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Research paper

Collaboration matters: A randomized controlled trial of patient-clinician collaboration in suicide risk assessment and intervention

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ABSTRACT

Background: Clinician collaboration can help high-risk individuals to manage their suicidal crises. However, limited research has directly examined how higher patient-clinician collaboration during assessment and intervention can effectively reduce suicidal ideation. This novel randomized clinical trial compared a high vs. low level of patient-clinician collaboration by pairing commonly used assessment (Structured Interview vs. Narrative Assessment) and intervention approaches (Safety Planning Intervention vs. Crisis Response Planning). We hypothesized that the interventions involving higher (than lower) patient-clinician collaboration during assessment (Narrative Assessment) or intervention (Crisis Response Planning) would lead to larger reductions in suicidal ideation.

Methods: Eighty-two participants with a history of suicide ideation and/or attempts were randomly assigned to one of the four interventions varying in patient-clinician collaboration. After attrition, sixty-six participants completed the study. Suicidal ideation via ecological momentary assessment was measured 14 days before and 14 days after treatment.

Results: Although the severity of suicidal ideation decreased in all groups, the two groups that included highly collaborative assessment had larger pre-post reductions in suicidal ideation (Narrative Assessment+Safety Plan; $d_{within} = 0.26$, and Narrative Assessment+Crisis Response Plan; $d_{within} = 0.19$) than the groups that included a checklist-based assessment (Structured Interview).

Limitations: Longer follow-up periods with a larger sample would have provided an understanding of the durability of intervention effects.

Conclusion: Results suggest that the inclusion of higher patient-clinician collaboration techniques during suicide risk assessment can effectively reduce suicidal thoughts. Thus, clinician-led collaborative risk assessment approaches can enhance the effects of safety planning-type interventions among patients with elevated risk for suicide versus checklist-based assessment approaches.

1. Introduction

Suicide remains an important public health issue in the United States. From 1999 to 2018, U.S. suicides increased by 35 % (Hedegaard et al., 2020) before reversing direction for two consecutive years, but rising again in 2021 (Martínez-Alés et al., 2022). Efforts to prevent suicide in healthcare settings have emphasized using evidence-based strategies designed to assess and treat patients with elevated risk for suicide (National Action Alliance for Suicide Prevention, 2012). Suicide prevention interventions are typically delivered after some form of suicide risk screening and assessment has occurred. The clinical approach to suicide risk assessment and intervention can vary significantly across interventions and clinicians, though. One dimension of variability involves the level of clinician-patient collaboration (Hawton et al., 2022). Higher levels of clinician-led collaboration can potentially help high-risk individuals better manage their suicidal crises and improve the quality of a crisis intervention, but it can also make the intervention more costly because it requires a greater amount of

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clinician time. However, limited evidence is available to evaluate how high (vs. low) clinician-led collaboration can effectively reduce suicide risk in real-world and personally relevant settings. The goal of this study was to address this knowledge gap.

Clinical approaches to suicide risk screening and assessment can vary widely across individual practitioners and systems of care but have increasingly focused on risk prediction, which aims to identify *which patients* are most likely to attempt suicide so they can receive an intervention (e.g., Carter et al., 2017; Franklin et al., 2017). A central feature of the risk prediction approach is the use of standardized risk assessment scales. Numerous studies have found that these scales have poor positive predictive value and sensitivity, however (Carter et al., 2017; Hubers et al., 2018; Large et al., 2017; McHugh et al., 2019; Quinlivan et al., 2017), prompting researchers and clinicians to advocate for a therapeutic assessment approach instead (Hawton et al., 2022).

The *therapeutic assessment* approach, alternatively known as the *narrative approach* or *Aeschi approach*, emphasizes the importance of building collaborative relationships with patients and understanding the contexts leading up to and surrounding their suicidal episodes (Hawton et al., 2022; Michel and Jobes, 2011). A common method for accomplishing this goal is to invite people to "tell the story" of their suicidal crisis and/or suicide attempt. This narrative approach features prominently in multiple evidence-based suicide-focused treatments like cognitive behavioral therapy for suicide prevention (Bryan and Rudd, 2018; Wenzel et al., 2009), the Collaborative Assessment and Management of Suicidality (Jobes et al., 2017), the Attempted Suicide Short Intervention Program (ASSIP; Michel and Gysin-Maillart, 2015), and safety planning-type interventions like crisis response planning (CRP; Bryan and Rudd, 2018; Bryan et al., 2017b; Rudd et al., 2006) and the safety planning intervention (SPI; Stanley and Brown, 2012).

Some research suggests that therapeutic assessment approaches may be associated with higher patient ratings of empathy and greater disclosure of details surrounding a suicidal crisis as compared to structured interviews (Bryan et al., 2019; Bryan et al., 2018; Rosti, 2017). Higher patient-rated empathy is also correlated with larger reductions in suicidal ideation and suicide attempts within suicide-focused treatments (Bryan et al., 2019), suggesting therapeutic assessment may be a critical component of suicide-focused treatments that contribute directly to intervention effects. To our knowledge, however, no controlled trials have explicitly examined this possibility or compared different suicide risk assessment approaches.

Collaboration may be especially important in safety planning-type interventions like Crisis Response Planning (CRP; Bryan and Rudd, 2018; Bryan et al., 2017b; Rudd et al., 2006) and Safety Planning Intervention (SPI; Stanley and Brown, 2012), which have been shown to significantly reduce suicidal behaviors among high-risk patients accessing emergency psychiatric services. Owing to their demonstrated effectiveness in reducing suicidal behaviors (Nuij et al., 2021), safety planning-type interventions are recommended for use in healthcare settings. Safety planning-type interventions may also reduce suicidal ideation, although the scarcity of studies reporting effects on suicidal ideation limits definitive conclusions (Nuij et al., 2021). One safety planning-type intervention that has been shown to reduce both suicide attempts and suicidal ideation is CRP (Bryan and Rudd, 2018). Typically handwritten on an index card, CRP focuses on five key components: personal warning signs of an emerging suicidal crisis, self-management strategies to distract from the situation or reduce emotional distress, reasons for living, sources of social support, and professional and/or crisis services. In a randomized controlled trial (RCT), CRP significantly reduced suicide attempts and suicidal ideation among treatment-seeking adults for up to six months post-intervention when compared to treatment as usual (Bryan et al., 2017b). Follow-up analyses indicated CRP also significantly reduced emotional distress and suicidal urges in less than one hour of receiving the intervention (Bryan et al., 2017a), suggesting rapid effects.

Rapid reductions in suicidal ideation may underlie the effectiveness of safety planning-type interventions for preventing suicidal behavior. Multiple studies show that rapid reductions in suicidal ideation are correlated with reduced risk for later suicide attempts (Czyz et al., 2012; Czyz and King, 2015; Lee et al., 2020; Prinstein et al., 2008). Because safety planning-type interventions help people to better recognize when they are experiencing the early stages of a suicidal crisis and respond to that situation, these interventions may strengthen perceived control of one's suicidal crisis. Enhancing perceived control of suicidal ideation has been identified as a critical target for reducing the likelihood of someone acting upon their suicidal thoughts (Nock et al., 2018). Understanding the short-term impact of safety planning-type interventions on suicidal ideation could therefore reveal novel information about how and why these interventions reduce suicidal behavior.

Although safety planning-type interventions are intended to be created by a suicidal patient in close collaboration with a trained clinician (Rudd et al., 2006; Stanley and Brown, 2012), in many settings, the level of patient-clinician collaboration can be very low or even absent. Self-guided versions of the SPI, wherein suicidal individuals are directed to use a "fill-in-the-blank" safety plan form with minimal interaction between clinician and patient, are common in many healthcare settings. The effectiveness of self-guided safety planning-type interventions for reducing suicidal behavior has garnered some support (Miller et al., 2017), although reported effect sizes are smaller than those observed in studies using a collaborative approach (e.g., Bryan et al., 2017b) wherein the patient and clinician work together to identify the patient's personal warning signs for an emotional crisis, self-management coping skills, and sources of social support. Thus, collaboratively developed safety planning-type interventions require more clinician time, but they may also be more effective. No previous work, to our knowledge, has compared the effect of these two intervention approaches on suicidal ideation.

The present study was designed to provide novel information about the impact of clinician involvement and collaboration on suicidal ideation. To achieve this objective, we manipulated collaboration levels associated with suicide risk assessment and intervention approaches for adults reporting recent suicidal ideation or a lifetime history of suicidal behavior and compared these conditions using a randomized factorial design. The assessment approaches and interventions used in this study are commonly used in clinical practice, although they differ in their focus and level of collaboration. We hypothesized that the approaches involving higher clinician collaboration during assessment or intervention would be associated with significantly larger reductions in short-term suicidal ideation, measured using ecological momentary assessment (EMA; Wilhelm and Grossman, 2010). We used EMA due to the considerable evidence indicating that suicidal ideation is highly dynamic, often changing within the course of a few hours (e.g., Kleiman et al., 2017). Although EMA provides a more accurate picture of how suicide risk changes over time and reduces memory biases, it has not been routinely used in clinical trial methodology (Davidson et al., 2017). The integration of this methodology into clinical research could therefore provide novel information about why and how an intervention works.

2. Method

2.1. Participants and procedures

Participants were 82 adults recruited from the community via online advertisements. Inclusion criteria were (1) being 18–50 years old[1]; (2) reporting suicidal ideation during the past week, assessed with the Scale for Suicidal Ideation (SSI; Beck et al., 1979), and/or a lifetime history of

[1] Given the completely online nature of this study, we had set the maximum age range to 50 as this age group is pretty comfortable with web-based platforms being used in the study.

suicidal behavior, assessed with the Self-Injurious Thoughts and Behaviors Interview-Revised (SITBI-R; Fox et al., 2020); (3) ownership of a smartphone; and (4) ability to communicate and comprehend English. Exclusion criteria were (1) a psychiatric or medical condition that precluded the ability to provide informed consent (e.g., acute intoxication, active manic episode); (2) inability to communicate and comprehend English; and (3) current enrollment in a suicide-focused therapy (e.g., cognitive behavioral therapy for suicide prevention). Attrition after randomization led to 66 participants completing the study.

All study procedures for this study were conducted online from May 2021 to December 2021 using a web-based videoconferencing platform. Interested individuals first completed an internet-based screening survey. Those whose responses suggested they were likely eligible were contacted by a researcher to schedule a virtual appointment to complete informed consent procedures, eligibility assessment, and suicide risk assessment to determine the risk level of safety. Eligible participants received a text message with an embedded survey link thrice daily for 14 consecutive days to report the severity of their suicidal ideation. They were informed that if they had responded to the prior EMA event, they should report the severity of their suicidal ideation since their last response. However, if it was the first response of the day or they had missed the previous response, they were directed to report severity based on their past 4 h. On average, each survey took less than 5 min to complete. After completing the 14-day EMA period, participants received one of the four randomly assigned assessment and intervention combinations. Participants then completed another two weeks of EMA using the same data collection procedures described above. At the end of the study, participants were given resources for mental health treatment. Participants were compensated $0.50 for completing each of the 84 planned phone-based surveys, received an additional $20 "bonus" for completing at least 75 % (63 of 84) of all planned surveys, received $20 for completing the one-month follow-up (possible total compensation of $82). Incentives were paid in the form of an Amazon.com electronic gift card. Study procedures were reviewed and approved by the University of Utah Institutional Review Board. This was part of a registered RCT: https://clinicaltrials.gov/study/NCT04888845

2.2. Eligibility assessment instruments

2.2.1. Scale for suicide ideation

The Scale for Suicide Ideation (SSI; Beck et al., 1979) was used at baseline for eligibility determination. The SSI is a 19-item clinician-administered interview that assesses the intensity of suicidal thoughts, plans, urges, and behaviors during the preceding week. Each item is rated on a 3-point ordinal scale and then summed. Higher scores indicate a more severe suicide risk.

2.2.2. Self-injurious thoughts and behaviors interview-revised

The Self-Injurious Thoughts and Behaviors Interview-Revised (SITBI-R; Fox et al., 2020) is a clinician-administered interview administered at baseline to distinguish and characterize the features of various forms of self-directed violence (e.g., actual suicide attempts, interrupted suicide attempts, nonsuicidal self-injury). Participants were asked to report if they had ever engaged in each behavior at any point during their lives.

2.3. Randomization

The study design was a longitudinal, randomized, single-blind 2 (assessment) × 2 (intervention) factorial controlled trial. Using a stratified randomization procedure, participants were randomized to one of four groups that differed with respect to the level of patient-clinician collaboration during assessment + intervention: 1 = Low+Low [Interview+SPI], 2 = Low+High [Interview+CRP], 3 = High+Low [Narrative+SPI]), and 4 = High+High [Narrative+CRP].

Biological sex and lifetime history of suicide attempts are associated with suicide ideation; therefore, to control their confounding effects, stratified randomization was implemented. Two stratification variables were used for randomization: biological sex assigned at birth (male or female) and lifetime history of suicide attempts (0, 1, or 2+). To reduce bias, a computerized randomization list was generated using the Sealed Envelope tool (Sealed Envelope Ltd., 2021) by the first author (ML), who did not interact with study participants.

2.4. Assessment types

2.4.1. Low clinician-led collaboration (structured interview)

Participants assigned to this assessment were administered the full-scale lifetime/recent version of the Columbia-Suicide Severity Rating Scale (C-SSRS; Posner et al., 2011) by a research clinician. The C-SSRS collects information about a broad range of suicidal thoughts and behaviors during the respondent's lifetime and within the past month. The C-SSRS was selected for the structured interview because it is frequently used in clinical settings as a tool to guide in-depth suicide risk assessments and has been described by some as the "gold standard" method for assessing suicide risk (e.g., Food and Drug Administration, 2012), but does *not* involve a *clinician-led* narrative description of the patient's suicidal crisis that characterizes the therapeutic assessment approach.

2.4.2. High clinician-led collaboration (therapeutic assessment)

In contrast, participants assigned to the therapeutic assessment group were invited by the clinician to share the sequence of internal experiences (e.g., thoughts, emotions, physical sensations) and contextual factors (e.g., sights, sounds, situational variables) leading up to the participant's most recent suicidal crisis. In the narrative assessment (Bryan and Rudd, 2018), clinicians first invite participants to "tell the story" of their recent suicidal crisis or suicide attempt. Clinicians subsequently encouraged participants to continue their narrative with prompts such as "What happened next?" and asked participants to share their internal experiences and details about contextual factors relevant to the suicidal crisis. Thus, this assessment was *clinician-led*, and the clinicians offered support and validation during the assessment. The narrative assessment was selected for this study because it is used in multiple empirically-supported suicide-focused treatments (e.g., Bryan and Rudd, 2018).

2.5. Intervention types

2.5.1. Low collaboration (self-directed safety plan intervention)

Participants assigned to the SPI therapy received a digital copy of the Stanley-Brown safety plan form (Stanley and Brown, 2012). The clinician explained the purpose of the SPI and provided an overview of how it works, then directed the participant to fill in the form and ask any questions if needed. After the participants had finished, the study therapist reviewed the plan to assess its appropriateness and feasibility and to identify potential barriers to use. The study clinician concluded the session by encouraging the participant to review the plan frequently.

2.5.2. High collaboration (crisis response planning)

Participants assigned to the CRP intervention were directed by the research clinician to handwrite the plan on an index card or piece of paper. The clinician explained the purpose of the CRP, provided an overview of how it works, and then asked the participants if they would be willing to develop a plan collaboratively. While developing the plan, clinicians asked participants to identify options and then invited the participants to discuss each option to assess appropriateness and feasibility. When participants were unable to identify options, clinicians asked guiding questions to help. After the participant finished the plan, the study therapist reviewed it to assess its appropriateness and feasibility and to identify potential barriers to use. The study clinician concluded the session by encouraging the participant to review the plan frequently.

2.6. Research clinicians

Research clinicians were trained on all assessments and therapies. They included one Ph.D. counseling psychology student, one licensed clinical social worker, one unlicensed clinical social worker, and one postdoctoral counseling psychologist. Study clinicians met weekly with the investigators for supervision, case consultation, and fidelity monitoring. As part of the fidelity monitoring process, a senior licensed clinician (JCB) reviewed therapy session videos of all study clinicians to ensure the proper administration of assessments and interventions.

2.7. Ecological momentary assessment

We used a web-based application, SurveySignal (Hofmann and Patel, 2015), to send Qualtrics surveys at randomized intervals to obtain more fine-grained assessments of participants' suicidal ideation before and after their intervention. Participants received three assessments each day at randomly selected times within the following hours: 9 am and 1 pm., 1 pm and 5 pm, and 5 pm and 9 pm. Short-term changes (within hours) in suicidal ideation were assessed using three items from the Self-Injurious Thoughts and Behaviors Interview-Revised (Fox et al., 2020) designed to measure "passive" suicidal ideation (*I wish I could disappear or not exist, My life is not worth living, I wish I were dead*) and two items designed to measure "active" suicidal ideation (*Maybe I should kill myself*, and *I am going to kill myself*). Participants were asked to rate the intensity of each item "since you were last beeped…even if only a little bit" using the following scale: 0 = not at all, 1 = a little, 2 = a moderate amount, 3 = a lot, and 4 = a great deal. Item scores were summed to create a severity metric for suicidal ideation.

2.8. Sample size calculation

Statistical power for our primary outcome (suicidal ideation) was estimated using the General Linear Mixed Model Power and Sample Size (GLIMMPSE) calculator. Results of an earlier CRP trial, which compared two different versions of the CRP containing overlapping components (Bryan et al., 2017b), reported large within-group reductions in suicidal ideation (d = 1.9–2.1) and small between-group differences in mean suicidal ideation (d = 0.4) one-month post-intervention. Assuming a two-tailed alpha = 0.05, 20 % missing data (i.e., 68 of 84 planned assessments per participant, on average), four treatment groups, and a moderate intraclass correlation (ICC) of 0.2, $N = 80$ ($n = 20$ per group) provided 80 % power for our planned within-between analysis.

2.9. Data analytic approach

Analyses were conducted using an intent-to-treat approach, whereby all data available from all participants were used, regardless of dropout. Analyses were conducted using SPSS and RStudio. Based on best practices (Venables, 1998), the highest-order interaction term was used to interpret findings across models. Our primary analysis focused on between-within change in mean EMA suicidal ideation scores. Assessment (2: Structured interview vs. Narrative), intervention (2: SPI vs. CRP), and time (2: pre vs. post), and their interaction were entered as fixed effects. To account for repeated assessments within participants, we used longitudinal mixed effects models with participants as a random intercept. The severity of suicide ideation was entered as the outcome. To control for the number of responses from participants, it was included as a covariate in the model. A Generalized Linear Mixed Model (GLMM) was fitted by maximum likelihood with the Laplace Approximation. A Poisson distribution with a log link function was utilized to handle the count nature of suicide ideation severity. Planned contrasts included within-group and between-group differences in estimated marginal mean scores for suicidal ideation.

3. Results

Participant flow through the controlled trial is summarized in Fig. 1. The demographic and clinical characteristics of the participants assigned to each treatment group are summarized in Table 1. None of the baseline variables or pre-intervention levels of suicidal ideation significantly differed across groups (cf. Moher et al., 2010). Overall, 63 (76.83 %) participants reported at least one prior suicide attempt, and 38 (43.2 % of the full sample, 60.32 % of participants with a prior attempt) reported a history of two or more suicide attempts. The sample's mean SSI score at baseline ($M = 17.47$, $SD = 6.20$, range = 3–28) suggested suicide risk was severe on average and demonstrated a good amount of variance.

Estimated marginal means for short-term suicidal ideation across groups are summarized in Table 2. The main effect of time was significant, suggesting a decline in suicide ideation from pre- to post-treatment ($z = 3.79$, $p = .0002$). The assess*time was also significant ($z = 5.045$, $p < .0001$). The three-way assess*intervention*time interaction was statistically significant ($z = 1.97$, $p = .048$), indicating that a change in short-term suicidal ideation significantly differed across treatment groups. Overall, short-term suicidal ideation significantly declined from pre- to post-intervention in all four interventions, but the largest declines occurred in the High+Low [Narrative+SPI] group ($z = 10.95$, $p < .0001$, $d = 0.2575$), followed closely by the High+High [Narrative+CRP] group ($z = 7.27$, $p < .0001$, $d = 0.1944$). The next largest decline in suicidal ideation was in the Low+High [Interview+CRP] group ($z = 5.368$, $p < .0001$, $d = 0.12$) and the smallest decline was in the Low+Low [Interview+SPI] group ($z = 3.785$, $p = .0002$, $d = 0.0896$).

Follow-up comparisons examined changes in suicide ideation from pre-to-post treatment across groups. The reduction in suicide ideation for the High+Low [Narrative+ SPI] group was significantly more than the Low+Low [Interview+ SPI] group ($z = 5.045$, $p < .0001$, $d = 0.1679$) and the Low+High [Interview+CRP] group ($z = 4.262$, $p < .0001$, $d = 0.1375$). Similarly, the reduction in suicidal ideation for the High+High [Narrative+CRP] group also more than the Low+Low [Interview+SPI] group ($z = 2.985$, $p = .0028$, $d = 0.1047$) and the Low+High [Interview+CRP] group ($z = 2.209$, $p = .0272$, $d = 0.0743$). The High+Low [Narrative+ SPI] group and High+High [Narrative+CRP] group did not significantly differ ($z = 1.786$, $p = .0741$, $d = 0.0632$). The Low+Low [Interview+SPI] and the Low+High [Interview+CRP] groups also did not significantly differ ($z = 0.948$, $p = .3431$, $d = 0.0304$).

4. Discussion

Suicide is a leading cause of premature mortality (Garnett et al., 2022), and timely interventions are necessary so that high-risk individuals can implement evidence-based approaches to manage their suicide risk. This study is the first RCT to directly compare the effects of commonly used assessment and intervention strategies that differed in the degree of clinician-led patient-clinician collaboration on short-term suicidal ideation. EMA was utilized to collect suicidal thoughts in real-world, personally relevant settings for two weeks before and after interventions. Although the severity of suicidal ideation decreased in all groups, the two groups that included the narrative assessment had significantly larger pre-post reductions in suicidal ideation than the two groups that included a structured interview. Reductions in suicidal ideation did not differ by intervention approach, however. These findings suggest that collaborative risk assessment approaches can enhance the effects of safety planning-type interventions among patients with elevated risk for suicide versus checklist-based assessment approaches.

Supporting the therapeutic assessment approach (Hawton et al., 2022), these results highlight the value of giving participants an opportunity to share their internal experience and details about contextual factors relevant to the suicidal crisis, which may be therapeutic in itself.

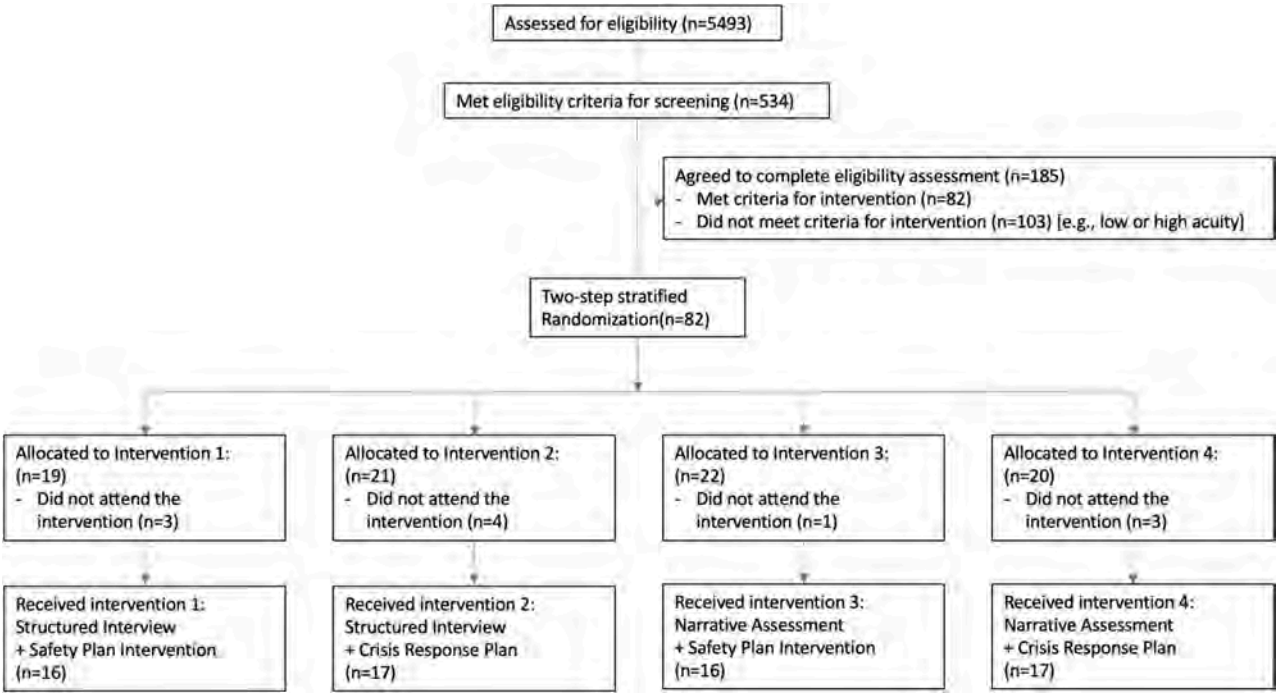

Fig. 1. A consort chart with participant flow through a randomized controlled trial to prevent suicidal ideation and risk in a high-risk national sample.

An important finding from this RCT is that a high level of clinician-led collaboration during the assessment phase of the clinical encounter had a larger effect on subsequent suicidal ideation than the level of collaboration during the treatment phase. These results suggest that collaborative relationship building at the beginning of the clinical encounter may be especially critical for short-term reductions in suicidal risk. One possible explanation is that the narrative assessment "primes the pump" for subsequent intervention. As applied to safety planning-type interventions, recounting the sequence of events and experiences leading up to a suicidal crisis may facilitate the patient's ability to identify personally relevant warning signs or indicators of an emerging suicidal crisis. This, in turn, may help patients use self-regulatory coping strategies with greater effect. Additional research is needed to replicate these findings in larger samples to further understand how clinician behaviors and engagement strategies can enhance suicide risk reductions.

In this study, the group that showed the smallest (albeit statistically significant) reduction in suicidal ideation combined a structured suicide risk assessment interview (the CSSRS) with a self-guided SPI, a specific combination of assessment and intervention approaches that is common in clinical practice (Brodsky et al., 2018; Joint Commission (2019). Although this particular combination had minimal pre-to-post effectiveness in reducing suicidal thoughts, our results suggest that increasing collaboration and clinician engagement either during the assessment or intervention phase can enhance intervention effects, with the largest potential gains coming from the adoption of a narrative assessment approach. Overall, our results support the therapeutic assessment and risk management framework (Hawton et al., 2022) and imply that clinical outcomes could be improved by implementing processes that are more collaborative and patient-centered.

Results also provide further evidence supporting CRP's effectiveness in reducing suicidal ideation, especially when integrated with the narrative assessment, thereby extending previous findings observed among U.S. military personnel receiving care in a medical facility (Bryan et al., 2017b) to a general population sample who received the intervention virtually. Our results also provide evidence that self-guided SPI can similarly reduce suicidal ideation, thereby addressing an important knowledge gap (Nuij et al., 2021). Previous research has shown an effect of CRP on suicidal ideation within the first hour of intervention (Bryan et al., 2017a). This study suggests the effects of CRP and other safety planning-type interventions may extend for up to two weeks post-intervention, a pattern that mirrors the short-term effects of ketamine (e.g., Abbar et al., 2022). Safety planning-type interventions may therefore represent a non-pharmacologic alternative to short-term risk reduction. Future studies comparing various combinations of safety planning-type interventions with ketamine and other pharmacologic agents should be conducted to examine potential synergistic effects and treatment-matching algorithms that can help clinicians determine which interventions are most likely to be effective for which patients.

A strength of this study was our use of EMA to assess suicidal ideation. This approach allows for more ecologically valid assessments that are less sensitive to retrospective biases than typical clinical trial designs (Davidson et al., 2017; Wilhelm and Grossman, 2010), which often assess suicidal ideation across much wider timeframes (e.g., weeks to months). Another strength of this study was our use of virtual platforms for delivering the intervention remotely. Suicide interventions have traditionally been delivered face-to-face within healthcare settings by licensed healthcare professionals. The use of virtual and remote technology-based systems to deliver mental health interventions has increased during the COVID-19 global pandemic and is expected to remain a commonly used delivery platform in the future. To our knowledge, this is the first study to examine the effectiveness of safety planning-type interventions administered completely remotely using remote technology. Our results provide preliminary evidence supporting the transportability of these interventions, which would improve scalability, especially for those who would prefer to receive support using telemental health services.

4.1. Limitations and future directions

The study findings should be interpreted with a few limitations in mind. First, this study's pre- and post-intervention follow-up period was brief, with short-term assessments for two weeks post-intervention to examine their effects on periodic changes in suicide ideation. However, longer follow-up periods would provide an understanding of the durability of intervention effects over time, which is an important future

Table 1
Baseline demographic and sample characteristics ($N = 82$). [a]

	Low + Low [Interview + SPI]	Low + High [Interview + CRP]	High + Low [Narrative + SPI]	High + High [Narrative + CRP]
	($n = 19$)	($n = 21$)	($n = 22$)	(n = 20)
Sex, n (%)				
Male	6 (31.6)	6 (28.6)	7 (31.8)	6 (30.0)
Female	13 (68.4)	15 (71.4)	15 (18.3)	14 (70.0)
Gender, n (%)				
Male	6 (31.6)	5 (23.8)	6 (28.6)	5 (25.0)
Female	10 (52.6)	13 (61.9)	15 (71.4)	12 (60.0)
Transgender (male to female	0 (0)	1 (4.8)	0 (0)	1 (5.0)
Transgender (female to male)	1 (5.3)	1 (4.8)	0 (0.0)	0 (0.0)
Genderqueer/ nonbinary	2 (10.5)	0 (0)	0 (0)	1 (5.0)
Other	0 (0)	1 (4.8)	0 (0)	1 (5.0)
Sexual orientation, n (%)				
Straight/ heterosexual	10 (52.6)	10 (47.6)	11 (52.4)	7 (35.0)
Gay/lesbian	0 (0)	2 (9.5)	1 (4.8)	2 (10.0)
Bisexual	7 (36.8)	6 (28.6)	6 (28.6)	7 (35.0)
Queer	1 (5.3)	1 (4.8)	1 (4.8)	2 (10.0)
Other	0 (0)	0 (0)	1 (4.8)	2 (10.0)
I don't know	1 (5.3)	1 (4.8)	1 (4.8)	0 (0.0)
Race, n (%)				
White	11 (57.9)	14 (66.7)	10 (47.6)	10 (50.0)
Black	3 (15.8)	3 (14.3)	5 (23.8)	4 (20.0)
Asian	2 (10.5)	1 (4.8)	1 (4.8)	4 (20.0)
American Indian/Alaskan	2 (10.5)	0 (0)	1 (4.8)	0 (0)
Multiracial	1(5.3)	2 (9.5)	0 (0)	2 (10)
Other	0 (0)	1 (4.8)	4 (19.0)	0 (0)
Attempter group, n (%)				
0	4 (21.1)	7 (33.3)	4 (18.2)	5 (25.0)
1	6 (31.6)	7 (33.3)	6 (27.3)	5 (25.0)
2+	8 (42.1)	7 (33.3)	11 (50.0)	10 (50.0)
Age, M (SD)	29.84 (6.83)	30.67 (8.16)	34.86 (9.32)	31.10 (10.57)
SSI, M (SD)	15.37 (7.36)	18.90 (5.21)	18.64 (5.31)	16.55 (6.49)
No. of prior attempts, median (IQR)	1 (4)	1 (3)	1.5 (3.5)	1.5 (3.25)

[a] Interview = Columbia-Suicide Severity Rating Scale (C-SSRS; Posner et al., 2011); Narrative = Narrative Assessment (Bryan and Rudd, 2018); SPI = Safety Plan Intervention (Stanley and Brown, 2012); CRP = Crisis Response Plan (Bryan and Rudd, 2018).

Table 2
Pre- and post-intervention estimated marginal mean suicidal ideation (log-transformed scale) across groups[a] and time, with effect sizes for within-subjects change from pre-to-post intervention.

Intervention group	Pre	Post	d_{within}
Low+Low [Interview + SPI]	4.83	4.74	0.0896**
Low+High [Interview + CRP]	5.16	5.04	0.1200***
High+Low [Narrative + SPI]	4.93	4.67	0.2575***
High+High [Narrative + CRP]	4.65	4.46	0.1944***

** $p < .01$.
*** $p < .001$.
[a] Interview = Columbia-Suicide Severity Rating Scale (C-SSRS; Posner et al., 2011); Narrative = Narrative Assessment (Bryan and Rudd, 2018); SPI = Safety Plan Intervention (Stanley and Brown, 2012); CRP = Crisis Response Plan (Bryan and Rudd, 2018).

direction for this work. Second, data were collected remotely from a community sample outside healthcare settings, which precluded access to information on other helpful metrics, such as suicide attempts post-intervention. Third, while participants were randomly sampled every few hours for 12 h a day for a total of 4 weeks, it is possible that changes occurred outside this timeframe. Future studies should provide a way for participants to report additional experiences of suicidal crisis even outside sampling windows. Fourth, the study occurred during the COVID-19 pandemic, but it was not specifically designed to study the pandemic. Because all study procedures were completed during COVID-19 and we utilized randomization, any effect on participant health and wellbeing should not have impacted one group more than another. Nonetheless, it is possible that the pandemic may have had an impact on the participants who were not directly assessed. Finally, the small sample size is a limitation, especially due to attrition post-randomization. Thus, further work is needed to replicate these findings in a larger sample and examine the ideal combination of clinician collaboration in suicide prevention interventions that are cost-conscious yet effective.

4.2. Conclusion

This RCT examined the optimal combination of clinician collaboration during the treatment of a high-suicide-risk community sample while suicidal thoughts were captured for two weeks before and after intervention in personally relevant real-world settings. Findings show the inclusion of the narrative approach with higher clinician collaboration during the assessment phase led to larger reductions in suicide ideation. Thus, clinician collaboration is critical to improving the effectiveness of suicide prevention interventions and should be included in the assessment of suicidal risk.

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CRediT authorship contribution statement

Monika Lohani: Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing. **Craig J. Bryan:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – review & editing. **Jamie S. Elsey:** Data curation, Investigation, Methodology, Project administration, Supervision, Validation. **Sam Dutton:** Data curation, Investigation, Methodology, Project administration. **Samuel P. Findley:** Methodology, Project administration, Supervision. **Scott A. Langenecker:** Funding acquisition, Investigation, Methodology, Project administration. **Kristen West:** Data curation. **Justin C. Baker:** Funding acquisition, Investigation, Methodology, Project administration, Supervision, Validation, Writing – review & editing.

Declaration of competing interest

Scott Langenecker has an interest in Secondary Triad, Inc. All other authors declare that they have no conflicts of interest.

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