. C. O'Connor et al., 2017), and safety planning (R. C. O'Connor et al., 2022). At the same time, the second category entailed psychosocial interventions such as problem-solving training (McAuliffe et al., 2014; Salkovskis et al., 1990; Stewart et al., 2009) and mindfulness-based cognitive training (Interian et al., 2021).

(2) Remote contact interventions. 20 trials investigated a remote contact intervention (Beautrais et al., 2010; Bennewith et al., 2002; Carter et al., 2005, 2013; Cedereke et al., 2002; Chen et al., 2013; Comtois et al., 2019; M. O. Evans et al., 1999; Kapur et al., 2013; Marasinghe et al., 2012; Matsubara et al., 2019; Morgan et al., 1993; Motto & Bostrom, 2001; Mouaffak et al., 2015; Mousavi et al., 2014, 2016; Sreedaran et al., 2021; Vaiva et al., 2006, 2018; Wang et al., 2016). The trials used different media for the brief contact including telephone calls (Cedereke et al., 2002; M. O. Evans et al., 1999; Kapur et al., 2013; Marasinghe et al., 2012; Matsubara et al., 2019; Mouaffak et al., 2015; Mousavi et al., 2014, 2016; Sreedaran et al., 2021; Vaiva et al., 2006, 2018), text messages (Comtois et al., 2019; Marasinghe et al., 2012), letters (Kapur et al., 2013; Motto & Bostrom, 2001; Mouaffak et al., 2015), postcards (Beautrais et al., 2010; Carter et al., 2005, 2013; Chen et al., 2013; Matsubara et al., 2019; Morgan et al., 1993; Vaiva et al., 2018), green cards (M. O. Evans et al., 1999; Morgan et al., 1993), coping cards (Wang et al., 2016), and crisis cards (Chen et al., 2013; Kapur et al., 2013; Morgan et al., 1993; Mouaffak et al., 2015; Vaiva et al., 2018). While a 'crisis card' contains the details of a patient's treatment plan in anticipation of a later occasion when the patient might be too ill to remember their treatment plan (Sutherby et al., 1999), a 'green card' provides the number of an on-call psychiatrist for 24/7 crisis telephone consultation, and a 'coping card' contains the acquired skills learned during therapy for easy and convenient access in situations of crisis (e.g., Wright, 2006).

(3) Multimodal interventions. There were 5 trials that investigated multimodal interventions (Arvilommi et al., 2022; Conner et al., 2021; Gysin-Maillart et al., 2016; Hatcher et al., 2015, 2016) that consisted of trials assessing the Attempted Suicide Short Intervention Program (ASSIP) (Arvilommi et al., 2022; Conner et al., 2021; Gysin-Maillart et al., 2016) and a program with postcards and problem-solving therapy (Hatcher et al., 2015, 2016). The ASSIP therapy comprises three psychotherapy sessions that aim to establish a therapeutic alliance early on, deliver psychoeducation, provide a cognitive case conceptualization, safety planning, and continue long-term outreach contact in the form of 12 letters sen over two years (Gysin-Maillart et al., 2016).

(4) Other. 10 trials investigated other forms of brief psychosocial interventions (Amadéo et al., 2015; Currier et al., 2010; Fleischmann et al., 2008; Ilgen et al., 2022; Liberman & Eckman, 1981;

Malakouti et al., 2021; Niederkrotenthaler & Till, 2020; Van Der Sande et al., 1997; Van Heeringen et al., 1995; Westling et al., 2019) including some form of psychoeducation and maintaining contact (Amadéo et al., 2015; Fleischmann et al., 2008; Malakouti et al., 2021), psychoeducation alone (Niederkrotenthaler & Till, 2020), psychoeducation and hands-on practice in using a crisis helpline (Ilgen et al., 2022), community-based clinical assessment and crisis stabilization (Currier et al., 2010), skills training (i.e., verbal and non-verbal skills and family negotiation) (Liberman & Eckman, 1981), brief admission for intense therapy including problem-solving approach (Van Der Sande et al., 1997), assessment of care and care co-ordination (Van Heeringen et al., 1995), and brief admissions by self-referral during a suicidal crisis (Westling et al., 2019).

Risk of bias assessment

There were 12 trials that were rated to have a low risk of bias (Arvilommi et al., 2022; Diefenbach et al., 2024; Gysin-Maillart et al., 2016; Hatcher et al., 2015; Ilgen et al., 2022; Interian et al., 2021; Kapur et al., 2013; LaCroix et al., 2018; Niederkrotenthaler & Till, 2020; R. C. O'Connor et al., 2017; Vaiva et al., 2018; Westling et al., 2019). The 12 trials with a high risk of bias (Carter et al., 2005; Conner et al., 2021; Depp et al., 2023; K. Evans et al., 1999; Fleischmann et al., 2008; Lin et al., 2019; Mousavi et al., 2016; R. C. O'Connor et al., 2022; S. S. O'Connor et al., 2015; Shu et al., 2022; Sreedaran et al., 2021; Wei et al., 2013) were rated as such because of possible bias due to deviations from intended interventions, possible bias due to missing outcome data, and possible bias in measurement of the outcome. Last, 30 trials (Amadéo et al., 2015; Armitage et al., 2016; Beautrais et al., 2010; Bennewith et al., 2002; Brown et al., 2005; Carter et al., 2013; Cedereke et al., 2002; Chen et al., 2013; Comtois et al., 2019; Currier et al., 2010; M. O. Evans et al., 1999; Hatcher et al., 2016; Liberman & Eckman, 1981; Malakouti et al., 2021; Marasinghe et

al., 2012; Matsubara et al., 2019; McAuliffe et al., 2014; Morgan et al., 1993; Motto & Bostrom, 2001; Mouaffak et al., 2015; Mousavi et al., 2014; S. S. O'Connor et al., 2020; Rudd et al., 2015; Salkovskis et al., 1990; Stewart et al., 2009; Vaiva et al., 2006; Van Der Sande et al., 1997; Van Heeringen et al., 1995; Wang et al., 2016; Weinberg et al., 2006) were rated as having some risk of bias (see Figure 2 and Supplementary Figure 2).

Meta-analysis results

Out of 54 trials, 5 trials reported none of the measured outcomes (Fleischmann et al., 2008; Niederkrotenthaler & Till, 2020; R. C. O'Connor et al., 2022; Shu et al., 2022; Sreedaran et al., 2021). Additionally, one trial (Armitage et al., 2016) could not be considered for the analysis because the data on self-harm could not be disaggregated from the data on suicidal ideation. Therefore, we considered 48 trials for the meta-analyses.

Meta-analysis of categorical outcomes

Re-attempts during the follow-up phase. There were 36 trials that assessed re-attempts during follow-up (Arvilommi et al., 2022; Brown et al., 2005; Carter et al., 2005; Cedereke et al., 2002; Chen et al., 2013; Comtois et al., 2019; Conner et al., 2021; Diefenbach et al., 2024; K. Evans et al., 1999; M. O. Evans et al., 1999; Gysin-Maillart et al., 2016; Ilgen et al., 2022; Interian et al., 2021; LaCroix et al., 2018; Liberman & Eckman, 1981; Lin et al., 2019; Malakouti et al., 2021; Matsubara et al., 2019; McAuliffe et al., 2014; Morgan et al., 1993; Motto & Bostrom, 2001; Mouaffak et al., 2015; Mousavi et al., 2014, 2016; S. S. O'Connor et al., 2020; Rudd et al., 2015; Salkovskis et al., 1990; Stewart et al., 2009; Vaiva et al., 2006, 2018; Van Der Sande et al., 1997; Van Heeringen et al., 1995; Wang et al., 2016; Wei et al., 2013; Westling et al., 2019). However, due to missing values only 32 trials could be included in the meta-analysis. The observed OR ranged from -2.77 to 1.01, with

Figure 2. Overview of the risk of bias assessments. The bar chart shows the results of the risk of bias assessment across all trials rated on a scale from 'low risk', 'high risk' to 'some concerns'. The bar chart was produced with the *robvis* package (McGuinness, 2019) in R.

most estimates being negative (68%). Based on the random-effects model, the estimated average OR was $\hat{\mu}$ = -0.37 (95% CI: -0.56–0.17). Thus, the average outcome differed significantly from zero (z = -3.74, p < 0.001, Figure 3). There was no significant heterogeneity in the outcomes ($Q(30)$ = 43.62, p = 0.52, $\hat{\tau}^2$ = 0.09, I^2 = 38.60%). The 95% prediction interval for the true outcomes from -0.99 to 0.26 indicated some heterogeneity, however, the true outcomes of the trials were in the same direction as the estimated average outcome. There was no indication of outliers as indicated by the studentized residuals, of which none was larger than 3.15. Also, according to Cook's distances, none of the trials was overly influential.

Self-harm during the follow-up phase. There were 9 trials that assessed self-harm during follow-up (Beautrais et al., 2010; Bennewith et al., 2002; Carter et al., 2013; Hatcher et al., 2015, 2016; Kapur et al., 2013; McAuliffe et al., 2014; R.

C. O'Connor et al., 2017; Weinberg et al., 2006). However, due to missing values only 7 trials could be included in the meta-analysis. The observed OR ranged from -0.40 to 1.25, with the average of the estimates being negative (50%). Based on the random-effects model, the estimated average OR was $\hat{\mu}$ = 0.01 (95% CI: -0.12-0.15). Thus, the average outcome did not differ significantly from zero (z = 0.22, p = 0.83, Figure 4).

There was no significant amount of heterogeneity in the outcomes ($Q(7)$ = 4.8, p = 0.22, $\hat{\tau}^2$ = 0.00, I^2 = 2.50%). The 95% prediction interval for the true outcomes from -0.13 to 0.16 indicated some heterogeneity, however, the true outcomes of the trials were in the same direction as the estimated average outcome. There was no indication of outliers as indicated by the studentized residuals, of which none were larger than 2.73. Also, according to Cook's distances, none of the trials was overly influential.
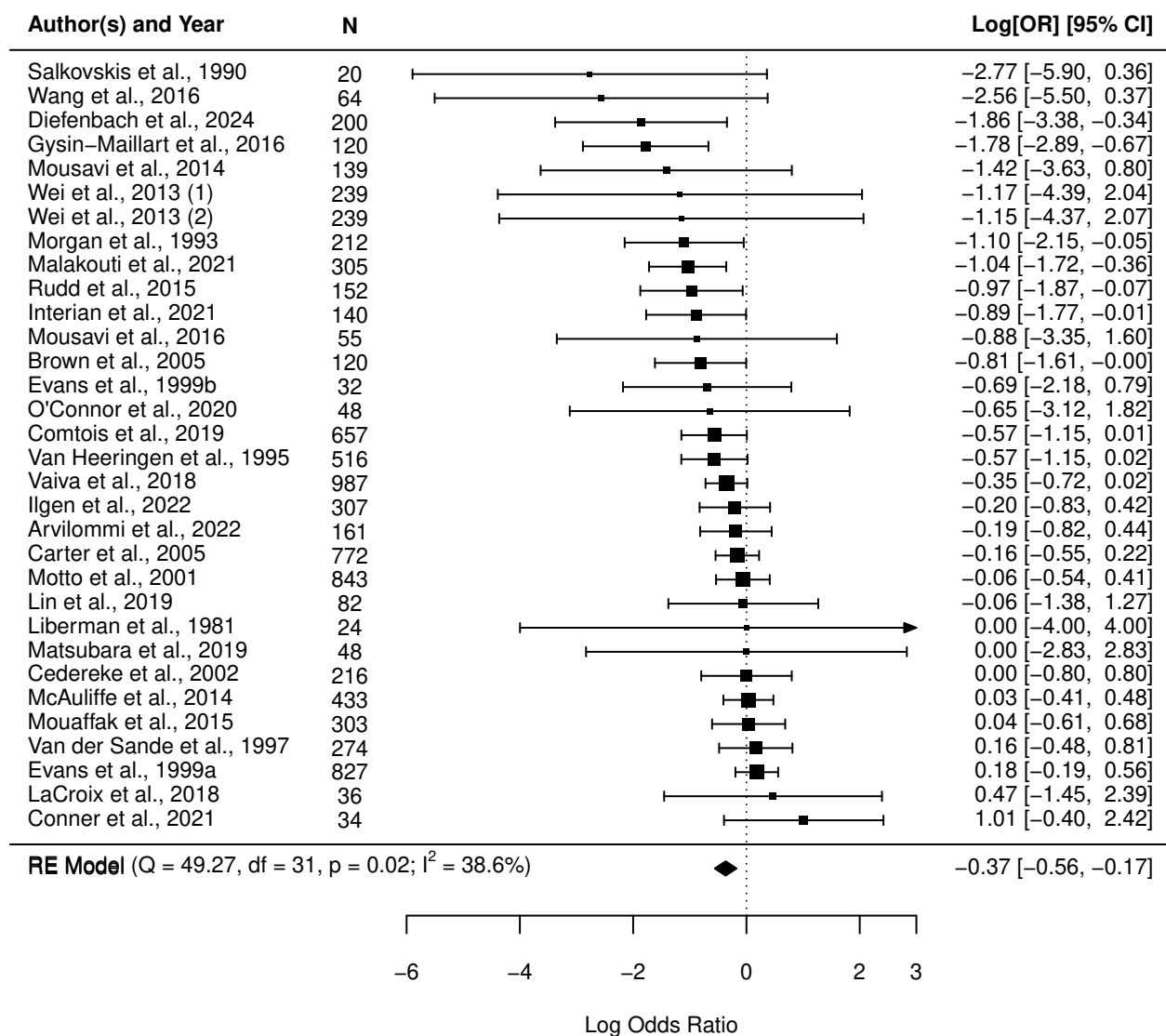
Author(s) and Year	N	Log[OR] [95% CI]
Salkovskis et al., 1990	20	−2.77 [−5.90, 0.36]
Wang et al., 2016	64	−2.56 [−5.50, 0.37]
Diefenbach et al., 2024	200	−1.86 [−3.38, −0.34]
Gysin–Maillart et al., 2016	120	−1.78 [−2.89, −0.67]
Mousavi et al., 2014	139	−1.42 [−3.63, 0.80]
Wei et al., 2013 (1)	239	−1.17 [−4.39, 2.04]
Wei et al., 2013 (2)	239	−1.15 [−4.37, 2.07]
Morgan et al., 1993	212	−1.10 [−2.15, −0.05]
Malakouti et al., 2021	305	−1.04 [−1.72, −0.36]
Rudd et al., 2015	152	−0.97 [−1.87, −0.07]
Interian et al., 2021	140	−0.89 [−1.77, −0.01]
Mousavi et al., 2016	55	−0.88 [−3.35, 1.60]
Brown et al., 2005	120	−0.81 [−1.61, −0.00]
Evans et al., 1999b	32	−0.69 [−2.18, 0.79]
O'Connor et al., 2020	48	−0.65 [−3.12, 1.82]
Comtois et al., 2019	657	−0.57 [−1.15, 0.01]
Van Heeringen et al., 1995	516	−0.57 [−1.15, 0.02]
Vaiva et al., 2018	987	−0.35 [−0.72, 0.02]
Ilgen et al., 2022	307	−0.20 [−0.83, 0.42]
Arvilommi et al., 2022	161	−0.19 [−0.82, 0.44]
Carter et al., 2005	772	−0.16 [−0.55, 0.22]
Motto et al., 2001	843	−0.06 [−0.54, 0.41]
Lin et al., 2019	82	−0.06 [−1.38, 1.27]
Liberman et al., 1981	24	0.00 [−4.00, 4.00]
Matsubara et al., 2019	48	0.00 [−2.83, 2.83]
Cedereke et al., 2002	216	0.00 [−0.80, 0.80]
McAuliffe et al., 2014	433	0.03 [−0.41, 0.48]
Mouaffak et al., 2015	303	0.04 [−0.61, 0.68]
Van der Sande et al., 1997	274	0.16 [−0.48, 0.81]
Evans et al., 1999a	827	0.18 [−0.19, 0.56]
LaCroix et al., 2018	36	0.47 [−1.45, 2.39]
Conner et al., 2021	34	1.01 [−0.40, 2.42]

RE Model (Q = 49.27, df = 31, p = 0.02; I^2 = 38.6%) −0.37 [−0.56, −0.17]

−6 −4 −2 0 2 3

Log Odds Ratio

Figure 3. Meta-analysis results for re-attempts. The forest plot shows the meta-analysis of odds ratios (OR) for the categorical outcome 're-attempt during follow-up' together with its 95% confidence interval (CI) for brief interventions and contacts versus control. The average outcome differed significantly from zero, indicating that brief interventions and contacts significantly reduced suicide re-attempts during the follow-up phase compared with control.
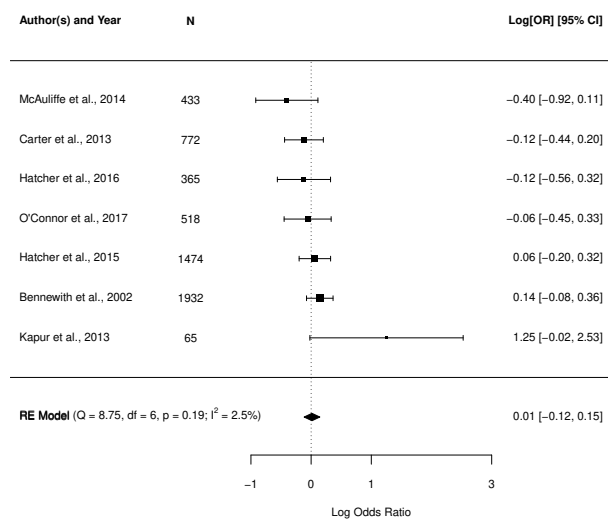
Figure 4. **Meta-analysis results for self-harm.** The forest plot shows the meta-analysis of odds ratios (OR) for the categorical outcome 'self-harm at follow-up' together with its 95% confidence interval (CI) for brief interventions and contacts versus control. The average outcome did not differ significantly from zero, suggesting no evidence for an effect of brief interventions on the reduction of self-harming behavior during the follow-up phase compared with control.

Linkage to mental health service at follow-up. There were 13 trials that assessed linkage to mental health service at follow-up (Cedereke et al., 2002; Currier et al., 2010; Hatcher et al., 2015, 2016; Ilgen et al., 2022; Kapur et al., 2013; Malakouti et al., 2021; Matsubara et al., 2019; Morgan et al., 1993; Mouaffak et al., 2015; S. S. O'Connor et al., 2020; Vaiva et al., 2006; Van Heeringen et al., 1995). However, due to missing values only 11 trials could be included in the meta-analysis. The observed OR ranged from -0.35 to 3.16, with most estimates being positive (75%). Based on the random-effects model, the estimated average OR was $\hat{\mu} = 0.60$ (95% CI: 0.05-1.15). Thus, the average outcome differed significantly from zero (z = 2.13, $p < 0.03$, Figure 5).

There was significant amount of heterogeneity in the true outcomes ($Q(11) = 55.73$, $p < 0.001$, $\hat{\tau}^2 = 0.68$, $I^2 = 88.30\%$). The 95% prediction interval for the true outcomes from -1.11 to 2.31 indicated that even though the average outcome is estimated to be positive, in some studies, it may, in fact, be negative. Further, there was no indication of outliers as indicated by the studentized residuals, of which none was larger than 2.73. Last, according to Cook's distances, none of the studies were overly influential.
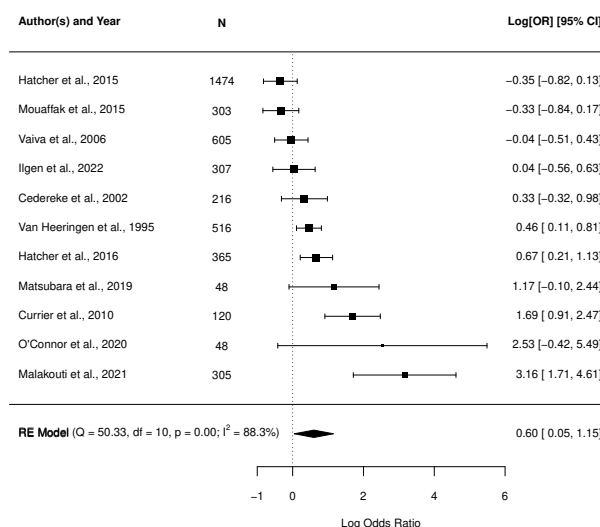

Figure 5. **Meta-analysis results for linkage to mental health services** The forest plot shows the meta-analysis of odds ratio (OR) for the categorical outcome 'linkage to mental health service at follow-up' together with its 95% confidence interval (CI) for brief interventions and contacts versus control. The average outcome differed significantly from zero suggesting that brief interventions and contacts were associated with an increased linkage to mental health services at follow-up compared with control.

Meta-analysis of continuous outcome

Suicidal ideation at follow-up phase. There were 21 trials that assessed suicidal ideation at follow-up phase (Arvilommi et al., 2022; Brown et al., 2005; Cedereke et al., 2002; Comtois et al., 2019; Conner et al., 2021; Depp et al., 2023; Diefenbach et al., 2024; Gysin-Maillart et al., 2016; Interian et al., 2021; LaCroix et al., 2018; Liberman & Eckman, 1981; Marasinghe et al., 2012; McAuliffe et al., 2014; Mousavi et al., 2014; S. S. O'Connor et al., 2015; Rudd et al., 2015; Salkovskis et al., 1990; Stewart et al., 2009; Wei et al., 2013; Weinberg et al., 2006). However, due to missing values only 15 trials could be included in the meta-analysis. The observed SMD ranged from -0.75 to 0.32, with more than half of the estimates being positive (55%). Based on the random-effects model, the estimated average SMD was $\hat{\mu}$ = -0.01 (95% CI: -0.14- 0.11). Thus, the average outcome did not differ significantly from zero (z = -0.23, p < 0.82, Figure 6).

There was no significant amount of heterogeneity in the true outcomes (Q(11) = 16.58, p = 0.12, $\hat{\tau}^2$ = 0.03, I^2 = 54.30%). The 95% prediction interval for the true outcomes from -0.37 to 0.34 indicates that even though the average outcome is estimated to be positive, in some studies, it may, in fact, be negative. Further, there was no indication of outliers as indicated by the studentized residuals, of which none was larger than 2.91. Last, according to Cook's distances, one study (McAuliffe et al., 2014) could be considered overly influential. We checked this, calculating a sensitivity analysis with this study removed.

Overall, there was no evidence of small study effects for either of the outcomes. Funnel plots and formal tests suggested some evidence for publication bias for the outcomes 're-attempt during follow-up' and 'linkage to mental health service at follow-up' but no strong evidence for 'suicidal ideation at follow-up' and 'self-harm at follow-up' (see Supplementary Materials, chapter 'Publication bias', and Supplementary Figure 4).
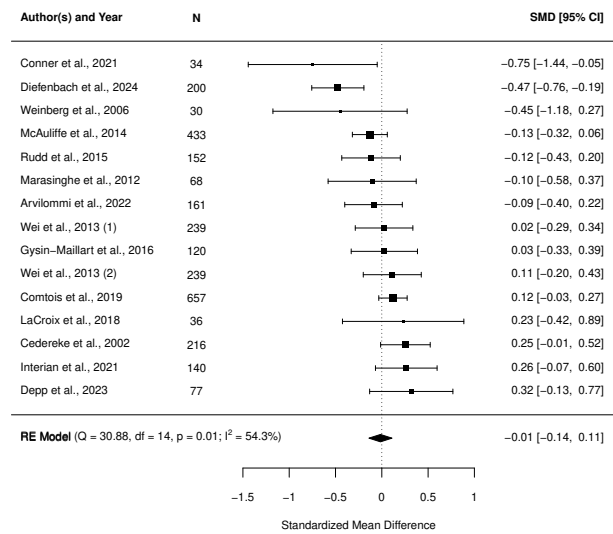

Figure 6. **Meta-analysis results for suicidal ideation.** The forest plot shows the meta-analysis of standardized mean differences (SMD) together with its 95% confidence interval (CI) for the continuous outcome 'suicidal ideation at follow-up' for brief interventions and contacts versus control. The average outcome did not differ significantly from zero suggesting no evidence for an effect of brief interventions on the reduction of suicidal ideation at follow-up compared with control.

Post-hoc analysis:

Effect of intervention type

We conducted multiple post-hoc mixed-effects meta-regressions to examine the effect of intervention type (i.e., brief interventions, remote contact interventions, multimodal interventions, or others) on the outcomes (i.e., 'suicide re-attempts at follow-up', 'suicidal ideation at follow-up', 'self-harm at follow-up', 'linkage to mental health service at follow-up') (see Supplementary Figures 5-8 and Supplementary Tables 2-5).

The meta-regressions' test of moderators was not significant for all outcomes (re-attempt: QM(3) = 2, p = 0.57; self-harm: QM(3) = 1.85, p = 0.40; sui-

cidal ideation: $QM(2) = 1.97$, $p = 0.37$; linkage: $QM(3) = 2.55$, $p = 0.28$). This indicated that intervention types did not significantly explain the variability in effect sizes.

Effect of the studied population

We conducted multiple post-hoc mixed-effects meta-regressions to examine the effect of the studied population (i.e., emergency department patients, inpatients, outpatients, general population, students, or soldiers/veterans) on the outcomes (i.e., 'suicide re-attempts at follow-up', 'suicidal ideation at follow-up', 'self-harm at follow-up', 'linkage to mental health service at follow-up') (see Supplementary Table 6-8).

For the outcomes 'suicide re-attempts at follow-up' and 'suicidal ideation at follow-up' the meta-regression analyses' test of moderators was not significant (Re-attempt: $QM(2) = 0.75$, $p = 0.69$; Ideation: $QM(2) = 1.59$, $p = 0.45$). This indicates that population subgroups did not explain the observed variability in effect sizes across studies. Yet, the meta-regression's test of moderators for 'linkage to mental health service at follow-up' was significant ($QM(1) = 3.84$, $p = 0.05$), indicating that population subgrouping accounted for some heterogeneity in effect sizes. In particular, the effect size for inpatients was significantly larger than the reference category (β = 1.33, 95% CI: -0.43 to 0.84, $p = 0.05$).

Sensitivity analyses

Excluding outliers

One trial (McAuliffe et al., 2014) in the meta-analysis of 'suicidal ideation at follow-up' was considered overly influential according to Cook's distances. Omitting this trial did not considerably affect results for brief interventions and contacts on suicidal ideation at the follow-up phase (SMD 0, 95% CI -0.14 to 0.13; N = 2734; k = 14; $I^2 = 54\%$; Supplementary Table 9).

Excluding high-risk rated studies

We undertook sensitivity analyses to investigate the impact of studies with a high risk for bias on the estimate of treatment effectiveness. Thus, we repeated the meta-analysis for those outcomes in which such studies had been identified. This was the case for the outcomes 'suicide re-attempts at follow-up' and 'suicidal ideation at follow-up'. The sensitivity analyses showed that removing the high-risk studies (re-attempts: 23/32; ideation: 10/15) and repeating the meta-analyses for these outcomes did substantially alter the overall effect size or its significance (re-attempts: original: -0.37, reduced: -0.38; ideation: original: -0.01, reduced: 0.03; Supplementary Table 10).

Discussion

In this meta-analysis and systematic review, we synthesized the current literature on brief interventions and contacts after suicide attempts over the past 20 years. With 53 included RCTs, this is the largest meta-analysis to date to assess the efficacy of brief interventions and contacts in 18124 patients and at-risk individuals. We grouped the brief interventions and contacts into different categories as follows: 'brief interventions', 'remote contact interventions', 'multimodal interventions', and a category for all other brief interventions ('others'). In contrast to conventional psychotherapy, some of these brief interventions consisted of a single session, while others comprised only of contact through letters or postcards. With this in mind, we want to highlight our most striking main findings, which are three-fold: (1) Despite the brevity of the intervention, there was strong evidence that suicide re-attempts were significantly reduced after brief interventions and contacts compared with any control condition; (2) this effect was independent of the type of the intervention; (3) there was a significant increase in the linkage to mental health services after the interventions compared with any control condi-

tion. Interestingly, we found no evidence for an effect of brief interventions and contacts on suicidal ideations or self-harm.

Effective reduction of subsequent attempts

Brief interventions and contacts are effective in reducing subsequent suicide attempts. This is remarkable. Considering the gravity of the suicidal episode and its consequences for the affected, their social network, and the wide-ranging implications for the public health system, these interventions can have a considerable impact. These interventions often require a minimum level of staff training and are easy to deliver, even to at-risk patients who present in an emergency. They are powerful enough to make a difference in a person's life, sometimes with only a single in-person session required (Doupnik et al., 2020). These findings are consistent with the growing evidence for single-session interventions for mental health problems (Schleider et al., 2024). In contrast, the alternative is traditional psychotherapeutic approaches that are long (i.e., 15 sessions and more), costly, and difficult to access (i.e., often with long waiting lists), and often show overall small effect sizes (Fox et al., 2020). Interestingly, we found no evidence of an effect on self-harm or suicidal ideation after brief interventions and contacts. The lack of evidence for self-harm may be linked to the heterogeneity of self-harm, with some studies showing that brief interventions may only be effective in some self-harm subgroups, such as those who have repeatedly self-harmed in the past (R. C. O'Connor et al., 2017). Tackling suicidal ideation might require longer-lasting psychotherapies, including the Collaborative Assessment and Management of Suicidality and CBT (Ballegooijen et al., 2024; Jobes, 2023), which are usually not administered in acute settings. Another possible explanation for our findings is offered by the . a possible explanation for our findings offers the framework of the *integrated motivational-volitional model of suicide*

(IMV model, (R. C. O'Connor & Kirtley, 2018)), one of the leading ideation-to-action models. The transition from suicidal ideation to suicidal behavior occurs when certain volitional factors (i.e., access to means, impulsivity, and exposure to others' suicidal behaviors) are present. These factors increase the likelihood of acting on suicidal thoughts by enabling the capability and opportunity for self-harm, particularly when a person feels trapped and unable to escape their situation (i.e., internal and external entrapment). Thus, the suicide-specific knowledge and tools to develop strategies that brief interventions and contacts provide help to handle escalating suicidal crises (Bryan et al., 2017; Ilgen et al., 2022; S. S. O'Connor et al., 2020) to prevent or interrupt the transition from suicidal thoughts to suicidal behavior. In short, the brief interventions are volitional interventions that interrupt suicidal thoughts, and targeting the volitional phase has been highlighted as a key target for suicide prevention (R. C. O'Connor et al., 2023).

Increased linkage to mental health services

Another important aim of brief interventions and contacts is to provide a link to the healthcare system. We found a significant increase in linkage to mental health services after brief interventions and contacts compared with control. This is particularly important considering that it is common for people who die by suicide to contact primary and mental health care systems in the year before their death (Cavanagh et al., 2003; Luoma et al., 2002; Stene-Larsen & Reneflot, 2019). Finding ways to stay connected with at-risk individuals, linking them with mental health professionals, and providing them with the help they need might save lives. Research shows that the linkage to the healthcare system is crucial, as it allows for the possibility of a longer-term connection to a therapist or the healthcare system in general and serves as an important protective factor (Luxton et al., 2013). Already, active outreach to at-risk

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individuals is preventative of further suicidal behavior (Mann et al., 2021). Thinking in terms of suicide frameworks such as the IMV model (R. C. O'Connor et al., 2016) and the *interpersonal theory of suicide* (Van Orden et al., 2010), being connected to someone who cares within the mental health system might reduce feelings of thwarted belongingness, perceived burdensomeness, social isolation, and shame (i.e., shame as a result of having made a suicide attempt which is often associated with stigma still). It also serves as a reminder that there is help available (e.g., physical contact person or in the form of a safety plan that was developed), and as such is suicide protective.

Open questions

Our results are in line with a growing body of evidence that highlights the efficacy of brief interventions and contacts for the treatment of at-risk individuals for suicidal behavior (Doupnik et al., 2020; McCabe et al., 2018; A. Milner et al., 2016; Spong et al., 2021; K. G. Witt et al., 2021). And yet, crucial questions have been left unanswered that are important for the field of suicide prevention research to move forward. Questions concerning the interventions themselves include, for example: "Which brief interventions and contact is most beneficial to tackle which outcome?", "What are the most helpful components of the brief interventions and contacts?", "How many sessions are necessary?". Other questions concern the target population (i.e., "Who benefits the most?") and target area (e.g., "Where should they be implemented?"). In this meta-analysis, we specifically asked some of these questions.

Addressing the question of intervention type

First, we were interested in whether intervention type moderated the relationship between suicidal thoughts and behaviors and the intervention's effectiveness. The meta-regression results indicated no moderating effect on either of the outcomes and the brief interventions and contacts. This is in line with earlier work (Hetrick et al., 2016) and might be explained by the few trials for some intervention types that limited the power to detect an effect. Second, regarding the question of the most helpful components, Milner and colleagues (2016) suggested that 'social support' (i.e., enabling participants to a sense of connectedness and the feeling of being listened to) and 'improved suicide prevention literacy' (i.e., improved knowledge about suicidal behavior, risk and protective factors, helplines, and how to access those) might be possible mechanisms underlying brief interventions and contacts. In this review, we identified 18 trials (34%) that reported a positive effect of brief interventions and contacts on reducing suicide deaths (Fleischmann et al., 2008), suicide re-attempts (Brown et al., 2005; Diefenbach et al., 2024; Gysin-Maillart et al., 2016; Motto & Bostrom, 2001), suicidal behavior (Armitage et al., 2016; Malakouti et al., 2021; Rudd et al., 2015), self-harm (Carter et al., 2013; Kapur et al., 2013; Wang et al., 2016), suicidal thoughts (Depp et al., 2023; Marasinghe et al., 2012; Salkovskis et al., 1990), STBs (Interian et al., 2021; Liberman & Eckman, 1981), and suicide risk (Niederkrotenthaler & Till, 2020), and an increased linkage to mental health services (Currier et al., 2010) compared with control. These positive outcomes were achieved by the following interventions: brief CBT (bCBT) (Brown et al., 2005; Diefenbach et al., 2024; Rudd et al., 2015), bCBT combined with antidepressant (fluoxetine) (Shu et al., 2022), mindfulness-based cognitive therapy for preventing suicide (including also safety planning) (Interian et al., 2021), problem-solving treatment (Salkovskis et al., 1990), behavioral therapy (Liberman & Eckman, 1981), AS-SIP + TAU (i.e., 3-4 therapy sessions and 12 letters over 24 months) (Gysin-Maillart et al., 2016), brief interventions and contact (i.e., 1-hour information session and follow-up contacts by phone calls or visit for 18 months) (Fleischmann et al., 2008), mobile-augmented SafeTy and Recovery

Therapy (mSTART) (Depp et al., 2023), educational intervention & contacts (Malakouti et al., 2021), suicide-educative media stories (Niederkrotenthaler & Till, 2020), postcard intervention over a 12-month period + TAU (Carter et al., 2013), letters for five years (Motto & Bostrom, 2001), leaflet, telephone contact, and letters over a 12-month period (Kapur et al., 2013), mobile crisis team intervention (Currier et al., 2010), mobile treatment + care as usual (Marasinghe et al., 2012), and coping cards (Wang et al., 2016). This suggests that overall, CBT-based brief interventions are effective as well as brief interventions that incorporate elements of learning coping or problem-solving skills or where suicide-specific psychoeducation plays a central role, and remote contact interventions with a duration of 12 months and more. These "active ingredients" that seem to make brief interventions and contacts effective have been suggested in psychotherapy research (CBT in person: e.g., (Ballegooijen et al., 2024; D'Anci et al., 2019; Fox et al., 2020; Gøtzsche & Gøtzsche, 2017; Mann et al., 2021); CBT online: e.g., (Yu et al., 2022)) and recent reviews before. For example, particularly components such as safety planning (Doupnik et al., 2020; McCabe et al., 2018; Nuij et al., 2021), psychoeducation (Doupnik et al., 2020; McCabe et al., 2018), follow-up contact for a minimum of 12 months (McCabe et al., 2018), care coordination (Doupnik et al., 2020), and early therapeutic engagement (McCabe et al., 2018) seem to be crucial for the successful prevention of subsequent suicidal behavior. The impact on suicidal ideations, however, seems limited (McCabe et al., 2018; Nuij et al., 2021).

Addressing the question of the target population

Next, we were interested in "Who benefits the most?". Intriguingly, the meta-regression results indicated an effect of the type of studied population such that inpatients (*versus* the general population) were significantly more likely to link to

mental health services at follow-up in the brief interventions and contact group compared with control (p = 0.05). We found no such effect for other study populations for the other outcomes (i.e., re-attempts or suicidal ideations). This finding should be interpreted with caution considering the large residual heterogeneity (I^2 = 87) which suggested that much of the variability remained unexplained. Thus, future studies should further investigate this relationship and potentially associated factors. With this in mind, we would like to provide a clinical explanation nonetheless. One reason for this result may be that there is tremendous value for the population of inpatients if part of the brief interventions and contact program is on aftercare, care coordination, or case management. This can mean that support with arranging appointments and finding an outpatient therapist could take weight off their shoulders during uncertain times, and overall, facilitate an easier transition from the inpatient to the outpatient setting. Because there were so few trials for some of the studied populations, we could not statistically assess their moderating effect. Therefore, future studies are needed to further investigate this question. Last, the question as to where is best to implement brief interventions and contacts was addressed by Stanley and colleagues (2023). They suggested that especially ultra-brief interventions (1-4 sessions) might be particularly suited for the emergency department context. These ultra-brief interventions have the advantage that they can be provided to someone seeking emergency care without needing the patient to commit to or follow through with a longer therapy program.

Clinical implications and future direction

Brief interventions and contacts are, by definition, short, which makes them appealing to be delivered online or via digital technologies. Surprisingly, we found only two trials that used digital technologies to deliver their interventions

(Depp et al., 2023; Marasinghe et al., 2012). The mobile-augmented SafeTy and Recovery Therapy (Depp et al., 2023) was an app which used ecological momentary interventions (EMIs) coupled with brief in-person CBT to extend the content of the therapy to everyday life. The Immediate Brief Mobile Treatment + usual care (Marasinghe et al., 2012) switched after in-person sessions to a mobile/web-based format for the second part of their intervention, which included components of problem-solving, social support, and reduction of alcohol/other drug use. Both approaches were found to be effective. Digital technologies such as online therapy (for a review on iCBT, see, for example, Büscher et al. (2020); Yu et al. (2022)) or EMIs (Jimenez-Munoz et al., 2022) provide unique potential. They have the advantage of being scalable, vastly available, and versatile. With EMIs, even just-in-time adaptive interventions could be delivered (Nahum-Shani et al., 2018), a tremendous opportunity for suicide prevention. In general, delivering interventions via digital technologies could reduce suicidal thoughts (Büscher et al., 2020; De Beurs et al., 2015; K. Witt et al., 2017), yet more evidence is needed (Jimenez-Munoz et al., 2022; Mann et al., 2021). What is more, digital technologies enable researchers to collect information on STBs with ecological momentary assessments (De Beurs et al., 2015; Kleiman & Nock, 2018), which is crucial for studying the same.

Limitations

This review has some limitations that merit comment. First, 12 studies were rated as high-risk for bias, and many were rated as some risk for bias (30 studies). This should be considered when interpreting the meta-analysis findings. However, the sensitivity analysis that we performed indicated that excluding the high risk studies did not substantially alter the overall effect size or its significance (Supplementary Table 7). Second, the included studies were heterogeneous in multiple aspects: sample size (range 20 – 1932

participants), length of follow-up period (range 7 days to 5 years), type of control condition (active vs. TAU), and differences in the approach to reduce STBs. Therefore, we grouped trials by intervention type to reduce heterogeneity. Yet, for the meta-regression, there were few trials in some intervention categories, which limited the power of investigating the effect of intervention type on the overall effect. Thus, further research is needed. Third, we addressed the question of differences in the comparator. There were 8 trials that had an active control group compared with 45 trials that had a control group such as TAU. To test whether the trials with an active control group had smaller effect sizes, we performed meta-regressions with a 'control group' as a moderator. We found no evidence for an effect of the control group (active vs. not active) on the effect sizes across studies (Test of Moderators: $p > 0.05$, $R^2 = 0\%$). Last, the population studied is often highly burdened. As such, compliance and adherence to study procedures can be a challenge. This measure was not reported in all trials. Therefore, future studies should take this into account and systematically assess the brief interventions and contacts regarding this feasibility criterion.

Conclusion

Taken together, there are several evidence-based brief interventions and contact programs with as few as one session that are highly effective: they reduce the likelihood of subsequent suicide re-attempts. However, no conclusions about individual responses to these brief interventions were possible as this would have required more complex designs in the original studies (Winkelbeiner et al., 2019). Also, although this review underlines the effectiveness of brief interventions and contacts, the mechanisms of effect remain unclear. For example, to what degree do specific psychological techniques versus having more frequent interaction with professionals account for their efficacy? Nonetheless, the findings are clear: out of

53 trials, one-third included a psychological intervention that effectively reduced suicidal thoughts or behaviors in 18 trials. Future research could further investigate and compare the specific components to determine which contributed to the intervention's effectiveness. Further, brief interventions and contacts were effective in increasing linkage to the mental health system. With this, they are a key element for suicide prevention as outlined in MQ Mental Health Research's priority actions to prevent premature mortality associated with mental illness and mental distress (R. C. O'Connor et al., 2023). In short, we recommend that brief interventions and contacts should be established as standard programs in emergency settings, potentially delivered by non-clinical staff to improve the continuity of mental health care. However, brief interventions and contacts are only one but crucial component in a set of long-lasting, systemic, and comprehensive interventions necessary to better prevent STBs.

Declaration of Interest

The authors have no conflicts of interest to report.

Funding

Author Contribution

Conceptualization: S. Homan, A. Ritzinger, B. Kleim, R. O'Connor, Ph. Homan, S. Olbrich; Methodology: S. Homan, Ph. Homan, B. Kleim, R. O'Connor; Formal analysis: S. Homan; Ressources: A. Ritzinger, S. Michel, A.-M. Bertram, Ch. Rühlmann, M.A. Marciniak, A. Petho, L. Kirchhofer; Writing – Original Draft Preparation: S. Homan; Writing – Review & Editing: B. Kleim, Ph. Homan, R. O'Connor, A. Ritzinger, S. Michel, A.-M. Bertram, Ch. Rühlmann, M.A. Marciniak, A. Petho, S. Olbrich, L. Kirchhofer; Supervision: B. Kleim, R. O'Connor.

Tables

Table 1

Descriptives charateristics of the studies' population.

Reference	Population	Inclusion	BIC: N	BIC: N (fem.)	BIC: age (M)	BIC: age (SD)	CG: N	CG: N (fem.)	CG: age (M)	CG: age (SD)
Amadéo et al., 2015	EDp	SB	90.00	58.00	33.00	NA	100.00	64.00	31.48	NA
Arvilommi et al., 2022	EDp	SA	89.00	62.00	32.20	13.30	72.00	52.00	32.00	12.40
Beautrais et al., 2010	EDp	SH or SA	153.00	107.71	33.80	NA	174.00	108.40	33.90	NA
Bennewith et al., 2002	OP	SH	964.00	581.00	32.20	13.00	968.00	555.00	32.80	13.50
Brown et al., 2005	EDp	SA	60.00	36.00	35.10	10.10	60.00	37.00	34.90	10.50
Carter et al., 2005	EDp	SH	378.00	233.00	NA	NA	394.00	291.00	NA	NA
Carter et al., 2013	EDp	SH	378.00	233.00	NA	NA	394.00	291.00	NA	NA
Cedereke et al., 2002	IP	SA	107.00	71.00	40.00	18.00	109.00	72.00	42.00	18.00
Chen et al., 2013	OP	SA	373.00	243.00	39.80	14.00	388.00	275.00	40.00	16.00
Comtois et al., 2019	OP soldiers	STB	329.00	54.00	25.60	6.30	328.00	64.00	24.80	5.80
Conner et al., 2021	IP	SA	16.00	12.00	42.80	15.20	18.00	10.00	38.40	17.80
Currier et al., 2010	OP	STB	56.00	33.00	34.50	NA	64.00	35.00	30.90	NA
Depp et al., 2023	OP	STB	38.00	16.99	48.30	13.70	39.00	22.00	43.70	13.00
Diefenbach et al., 2024	IP	SA	94.00	58.00	33.10	12.40	106.00	59.00	32.50	12.80
Evans et al., 1999a	IP	SH	417.00	242.00	32.90	12.90	410.00	216.00	33.80	13.10
Evans et al., 1999b	Patients	SH	18.00	NA	NA	NA	14.00	NA	NA	NA

Table 1 continued

Reference	Population	Inclusion	BIC: N	BIC: N (fem.)	BIC: age (M)	BIC: age (SD)	CG: N	CG: N (fem.)	CG: age (M)	CG: age (SD)
Fleischmann et al., 2008	EDp	SA	872.00	518.00	NA	NA	827.00	475.00	NA	NA
Gysin-Maillart et al., 2016	EDp	SA	60.00	36.00	36.50	14.30	60.00	30.00	39.20	14.60
Hatcher et al., 2015	EDp	SH	737.00	480.00	36.20	NA	737.00	498.00	36.70	NA
Hatcher et al., 2016	Maori EDp	SH	182.00	124.00	31.50	NA	183.00	118.00	32.20	NA
Ilgen et al., 2022	IP veterans	STB	157.00	19.00	47.20	12.80	150.00	20.00	46.80	13.50
Interian et al., 2021	IP veterans	STB	71.00	8.00	48.00	12.20	69.00	9.00	46.00	14.30
Kapur et al., 2013	EDp	SH	33.00	NA	NA	NA	32.00	NA	NA	NA
LaCroix et al., 2018	IP soldiers	SA	18.00	6.00	28.90	8.60	18.00	5.00	33.00	10.80
Liberman et al., 1981	EDp	SA	12.00	9.00	29.50	8.60	12.00	7.00	25.50	9.10
Lin et al., 2019	College students	SA	42.00	38.00	20.40	0.76	40.00	34.00	20.47	0.71
Malakouti et al., 2021	IP	SA	153.00	105.00	NA	NA	152.00	99.00	NA	NA
Marasinghe et al., 2012	IP	SA	34.00	17.00	32.00	15.50	34.00	17.00	30.00	15.00
Matsubara et al., 2019	EDp	SA	24.00	NA	NA	NA	24.00	NA	NA	NA
McAuliffe et al., 2014	EDp	SH	222.00	64.00	33.40	11.50	211.00	65.00	33.60	12.10
Morgan et al., 1993	IP	SH	101.00	NA	27.40	NA	111.00	NA	32.50	NA
Motto et al., 2001	IP	STB	389.00	225.00	34.40	NA	454.00	243.00	32.80	NA

Table 1 continued

Reference	Population	Inclusion	BIC: N	BIC: N (fem.)	BIC: age (M)	BIC: age (SD)	CG: N	CG: N (fem.)	CG: age (M)	CG: age (SD)
Mouaffak et al., 2015	EDp	SA	152.00	113.00	39.00	13.00	151.00	111.00	38.60	13.30
Mousavi et al., 2014	EDp	SA	69.00	50.00	NA	NA	70.00	38.00	NA	NA
Mousavi et al., 2016	EDp	SA	29.00	27.00	27.07	7.79	26.00	21.00	29.69	7.73
Niederkrotenthaler et al., 2020	GLr	STB	49.00	38.50	27.07	1.97	48.00	29.50	29.69	1.97
O'Connor et al., 2015	IP	SA	15.00	1.00	43.67	13.13	15.00	7.00	39.02	14.43
O'Connor et al., 2017	EDp	SA	259.00	160.00	36.50	14.59	259.00	164.00	36.07	12.77
O'Connor et al., 2020	IP	SA	23.00	10.00	43.26	2.48	25.00	12.00	41.96	2.70
O'Connor et al., 2022	IP	SH	80.00	50.00	36.10	16.10	40.00	25.00	37.00	14.10
Rudd et al., 2015	IP soldiers	STB	78.00	12.00	27.18	6.25	76.00	7.00	27.62	6.19
Salkovskis et al., 1990	IP	SA	12.00	7.00	26.40	6.00	8.00	3.00	28.50	7.90
Shu et al., 2022	IP	SA	25.00	15.00	22.10	2.80	21.00	12.00	23.40	3.60
Sreedaran et al., 2021	IP	SA	15.00	10.00	NA	NA	13.00	11.00	NA	NA
Stewart et al., 2009	EDp	SA	19.00	NA	NA	NA	19.00	NA	NA	NA
Vaiva et al., 2006	EDp	SA	11.50	NA	NA	0.00	9.00	NA	NA	0.00
Vaiva et al., 2018	IP	SA	455.00	312.00	38.40	13.40	447.00	314.00	38.10	13.10
Van Heeringen et al., 1995	EDp	SA	258.00	157.00	34.00	NA	258.00	135.00	33.80	NA

Table 1 continued

Reference	Population	Inclusion	BIC: N	BIC: N (fem.)	BIC: age (M)	BIC: age (SD)	CG: N	CG: N (fem.)	CG: age (M)	CG: age (SD)
Van der Sande et al., 1997	IP	SA	140.00	92.00	35.80	15.60	134.00	88.00	36.80	14.60
Wang et al., 2016	Ad	SA	32.00	24.00	39.13	10.25	32.00	23.00	36.78	11.87
Wei et al., 2013 (1)	IP	SA	82.00	61.00	31.41	11.95	77.00	58.00	32.12	13.87
Wei et al., 2013 (2)	IP	SA	80.00	63.00	34.06	15.84	77.00	58.00	32.12	13.87
Weinberg et al., 2006	fem. BPD pat.	SH	15.00	15.00	30.00	8.61	15.00	15.00	26.33	7.67
Westling et al., 2019	IP	SB	62.00	56.00	30.90	8.80	63.00	50.00	33.10	9.90

Note. BIC, brief intervention and contacts; BPD, borderline personality disorder; CG, control group; ED, emergency department; EDp, emergency department patients; fem., female; GH, general hospital; 'other services' including Adult Psychiatry Consultation Service, case management services, trauna center, and walk-in services; IP, inpatients; M, mean; 'multi-centre' including Brazil, India, Sri Lanka, Iran, and China; 'multiple' including government organizations, prevention center, and GH; N, sample size; GP, general population; NA, not available; OP, outpatients; 'public space' including supermarkets, university campus, and online; SA, suicide attempt; SD, standard deviation; SH, self-harm; STB, suicidal thoughts and behaviors.

Table 2

Descriptives charateristics of the studies' interventions.

Reference	Intervention	Type	Sessions	Duration	BIC	BIC duration	Follow-ups	CT	Aim	Effective
Amadéo et al., 2015	START + TAU	Other	1	60	9	NA	2.00	TAU	Study a BIC to decrease suicide re-attempts.	no
Arvilommi et al., 2022	ASSIP + TAU	MI	3	60-90	6	NA	2.00	active	Test ASSIP compared to Crisis Counselling to prevent SA.	no
Beautrais et al., 2010	PCI + TAU	RCI	NA	NA	6	NA	1.00	TAU	Examine a post-card intervention to reduce self-harm.	no
Bennewith et al., 2002	GP intervention	RCI	NA	NA	1	NA	1.00	CAU	Evaluate the impact of an intervention based in general practice on self-harm.	no
Brown et al., 2005	sCBT	BI	10	50-60	NA	NA	5.00	CAU	Evaluate the effectiveness of cognitive therapy compared to usual care.	yes
Carter et al., 2005	PCI + TAU	RCI	NA	NA	8	NA	1.00	TAU	Use postcards to reduce repetitions of deliberate self-harm.	no
Carter et al., 2013	PCI + TAU	RCI	NA	NA	8	NA	3.00	TAU	Evaluate the long-term effectiveness of a postcard intervention for self-harm.	yes
Cedereke et al., 2002	TC	RCI	NA	NA	2	20-45	2.00	no intervention	Investigate influence of telephone contacts.	no

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Table 2 continued

Reference	Intervention	Type	Sessions	Duration	BIC	BIC duration	Follow-ups	CT	Aim	Effective
Chen et al., 2013	PCI	RCI	6	NA	1	NA	1.00	no intervention	Evaluate effectiveness of crisis postcards.	no
Comtois et al., 2019	SMS	RCI	NA	NA	11	NA	1.00	SC	Effect of augmenting standard care for military personnel with brief caring text messages.	no
Conner et al., 2021	mASSIP	MI	4	60-90	NA	NA	3.00	active	Modified ASSIP therapy for substance use disorder patients after suicide attempt.	NA
Currier et al., 2010	Mobile crisis team intervention	Other	2	NA	NA	NA	2.00	PA	Determine the efficacy of a crisis team intervention after ED-discharge.	yes
Depp et al., 2023	mSTART	BI	4	60	NA	NA	3.00	active	Evaluating START for reducing ST with a mobile app.	yes
Diefenbach et al., 2024	bCBT inpatient + TAU	BI	4	60-90	NA	NA	6.00	TAU	Determine if bCBT for inpatients reduces re-attempts and suicidal ideations.	yes
Evans et al., 1999a	TC	RCI	NA	NA	1	NA	2.00	no intervention	Test offer of repeated emergency telephone support after self-harm.	no
Evans et al., 1999b	CT	BI	2-6	NA	NA	NA	1.00	TAU	Use manual-assisted CBT after suicide attempt.	no

Table 2 continued

Reference	Intervention	Type	Sessions	Duration	BIC	BIC duration	Follow-ups	CT	Aim	Effective
Fleischmann et al., 2008	BIC	Other	1	60	9	NA	1.00	TAU	Compare BIC with TAU on suicide mortality	yes
Gysin-Maillart et al., 2016	ASSIP + TAU	MI	3	60-90	6	NA	4.00	TAU	Compare ASSIP with TAU on reducing SA	yes
Hatcher et al., 2015	PC + PST	MI	4-6	NA	8	NA	2.00	TAU	Test if postcards and problem-solving therapy can reduce suicide re-attempts.	no
Hatcher et al., 2016	PC + PST	MI	4-6	NA	8	NA	2.00	TAU	Test the impact of a culturally adapted BIC on self-harm.	no
Ilgen et al., 2022	Crisis Line Facilitation	Other	1	30-45	NA	NA	3.00	E-CAU	Testing facilitation for a veteran's crisis helpline.	no
Interian et al., 2021	MBCT-S + eTAU	BI	10+boost	90-120	NA	NA	2.00	eTAU	Test the efficacy of Mindfulness-Based CT for suicide prevention.	yes
Kapur et al., 2013	Leaflet, TC & letters	RCI	NA	NA	8	NA	1.00	TAU	Assess the impact on repetition of self-harm after remote contact intervention.	yes
LaCroix et al., 2018	CT + EUC	BI	6	60-90	NA	NA	3.00	E-UC	Analyze efficacy of cognitive therapy among service members with PTSD.	no

Table 2 continued

Reference	Intervention	Type	Sessions	Duration	BIC	BIC duration	Follow-ups	CT	Aim	Effective
Liberman et al., 1981	BT	Other	8	4 hours	NA	NA	5.00	active	Use behavioral therapy for repeated suicide attempters.	yes
Lin et al., 2019	DBT Skills Training Group	BI	8	120	NA	NA	4.00	active	Dialectic Behavior Therapy Skills Training to reduce students' suicide reattempts.	no
Malakouti et al., 2021	Educational intervention & contacts	Other	1	40-45	14	15-20	2.00	TAU	Investigate a brief educational intervention and contact program	yes
Marasinghe et al., 2012	mobile treatment + CAU	RCI	6	30-60	10	10-15	1.00	CAU + D-BMT	To test a Brief Mobile Treatment (BMT) intervention.	yes
Matsubara et al., 2019	BCI + TAU	RCI	NA	NA	3	NA	1.00	TAU	Determine effectiveness of Combining phone and postcard BICs.	no
McAuliffe et al., 2014	PS skills training	BI	6	120	NA	NA	2.00	TAU	Evaluate efficacy of a structured group problem solving skills training.	no
Morgan et al., 1993	Green Card	RCI	NA	NA	1	NA	1.00	CAU	Investigate effect of a crisis card to encourage help seeking behaviour.	no
Motto et al., 2001	Letters	RCI	NA	NA	24	NA	15.00	no intervention	Test the maintenance of long-term contact for suicide prevention.	yes

Table 2 continued

Reference	Intervention	Type	Sessions	Duration	BIC	BIC duration	Follow-ups	CT	Aim	Effective
Mouaffak et al., 2015	OSTA	RCI	NA	NA	4	NA	1.00	TAU	Test intervention to reduce re-attempts and increase linkage to MH services.	no
Mousavi et al., 2014	TC	RCI	NA	NA	7	30	5.00	TAU	Evaluation of tele-phone follow up on suicide reattempt.	no
Mousavi et al., 2016	TI	RCI	NA	NA	8	20	1.00	active	Comparison of telephone deliv-ered intervention versus face-to-face for suicide attempters.	no
Niederkrotenthaler et al., 2020	Suicide-educative media stories	Other	NA	NA	1	NA	1.00	active	Assess effects of suicide awareness materials.	yes
O'Connor et al., 2015	TMBI + TAU	BI	1	30-60	NA	NA	1.00	CAU	Test the feasibility of a Teachable Mo-ment Brief Inter-vention after sui-cide attempt.	no
O'Connor et al., 2017	VHS	BI	1	NA	NA	NA	1.00	TAU	Evaluate if a vo-litional helpsheet would decrease repeated self-harm.	no
O'Connor et al., 2020	TMBI	BI	1	30-60	NA	NA	3.00	CAU	Evaluate the Teachable Moment Brief Intervention (TMBI).	no

Table 2 continued

Reference	Intervention	Type	Sessions	Duration	BIC	BIC duration	Follow-ups	CT	Aim	Effective
O'Connor et al., 2022	SPI + TC + TAU	BI	2-6	15	5	NA	1.00	TAU	Test the feasibility of a safety plan with telephone follow-ups.	NA
Rudd et al., 2015	bCBT + TAU	BI	12	60/90	NA	NA	5.00	TAU	Reduce SB with brief CBT.	yes
Salkovskis et al., 1990	PST	BI	5	60	NA	NA	5.00	TAU	Problem Solving to reduce repeated suicide attempts.	yes
Shu et al., 2022	bCBT + fluoxetine	BI	8	30-35	NA	NA	1.00	medication	Functional connectivity changes after CBT with antidepressant.	yes
Sreedaran et al., 2021	TI	RCI	NA	NA	3	12-14	1.00	active	Assess the acceptability of a telephone intervention vs. telephone contacts.	NA
Stewart et al., 2009	bCBT or PST	BI	4-7	60	NA	NA	1.00	TAU	Compare brief interventions to TAU for the treatment of suicidal thoughts.	partly
Vaiva et al., 2006	TC	RCI	NA	NA	1	NA	1.00	TAU	Test telephone contact one month vs. three months compared with TAU.	no
Vaiva et al., 2018	AlgoS + TAU	RCI	NA	NA	1-5	NA	2.00	TAU	Evaluate efficacy of an intervention algorithm.	no

Table 2 continued

Reference	Intervention	Type	Sessions	Duration	BIC	BIC duration	Follow-ups	CT	Aim	Effective
Van Heeringen et al., 1995	Special Care	Other	1	NA	NA	NA	1.00	CAU	Testing an experimental referral procedure to outpatient aftercare.	no
Van der Sande et al., 1997	Intensive inpatient & community int.	Other	4	NA	NA	NA	3.00	CAU	Intensive inpatient intervention program for suicide attempters.	no
Wang et al., 2016	Coping Cards	RCI	6	NA	NA	NA	1.00	TAU	Use coping cards to reduce subsequent suicide attempts.	yes
Wei et al., 2013 (1)	bCT	BI	10	45-60	NA	NA	3.00	no intervention	Evaluate the effectiveness of 10 CBT sessions to reduce SB.	no
Wei et al., 2013 (2)	TC	BI	NA	NA	12	20-40	3.00	no intervention	Evaluate the effectiveness of a telephone intervention to reduce SB.	no
Weinberg et al., 2006	CT	BI	6	NA	NA	NA	1.00	TAU	Test a modified manual-assisted cognitive therapy for BPD patients.	partly
Westling et al., 2019	BA + TAU	Other	3 nights	24 hours	NA	NA	2.00	TAU	Determine the effects of BA on inpatient service use and re-attempts.	no

Note. BI, brief intervention; MI, multimodal intervention; RCI, remote contact intervention.

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