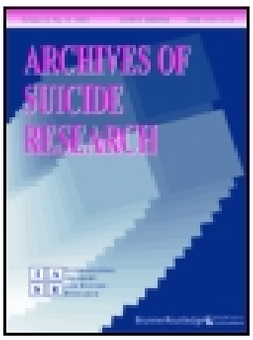

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Developing Adaptive Treatment Strategies to Address Suicidal Risk in College Students: A Pilot Sequential, Multiple Assignment, Randomized Trial (SMART)

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This pilot study investigated the potential to utilize adaptive treatment strategies for treating moderate to severe suicidal risk among college students. This article will describe the unique study design and report on feasibility and acceptability findings. A 2-stage Sequential Multiple Assignment Randomized Trial (SMART) was conducted: In Stage 1, 62 suicidal college students were randomized to either a suicide-focused or a treatment-as-usual condition (4–8 weeks). Those deemed insufficient responders were re-randomized to one of two Stage 2 interventions—both suicide-focused but one comprehensive and multimodal and the other flexible and theoretically agnostic (4–16 additional weeks). Recruitment rates were high, treatment dropout levels were lower than expected for the setting, study dropouts were rare, and counselors were able to deliver suicide-focused approaches with fidelity. Treatment satisfaction was high among clients and moderately high among counselors. Findings from this pilot show that a SMART is highly feasible and acceptable to suicidal college students, counselors, and campuses.

Keywords adaptive strategies, CAMS, college students, DBT, SMART, suicidality

Suicide is the second leading cause of death among individuals in the typical age range for college populations (Center for Disease Control and Prevention, 2015) and among college students specifically (Suicide Prevention Resource Center, 2004); 10% of college students report having attempted suicide in their lifetime and 1.5% in the past year (American College Health

Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/usui.

Association [ACHA], 2016). Over a third of students seeking services at college counseling centers (CCCs) report having seriously considered suicide (Center for Collegiate Mental Health or CCMH, 2017). CCCs are at the front line of treating suicidal students (Kay & Schwartz, 2010). CCCs are often overwhelmed, however, as half of them develop treatment waitlists that last all semester (Gallagher, 2012). Importantly, students with a lifetime history of "threat-to-self" symptoms use 20–30% more services than those who do not have such a history (CCMH, 2017).

Not all suicidal college students demonstrate the same level of risk or respond uniformly to treatments (Jobes, Jacoby, Cimbolic, & Hustead, 1997); however, there is no established guidance as to how CCCs can best utilize their limited resources with suicidal students (Lamis & Lester, 2011). There is a clear need for evidence-based guidelines regarding suicide-specific, least-restrictive, and cost-effective clinical care for suicidal college students (Jobes, 2016; Pistorello, Coyle, Locey, & Walloch, 2017). Uniform treatment of something as complex and heterogeneous as suicidal thoughts, feelings, and behaviors may not be adequate (Jobes, 1995, 2016). Furthermore, Franklin et al. (2017) have shown in a recent meta-analysis of 50 years of research that our traditional risk factor approach for suicidal thoughts and behaviors has not yielded desired gains. These authors suggest moving from a "one size fits all" approach to tailoring clinical work to different suicidal populations.

To this end, what appears to be needed are psychological treatment algorithms matching different treatments to different suicidal states. Thus, the optimal treatment of suicidal risk—henceforth SR—requires clinical care that is tailored, thus offering different types, doses, or sequences of treatment that correspond to different suicidal states and intensity (Jobes, 1995). To date, however, there have been no rigorous studies on the possible sequencing of SR treatments to determine what treatments work best for whom and at what level of intensity. Studies of this kind demand methodologies that go beyond the typical randomized controlled trial (RCT). For the purposes of this article, we are defining SR as "suicidal ideation in the past 2 weeks, including attitudes, behaviors, and plans," which takes into account severity, intent, and ability to cope with ideation without engaging in suicidal behaviors, such as planning/rehearsal, non-suicidal self-injury (NSSI), and suicide attempts.

ADAPTIVE TREATMENT STRATEGIES (ATSS)

Adaptive treatment strategies (ATSs; e.g., Marlowe et al., 2008) can be tested in a Sequential Multiple Assignment Randomized Trial (SMART; Lei, Nahum-Shani, Lynch, Oslin, & Murphy, 2012), examining a sequence of interventions that matches the heterogeneity of suicidal individuals' needs. A few SMART studies exist in the treatment of depression (e.g., Gaynes et al., 2005; Gunlicks-Stoessel, Mufson, Westervelt, Almirall, & Murphy, 2016), but none have specifically examined SR. Although depression correlates with SR (Kisch, Leino, & Silverman, 2005), meta-analyses suggest that treatments for depression may not impact suicidal ideation (Cuijpers et al., 2013). Data from various studies (e.g., Brown et al., 2005; Rudd et al., 2015) suggest that SR should be the focus of care independent of diagnosis (Jobes, 2000). Utilizing personalized adaptive strategies to directly treat SR with evidence-based interventions is a crucial next step and is the focus of the present study.

This article describes a pilot SMART for treating SR among suicidal college students using first and second line clinical interventions. SMARTs can be used to

identify the most effective ATSs, where " … the type or the dosage of the intervention offered to patients is individualized on the basis of patients' characteristics or clinical presentation and then are repeatedly adjusted over time in response to their ongoing performance" (Lei et al., 2012, p. 2). The sequence of interventions within an ATS can be based not only on an individual's characteristics but also on the individual's response to treatment, as in this study. ATSs are recommended when clients vary in their response to treatment, the effectiveness of an intervention changes over time due to waxing and waning of the problem, comorbid presentations may render treatment more complex, there is a high probability of relapse, intensive interventions are effective but costly, and adherence to intensive interventions is difficult to achieve (Lei et al., 2012). All of these conditions apply when treating SR at CCCs.

PILOT SMART AND THE SELECTION OF SUICIDE-FOCUSED INTERVENTIONS

Fully powered SMART designs are large, expensive, and generally multisite studies due to the large numbers of participants needed to answer ultimate questions. Such questions, in this case, will include which suicide-specific approach is most effective for suicidal students who do not initially respond to first-stage interventions; which sequence of treatments provides the best and most cost-effective outcomes; or issues of moderators of treatment response, and crucially, mechanisms of action. Because of their complexity and expense, SMART designs require a pilot study to allow for the development and testing of the methodology and its embedded interventions to ascertain its feasibility/acceptability for a future large-scale study—hence the pilot SMART described here.

Based on replicated randomized controlled trials, there are three major evidence-based clinical approaches for treating SR (Jobes, Au, & Siegelman, 2015): Dialectical Behavior Therapy (DBT; Linehan, 1993, 2015a); two forms of cognitive-behavioral therapy—cognitive therapy for suicide prevention (CT-SP; Brown et al., 2005; Wenzel, Brown, & Beck, 2009) and brief cognitive-behavioral therapy (BCBT, Rudd et al., 2015); and the Collaborative Assessment and Management of Suicidality (CAMS; Jobes, 2006, 2016). Of these, only DBT and CAMS have been specifically tested with suicidal college students seeking treatment at campus clinics.

Dialectical Behavior Therapy

Dialectical Behavior Therapy (DBT, Linehan, 1993, 2015a) is an empirically validated treatment designed for individuals with complex and severe mental health problems, including borderline personality disorder (BPD), SR, and NSSI. DBT is a multi-component behavioral treatment (Linehan, 1993, 2015a). While DBT preserves the overarching behavioral change focus of CBT, it postulates that a treatment that focuses solely on change can be invalidating for the client. Thus, acceptance-based strategies rooted in the philosophy of Zen practice are included in DBT.

Comprehensive DBT (Linehan, 1993) includes several months of weekly individual therapy, a weekly skills group, between-session skills coaching, and a weekly peer consultation group for the therapists. DBT has been shown to produce long-term gains for suicidal BPD clients across a variety of domains, including BPD symptoms, SR, suicide attempts, NSSI, psychiatric hospitalization, and social functioning (see Kliem, Kröger, & Kosfelder, 2010; Panos, Jackson, Hasan, & Panos, 2014 for recent reviews). A recent RCT found comprehensive DBT to be highly effective for treatment-seeking

suicidal college students with BPD features, depression, and a history of NSSI or suicide attempts, and particularly so for those lower in global functioning (Pistorello, Fruzzetti, MacLane, Gallop, & Iverson, 2012). Compared to an optimized control condition, those in the DBT condition showed significantly greater improvements in suicidal ideation, depression, number of NSSI events (when NSSI was present), and social adjustment after 7–12 months of treatment.

While effective, DBT requires specialized, time-consuming, and expensive training that is difficult or costly to implement with a large number of students (Chugani & Landes, 2016). Therefore, it would be very helpful to CCCs to be equipped with a less resource-intensive treatment, shorter in duration, and easier to disseminate as a first line treatment for SR.

Collaborative Assessment and Management of Suicidality

Collaborative Assessment and Management of Suicidality (CAMS) is an evidence-based suicide-specific approach developed and investigated in CCCs (Jobes & Jennings, 2011). CAMS is a "non-denominational" therapeutic framework for assessing and treating SR (Jobes, 2012, 2016). It is less resource-intensive and more adaptable than DBT; additionally, it may have differential utility depending on the nature of the suicidal state (Jobes et al., 1997; Jobes, Kahn-Greene, Greene, & Goeke-Morey, 2009). Guided by the "Suicide Status Form" (SSF), CAMS emphasizes collaborative assessment, treatment planning, and interim tracking of risk to achieve optimal clinical outcomes. CAMS philosophy underscores empathy for the client's suicidal struggle and collaboration between the client and clinician to identify client-defined problems, called suicidal "drivers," which are targeted and treated over the course of care (Jobes, 2016). Because clinicians can retain their theoretical approach, CAMS is well suited as a first-line suicide-specific intervention in CCCs.

In addition to non-randomized studies (Jobes, 2012), three RCTs have found that CAMS significantly reduces suicidal ideation when compared to control care-as-usual (Jobes et al., in press), as well as leading to significant reductions in overall symptom distress, while increasing hope and patient satisfaction in comparison to control care (Comtois et al., 2011). Moreover, CAMS performed similarly well as DBT in terms of reductions in NSSI and suicide attempts (Andreasson et al., 2016). Open trials of CAMS have shown significant reductions in SR and overall symptom distress in college student populations (Jobes et al., 1997, 2009).

The present study used these two suicide-specific approaches, CAMS and DBT, given that they both have been empirically validated and tested at a CCC with suicidal college students, and complement each other well in terms of implementation by stages, with a goal of cost effectiveness and ease of dissemination. As illustrated in Figures 1 and 2, four ATSs were used in this pilot study. Clients were initially randomized either to treatment as usual (TAU) or CAMS for 4 to 8 sessions. If by session 8 the client was not characterized as a sufficient responder (see below) by the counselor for 3 weeks in a row, clients were re-randomized either to CAMS for an additional 4 to 16 individual sessions or to DBT for an additional 4 to 16 individual sessions plus 10 skills training group sessions. If the client was a sufficient responder by session 8, treatment was ended or the client was monitored sporadically as is normal within the CCC. Thus, there were *four ATSs*. ATS1 (CAMS → CAMS): Start with CAMS; if responding, end treatment; if not, more CAMS. ATS2 (CAMS → DBT): Start with CAMS; if responding, end treatment; if not, DBT.

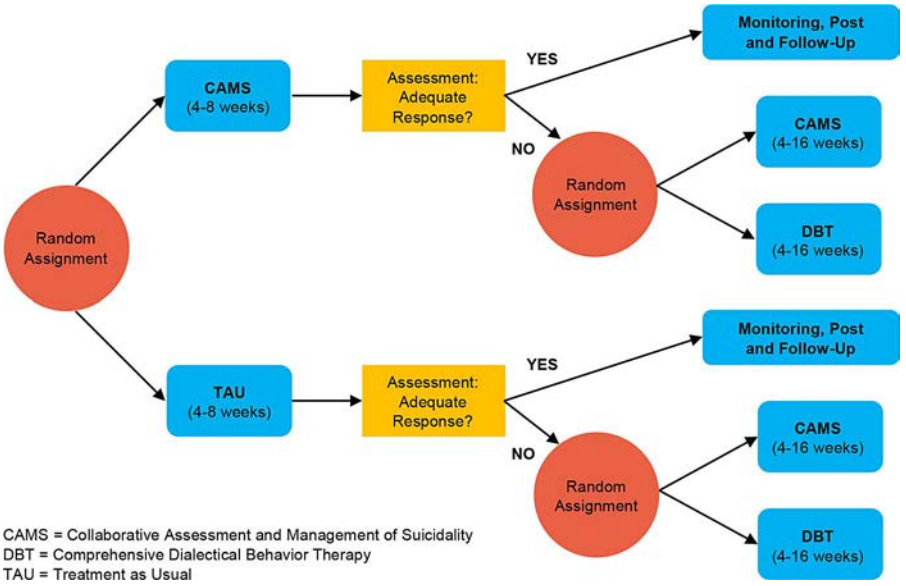

FIGURE 1. *Suicidal college student client flow through the SMART.*

ATS3 (TAU → CAMS): Start with TAU; if responding, end treatment; if not, CAMS. ATS4 (TAU → DBT): Start with TAU; if responding, end treatment; if not, DBT. We expected most students to resolve their SR in S1 and only one third to proceed to S2.

PRIMARY AIMS OF THIS PILOT SMART

The primary aim of this SMART pilot was to ascertain the feasibility of the study in terms of participant recruitment (numbers and diversity) and clinician adherence to treatment, and the acceptability of the adaptive strategies in terms of clients' attendance, treatment dropout, and response to treatment and clients' and clinicians' satisfaction with treatments. Unique to SMARTs are "tailoring variables" or variables upon which randomization or re-randomization is based (Almirall, Compton, Gunlicks-Stoessel, Duan, & Murphy, 2012)—in this case, sufficient response to treatment (in terms of counselors' clinical impressions of improvement in and severity of SR); therefore, an additional aim was to examine how to measure and manage the tailoring variable at the point of re-randomization.

METHOD

Participants, Inclusion/Exclusion Criteria, and Recruitment Procedure

This study was approved by the local Institutional Review Board and monitored by an independent Data and Safety Monitoring Board (DSMB). A total of 62 male, female, and transgendered college students enrolled in a mid-sized public university, seeking services at the campus clinic, and reporting moderate to severe suicidal ideation, participated in this pilot SMART. As recommended (Almirall et al., 2012), the sample size was based on the aim of gauging the feasibility/acceptability of the project and its embedded ATSs, rather than examining the clinical impact of intervention sequences.

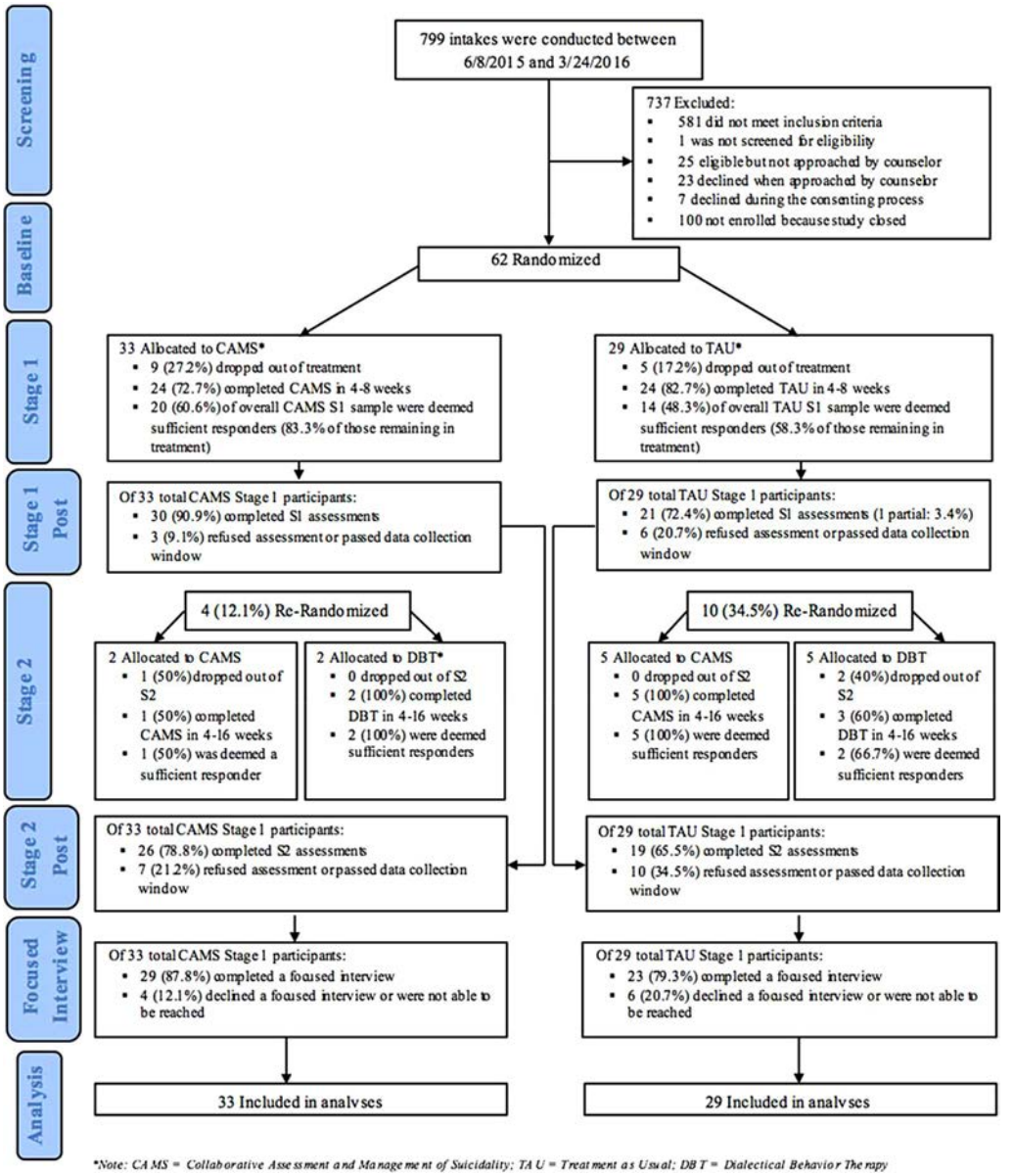

FIGURE 2. *CONSORT diagram. Flow of participants through SMART for suicidal college students.*

To be eligible for inclusion in the study, students had to be 18 to 25 years old and endorse a 2 or above on the Counseling Center Assessment of Psychological Symptoms (CCAPS-34; Locke et al., 2012) question, "I have thoughts of ending my life" (range is 0 *not at all like me* to 4 *extremely like me*). Students who met these criteria were invited to participate in the study regardless of diagnoses—unless deemed clinically inappropriate to receive services at the CCC (e.g., need for higher

level of care; severe psychosis) or inability to remain enrolled in school (e.g., failing all classes). Students in either category (less than 5% of cases) were triaged to off-campus treatments.

Students completed the CCAPS (Locke et al., 2012) before their initial appointment. Students meeting inclusion/exclusion criteria and interested in participating were scheduled to meet with an independent evaluator (IE). The IE consented each student to 1) be randomized to treatment in Stage 1 (4–8 weeks), 2) then proceed in a flexible ("adaptive") manner, depending on how they responded to treatment (e.g., end treatment after Stage 1 or be re-randomized to Stage 2 for an additional 4–16 weeks of treatment), and 3) potentially participate in a group in Stage 2.

Selection and Training of Counselors

Given the focus on effectiveness and dissemination, the study relied on seven existing staff members interested in working with suicidal individuals and learning new treatments. The counselors included four licensed psychologists and three trainees (two postdoctoral fellows and one social work intern). Theoretically, the therapists were psychodynamic (n = 1), integrative/humanistic (n = 3), and cognitive-behavioral (n = 3). None were familiar with CAMS prior to the study, and experience with DBT ranged from none (n = 3), to some (n = 2), to moderate/extensive (n = 2). CAMS training consisted of reading the CAMS book available (Jobes, 2006) and participating in a 2-day training and weekly phone conference consultation conducted by Dr. David Jobes, the developer of CAMS. DBT training followed the traditional "intensive" approach with an initial 5-day training, weekly webinars for 6 months to learn how to teach coping skills, and an additional 2-day training conducted primarily by Dr. Shari Manning—a recognized DBT trainer. The manual was the original DBT book (Linehan, 1993) and the revised skills training book (Linehan, 2015a). Weekly DBT peer consultation meetings with local team and monthly videoconference consultation with Dr. Manning continued throughout the study.

Assessments

Participants were assessed by the IE at baseline, after Stage 1 (S1 Post—approximately 8 weeks after baseline) and after Stage 2 (S2 Post—approximately 6 months after baseline). The IE read interview manuals, witnessed the administration of the interviews by a trained assessor, conducted practice interviews with feedback from trainer, and then co-rated interviews, with discussion on discrepancies, until reaching 100% agreement with trainer. Inter-rater reliability was checked by randomly rating 10% of the interviews. A 30-minute structured exit interview was conducted with participants after the S2 post. Audiotapes of the interviews were transcribed and emerging themes identified by independent qualitative researchers. Clients completed a brief questionnaire before each session and counselors filled out a clinical impression measure after each session. Counselors also completed treatment satisfaction measures at S1 and S2 post assessments.

Students were reimbursed for their participation in assessments at S1 post ($10) and S2 post ($20), with an additional $10 for attending each assessment the first time it was scheduled. Students were paid $40 for participating in the exit interview.

Screening and Baseline Measures. The measures utilized are described below.

CCAPS-34

The CCAPS has good psychometric properties (Locke et al., 2012). It has six

subscales and a Distress Index summary score. Students respond to questions based on a 5-point Likert scale, ranging from not at all like me to extremely like me. A question ("I have thoughts of ending my life") was used to screen prospective participants.

Scale for suicide ideation—current

The Scale for Suicide Ideation—Current (SSI; Beck, Brown, & Steer, 1997; Beck, Kovacs, & Weissman, 1979), an interviewer-rated measure with 19 questions related to the highest intensity of suicidal ideation in the past 2 weeks, including attitudes, behaviors, and plans, was administered at baseline. Each item is rated as 0, 1, or 2 and the total scale yields a score of 0-38. The SSI has good psychometric properties (Beck et al., 1997) and a score of 3 or above has been proposed as a cut off for identifying significant SR (Brown, Beck, Steer, & Grisham, 2000).

Beck hopelessness scale

The Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974) is a 20-item true/false measure that assesses negative expectations for the future. The scale has adequate psychometric properties and predicts subsequent death by suicide (Beck, Brown, & Steer, 1989). A cutoff of 9 has been recommended for identifying significant hopelessness (Beck, Brown, Berchick, Stewart, & Steer, 1990).

Personality assessment inventory

The Personality Assessment Inventory—Borderline Features scale (PAI-BOR; Morey, 1991) is commonly used to assess BPD features in college students (Trull, 1995). The scale consists of 24 items, rated on a 4-point scale, with a range of 0–72 (38 is the cut off for significant BPD features). It has excellent test-retest reliability, as well as good internal consistency and convergent and discriminant validity (Morey, 1991; Trull, 1995).

Measures to Assess for Sufficient Response to Stage 1 Interventions. For this pilot trial, sufficient treatment response was the primary tailoring variable. Although we originally planned to define treatment response as a stable pattern (3 consecutive weeks) of clients reporting no suicidal thoughts on the CCAPS, this strategy was quickly abandoned (see Discussion).

Clinical global impressions

Clinical Global Impressions (CGI; Guy, 1976) was instead used to define treatment response. Following each treatment session, the counselor used the 7-point Likert-style CGI to rate overall improvement in SR since baseline—from (1) *Very much improved* to (7) *Very much worse*—and current overall severity of suicidality—from (1) *Normal, not at all suicidal* to (7) *Extremely suicidal*. Both improvement and severity were rated by the clinician in terms of client's suicidal ideation and ability to cope with suicidal thoughts without engaging in suicidal behaviors. Sufficient treatment response was defined as an Improvement score of ≤2 ("much improved" or "very much improved") combined with a Severity score of ≤3 ("not at all suicidal," "minimally suicidal," or "mildly suicidal"). This combined score was chosen because the severity of SR, not just the improvement in symptoms, matters in terms of discontinuing treatment. Although some students continued to show emotional distress even after resolution of SR, for the purposes of this study, sufficient treatment response was focused on SR only, to facilitate the establishment of adaptive strategies for dealing with SR specifically in CCCs.

Satisfaction with Treatment and Acceptability of the Study. Self-report questionnaires and qualitative interviews assessed satisfaction with, and acceptability of, treatments and the study.

Client satisfaction questionnaire

The Client Satisfaction Questionnaire (CSQ-8; Attkisson & Zwick, 1982), a well-established 8-item self-report measure, assessed clients' satisfaction with treatment. This measure has adequate psychometric characteristics and has been used in other SMART feasibility studies (e.g., Gunlicks-Stoessel et al., 2016). Counselors completed an adapted version to assess their satisfaction with treatments. Clients' satisfaction can be deemed low (8 to 20), medium (21 to 26), or high (27 to 32). For counselors, the adapted CSQ-8 was locally created and there are no known norms; cut-offs from the original CSQ-8 are tentatively utilized.

Exit interview

The exit interview was conducted after participants completed the S2 post and contained questions about the acceptability of the study itself and the ATSs. Audiotapes of the interviews were transcribed and emerging themes identified by independent qualitative researchers through a general inductive approach (Thomas, 2006). Transcript paragraphs (raw data) were assigned initial emergent codes. Through several phases of examination, data coding was refined, and categories identified. Categories were then grouped and themes identified based on clusters of interrelated categories.

Monitoring of referrals into treatment

Study staff followed up with intake workers after each intake in which the client indicated moderate to severe suicidal ideation on the screening measure.

SMART Study Design and Interventions

As illustrated in Figure 2, suicidal students seeking services at a CCC progressed through two stages of intervention. In Stage 1 (S1), 62 participants were randomized using an adaptive-biased coin design (Wei & Lachin, 1988) to CAMS or Treatment-as-Usual (TAU) for 4–8 weeks, ensuring that both treatments were balanced with respect to gender, presence of a past suicide attempt, and current use of psychotropic medication. When a client was deemed a sufficient responder to S1 (see above), treatment ended or the client was monitored via sporadic sessions. In Stage 2 (S2), non-responders to either CAMS or TAU were re-randomized to 1) CAMS (continued or administered for the first time) or 2) comprehensive DBT (Linehan, 1993, 2015a), for an additional 4–16 weeks. This randomization was balanced for S1 assignment and gender. Both S1 and S2 treatments were conducted by the same therapists, unless a client requested otherwise, in order to mirror what happens in real world settings (a therapist tries one approach and then if that does not work, another) and to avoid the possibility that fears of abandonment would result in escalation of symptoms towards the end of S1 for some clients.

Stage 1 Interventions. Stage 1 (S1) treatment lasted 4–8 weeks. This treatment length fits with CAMS data showing an effect in six sessions or less with "acute resolvers" (Jobes et al., 1997) and matches the average number of sessions at CCCs (CCMH, 2017). However, students who appeared to be deteriorating (higher SR than at baseline for 3 weeks) could be re-randomized to S2 earlier.

CAMS

The CAMS (Jobes, 2006, 2016) manual was Dr. Jobes' then available book (2006). CAMS individual sessions were provided weekly for 50–60 minutes. See above for more details about CAMS.

TAU

The treatment as usual (TAU) condition was defined as the customary treatment a study counselor would utilize

as part of their clinical work. There was no attempt to control the type of intervention provided, with the exception that therapists were asked not to utilize CAMS or DBT strategies.

Both S1 conditions allowed for referrals for medication management or an existing clinic group (e.g., social anxiety) as long as it was not a DBT skills group. These referrals were at the discretion of the clinician and mirrored regular practice.

Stage 2 Interventions. In Stage 2 (S2) interventions (4–16 weeks), clients who remained in treatment and were not deemed sufficient responders based on the CGI-S and CGI-I were re-randomized to DBT or CAMS.

CAMS

Re-randomizing to CAMS (Jobes, 2006, 2016) was deemed appropriate because the standard dosage for CAMS is 12 sessions (Jobes, 2012). In S2, CAMS lasted at least 4 weeks, to be able to apply the 3 weeks in a row suicidal resolution criteria (Jobes, 2006, 2016), and up to 16 weeks.

Comprehensive DBT

Comprehensive DBT (Linehan, 1993, 2015a) in this study included weekly individual sessions (spaced out if clinically warranted), group skills training (sometimes conducted individually), weekly 2-hour peer consultation, and phone/text coaching (as needed). The 2-hour DBT skills training group lasted 10 weeks and was primarily focused on mindfulness and emotion regulation skills, given that these skills appear to result in the greatest impact (Dixon-Gordon, Chapman, & Turner, 2015).

Up to 16 weeks of comprehensive DBT was considered appropriate because investigations of DBT skills groups with college students have typically relied on durations of 8–12 weeks (Chugani, Ghali, & Brunner, 2013; Meaney-Tavares & Hasking, 2013) and previous studies of comprehensive DBT with college studies have found SR improvements as early as 3 months into treatment (Pistorello et al., 2012).

Adherence to Treatment. The study focused on line clinicians' ability to apply the suicide-specific approaches with reasonable fidelity. The first four sessions of a randomly selected CAMS S1 case were rated for adherence for each counselor. For DBT, a sample of approximately 10% of available DBT session tapes, or 1–2 per counselor for five counselors (two counselors did not have available tapes), were semi-randomly selected and rated for adherence.

RESULTS

Feasibility: Recruitment

There were two levels of recruitment, both of which were highly successful (see Figure 2): willingness of intake workers to refer into the study and of suicidal students to participate.

Did a Significant Number of Students Present with Moderate to Severe SR? In a period of 9 months, 218 students out of 799 (27%) seeking treatment indicated moderate to severe suicidal ideation on the question, "I have thoughts of ending my life."

Did Intake Workers Refer to the Study? Among the 117 intakes occurring with moderately to severly sucidal students. While recruitment was open, intake workers suggested the study to the client approximately 80% of the time. Intake workers noted not approaching students to participate in the study because they believed the suicidal ideation was in the past only (n = 6), recruitment into the study was closed (n = 5), or students' suicidality was not severe enough (n = 4); or because

students had been referred off-campus for services (n = 3), the intake was focused on crisis management (n = 3), or other (n = 4).

Did Suicidal Students Agree to Participate in the Study? Among the 92 eligible students invited to participate, 62 (67.4%) participated in the study. Although most students who declined participation during intake did not provide a reason ($n = 7$), others expressed ambivalence about treatment in general ($n = 6$) or lack of interest in targeting suicidality in treatment ($n = 4$), rescinded their endorsement of suicidality on the questionnaire ($n = 4$), or requested a particular treatment ($n = 2$). Among the 7 who expressed interest in the study at intake but then did not consent (3.2% of those eligible), the primary reasons for not participating were missing appointments with the IE ($n = 2$), not committing after hearing more about the study ($n = 3$), refusing to be videotaped ($n = 1$), and realizing they would not be in school long enough ($n = 1$).

During exit interviews with 52 study participants (83.8% of the intent to treat [ITT] sample), most students noted participating because of the study's relevance to them ($n = 21$), such as a good fit with their problems, good timing, and a desire for longer treatment. Another commonly cited reason was helping others/science ($n = 15$). Most students ($n = 32$) felt willing or unconcerned/indifferent about being randomized/re-randomized, although a few ($n = 8$) acknowledged having had some apprehension about being randomly assigned to treatment at the outset. Participants indicated that they would highly ($n = 43$) or likely ($n = 7$) recommend participation in a similar study to a friend (50/52 = 98% of those interviewed).

Feasibility: Sample Characteristics and Severity

Another aspect of recruitment success is whether or not the ITT sample is representative of the population sampled and showed significant SR. See Table 1 for baseline characteristics.

Was the Sample Diverse? Approximately half of the participants were 18–19 years old, college freshmen, and Caucasian; two-thirds were female and heterosexual. The study sample, relative to other treatment-seeking students at the CCC, had a higher percentage of freshmen and racial/ethnic and sexual minorities. Thus, this recruitment method resulted in a diverse sample in terms of race/ethnicity and sexual orientation. The study also reached students early in their college careers—a desired outcome given that freshman problems predict later functioning among college students without interventions (Zivin, Eisenberg, Gollust, & Golberstein, 2009).

Can a Brief Effectiveness-Based Screening Procedure Result in a Sample with Significant SR? In accordance with the study's emphasis on effectiveness, participants were screened for inclusion with one self-report question about suicidal thoughts routinely used in CCCs, followed by the intake worker's clinical judgment that suicidality would need to be addressed in treatment. This method of screening for SR closely mirrored the "real world" CCC setting.

As illustrated in Table 1, the final sample was characterized by high levels of depression, psychological distress, SR, hopelessness, and significant BPD features. Subscale scores of the CCAPS (Locke et al., 2012) placed 97% of the participants in the highly depressed (2.98, $SD = 0.65$) and 77% in the highly distressed (2.55, $SD = 0.62$) range (CCMH, 2015). The Suicidal Ideation Scale (SSI; Beck et al., 1979) scores suggested that this simple screening method correctly identified a sample marked by SR, with almost all participants (95.2%) meeting the cut-off score of 3 and above to identify significant SR (Brown et al., 2000) and average scores

TABLE 1. **Selected Participant Sample Characteristics at Baseline**

	ITT (n = 62)	
Characteristic	**Number**	**Percent**
Age		
18–19	32	52%
20–21	18	29%
22–23	7	11%
24–25	5	8%
Gender		
Female	42	68%
Male	19	31%
Transgender	1	2%
Sexual Orientation		
Heterosexual	38	61%
Lesbian/Gay	6	9.7%
Bisexual	6	9.7%
Questioning	6	9.7%
Other/Not reported	6	9.7%
Race / Ethnicity		
African American / Black	2	3%
American Indian/Pacific Islander	0	0%
Asian American / Asian	10	16%
Hispanic / Latino/a	5	8%
Multi-racial	15	24%
White / Caucasian	30	49%
Previous Suicide Attempts Interview		
None	43	69%
One	13	21%
Two or more	6	10%
Scale for Suicidal Ideation - Current (SSI-C) Interview Total		
Score of ≥3*	59	95%
Beck Hopelessness Scale (BHS) Self-Report Total		
Score of ≥9*	49	79%
Counseling Center Assessment of Psychological Symptoms-34 (CCAPS-34) Self-Report Subscales		
Depression - Score of ≥1.75	60	97%
Distress Index - Score of ≥2.15	48	77%
Personality Assessment Inventory – Borderline Features Scale (PAI-BOR) Self-Report Total		
Score of ≥38*	44	71%

**Note.* Scale for Suicidal Ideation-Current (SSI-C; Beck et al., 1979) ≥ 3 has been suggested as a cutoff for greater suicidal risk (Brown et al., 2000). Beck Hopelessness Scale (BHS; Beck et al., 1974) indicates significant hopelessness at cutoff score of 9 or above (Beck et al., 1990); Counseling Center Assessment of Psychological Symptoms-34 [CCAPS-34; (CCMH, 2015)] elevated scores for clinical significance are ≥1.75 for depression and ≥2.15 for the Distress Index Score among college students in treatment [(CCMH, 2015), p. 23]. Personality Assessment Inventory – Borderline Features Scale (PAI-BOR; Morey, 1991) has a cutoff score of 38 for significant BPD features.

($M = 13.75$, $SD = 6.06$) falling within severe levels of suicidal ideation (cf. Comtois et al., 2011). Approximately 80% of participants had cutoff scores of 9 or above on the BHS, which indicates significant hopelessness (Beck et al., 1990). One third of this young sample (most were 18–19 years old) reported having had at least one prior suicide attempt and 71% received a positive screen for significant BPD features at baseline (38 or above on the PAI-BOR; Morey, 1991).

Feasibility: Treatment Adherence

To assess CAMS adherence, each therapist's first four CAMS digitally recorded sessions from an S1 case were scored by 2 coders using version three of the CAMS Rating Scale (CRS.3; Corona, 2017). The CRS.3 has 14 items rated on a seven-point Likert scale ranging from 0 (*Poor*) to 6 (*Excellent*). Adherence assessments included items 1 to 12 and covered domains like collaboration (4 items), suicide focus (1 item), risk assessment (1 item), treatment planning (3 items), intervention (2 items), and overall adherence (1 item). Average scores in each domain were generated across coders. Inter-rated reliability was high (overall adherence [ICC (3,3) = .779]). Clinicians demonstrating average scores of 3 (satisfactory) or above in each domain and on the overall adherence item in four consecutive sessions were considered adherent.

The overall average CAMS adherence score in S1 was high (4.88 [$SD = 1.16$] on a 0–6 scale) and well above the adherence cut-off score of 3. Six of the seven CAMS clinicians satisfied the requirements of a 3 or above in individual area (e.g., suicidality, collaborative) and the overall adherence score, suggesting that CAMS can be reliably disseminated within CCC settings.

Approximately 10% of available DBT tapes per counselor were rated for adherence. Unfortunately, some therapists had no videotapes available for coding because only seven participants were randomized to DBT in S2 and two dropped out relatively early. Consequently, only one or two sessions across five therapists (out of seven) were rated for DBT adherence. A total of seven recordings were rated, selected in a quasi-random fashion due to availability of digitally recorded.

The University of Washington Dialectical Behavior Therapy Adherence Coding Scale (DBTACS; Linehan & Korslund, 2003) was utilized to check DBT adherence. A score of 4.0 is the "red line" measure of adherence. Five out of five therapists rated obtained scores at or above the cut-off for adherence for at least one tape; one of the seven tapes was rated slightly below the cut-off (3.8). This suggests that it is feasible for line therapists to deliver DBT with adequate fidelity in a CCC, although DBTACS scores are specific to a given session and only when multiple consecutive sessions are rated can a therapist be considered "adherent."

Acceptability: Attendance, Treatment Attrition, and Sufficient Response

Did Clients Attend Sessions and Stay in Treatment at Expected Levels? Treatment completion was based on counselors' perceptions that clients were sufficient responders (S1/S2) or the maximum number of sessions was reached (S2). Although S1 allowed for a minimum of four sessions, 41 (66.1%) participants completed all eight sessions (average = 6.76, SD = 2.32). Nine (27.2%) CAMS participants and five (17.2%) TAU clients were treatment dropouts; this difference was not significant ($X^2(1) = .88$, $p = .34$; see Figure 2). The 22% S1 treatment dropout rate is somewhat lower than the 32.1% reported across CCCs nationally (CCMH, 2017).

S2 allowed for 4–16 individual sessions, although DBT clients were

encouraged to complete the 10-week group even when SR decreased. Among the 14 individuals re-randomized to S2, the mode number of individual sessions was 16 ($n = 4$, 28.5%) and the average was 11.5 ($SD = 4.2$). As illustrated in Figure 2, seven participants were allocated to each treatment condition in S2 and a total of five in DBT (71.4%) and six in CAMS (85.7%) completed treatment—resulting in comparable treatment dropout rates to those in S1 and this setting (CCMH, 2017).

The SMART resulted in four ATSs, with variable numbers of participants proceeding to S2: ATS1: Started with CAMS; if responding, ended treatment; if not, more CAMS ($n = 2$). ATS2: Started with CAMS; if responding, ended treatment; if not, DBT ($n = 2$). ATS3: Started with TAU; if responding, ended treatment; if not, CAMS ($n = 5$). ATS4: Started with TAU; if responding, ended treatment; if not, DBT ($n = 5$). Due to the low sample size per ATS, analyses at S2 are not meaningful, but descriptives on S2 satisfaction and treatment response are reported here for exploratory purposes. Although some participants declined continued participation in study assessments, only one participant was dropped from the study officially due to refusal to participate in the S2 treatment assigned (DBT).

What Percentage of the Sample Was Sufficient Responders? Based on counselors' endorsement of CGI-I and CGI-S, 20 CAMS participants (60.6% of the ITT sample and 83.3% of treatment completers) and 14 TAU participants (48.3% of the ITT sample and 58.3% of treatment completers) were deemed sufficient responders and ended treatment after S1; some continued to be monitored via sporadic sessions. Treatment response was not significantly different across conditions in S1 ($X^2(1) = .94$, $p = .44$). Among the 14 students re-randomized to S2 interventions, 10 (71.4%) responded sufficiently to S2 treatment; non-responders were maintained in therapy or referred to off-campus resources.

Acceptability: Treatment Satisfaction

Were Clients Satisfied with the ATSs? CSQ scores indicated that on average, clients were highly satisfied with S1 treatment ($Mean = 27.43$, $SD = 3.82$, $n = 51$) and there was no difference across conditions ($Mean_{CAMS} = 27.89$, $SD = 3.90$, $n = 28$; $Mean_{TAU} = 26.86$, $SD = 3.73$, $n = 23$; F (1, 49) = .90, $p = .34$).

S1 treatment responders' CSQ scores ($Mean = 28.62$, $SD = 3.32$, $n = 32$) were significantly higher than non-responders' scores ($Mean = 25.42$, $SD = 3.84$, $n = 19$; F (1, 49) = 9.82, $p = .003$). There was no difference in treatment responders' satisfaction across conditions (Responders' $Mean_{CAMS} = 29.20$, $SD = 2.69$, $n = 20$; Responders' $Mean_{TAU} = 27.67$, $SD = 4.14$, $n = 12$; F (1, 30) = .1.62, $p = .212$).

Fourteen clients were re-randomized to S2 and their satisfaction with treatment throughout the whole ATS, not just S2, was measured. CSQ scores indicated that on average, clients were moderately to highly satisfied with the sequence of treatments received in the study (CAMS → CAMS, CAMS → DBT, TAU → CAMS, TAU → DBT; $Mean = 26.81$, $SD = 4.91$, $n = 11$). The sample was too small to calculate statistical differences among the ATSs.

What Did Clients like about the Interventions? During exit interviews, participants stated that they liked how "tailored" the interventions seemed to their specific needs ($n = 8$), skill-building and acquiring tools for coping ($n = 5$), group counseling ($n = 2$), and how structured the treatment was ($n = 1$). Participants also noted appreciating learning to help themselves ($n = 6$), coping with problems ($n = 4$), coping with suicidal drivers ($n = 3$), gaining self-awareness ($n = 3$), and

articulating their wants/needs ($n = 1$). Eleven participants also stated that they liked their counselor.

Seven out of eight clients interviewed who were re-randomized to S2 (87.5%) offered positive statements about receiving a different kind of treatment in S2 regardless of how they had initially felt about being re-randomized.

Were Counselors Satisfied with the ATSs? Assuming that client-based CSQ norms (Attkisson & Zwick, 1982) can be applied to the provider-based CSQ, counselors were, on average, moderately satisfied with S1 treatments ($Mean = 24.98$, $SD = 5.6$, $n = 61$), with no difference across conditions ($Mean_{CAMS} = 24.75$, $SD = 6.21$, $n = 32$; $Mean_{TAU} = 25.24$, $SD = 4.94$, $n = 29$; $F(1, 49) = .11$, $p = .73$).

However, counselors were *highly satisfied* with S1 treatments when the client was deemed a treatment responder: Scores given to S1 treatment responders ($Mean = 27.97$, $SD = 4.37$, $n = 34$) were significantly higher than those for non-responders ($Mean = 21.22$, $SD = 4.67$, $n = 27$; $F(1, 59) = 33.70$, $p = .000$). There was no difference across conditions among responders (Responders' $Mean_{CAMS} = 27.95$, $SD = 4.88$, $n = 20$; Responders' $Mean_{TAU} = 28.00$, $SD = 3.70$, $n = 14$; $F(1, 32) = .001$, $p = .974$).

Counselors' satisfaction with the ATSs (measured at the end of S2) fall in the moderately satisfied range ($M = 24.64$, $SD = 3.47$, $n = 11$), although scores appeared higher with treatment completers.

DISCUSSION

Summary of Findings

This study explored the feasibility and acceptability of conducting a SMART, and its four ATSs, with treatment-seeking suicidal college students. Results supported the feasibility of clinic staff referring into the study, suicidal students agreeing to participate, a simple and "real world" screening procedure identifying SR, and counselors implementing suicide-focused approaches with fidelity.

Both suicide-focused (CAMS) and not suicide-focused (TAU) S1 treatments were highly acceptable to clients and moderately so to counselors, without condition differences. Clients progressing to S2 had slightly lower (but still adequate) satisfaction scores, possibly because re-randomized clients were making less progress. Treatment dropout rates were somewhat lower than national averages. Only one individual refused to continue with a randomized approach at S2 (this person was withdrawn from the study).

This study suggests that CAMS is a readily disseminate approach as a first line intervention for SR, even among counselors unfamiliar with CAMS and from various theoretical orientations. DBT adherence ratings also suggest that DBT is feasible and can be disseminated at CCCs, but these findings are not conclusive due to the small sample size. Because treatment fidelity was itself a study outcome, study counselors were not informed of their adherence ratings until the end of the study. The integration of adherence feedback into supervision would likely have increased adherence even further.

The present study was not designed to examine the relative efficacy of the ATSs. A much larger study will be needed to identify the most effective and cost-effective sequence of care for SR treatments in CCCs. Rather, present findings pave the way for a fully powered, ideally multisite study, given that this pilot SMART trial with suicidal college students at a CCC was found to be feasible and acceptable.

A key feature of a SMART is the use of a tailoring variable during re-randomization. Several findings (quantitative and qualitative) from this pilot are relevant to a large-scale SMART investigating ATSs.

Lesson Learned: How to Measure Sufficient Response to Treatment

The choice of how to measure the tailoring variable, i.e., whether someone was a sufficient responder or not (Almirall et al., 2012) and therefore could stop treatment at S1, evolved in three related ways during the study.

Client Versus Counselor Support. The original plan was to use client self-report via the CCAPS-34 suicidal ideation question (Locke et al., 2012) as the sole criterion for classifying participants as treatment responders. However, counselors soon noted that these scores did not match clinicians' (or clients') perceptions of resolution of SR: Some clients presented with "persistent high distress" CCAPS profiles (CCMH, 2015), though progress could be easily discerned by the counselor and fidelity coding team. It was decided that the counselor, in consultation with the client, would become the primary reporter using a locally created version of a CGI scale (see Method).

Resolution of Suicidal Risk. Early on, resolution of SR was defined as a score of *zero* on the CCAPS suicidal thoughts question for three consecutive appointments. In recent years, however, clinicians and experts have concluded that complete elimination of suicidal thoughts in brief therapy may be unrealistic (Jobes, 2016). For example, the CAMS criteria for resolution have shifted from the absence of suicidal thoughts to reduced intensity of such thoughts and the ability to manage suicidal thoughts and behaviors (Jobes, 2016). In DBT, suicidal overt behaviors (NSSI, suicide attempts, rehearsals) are addressed in individual therapy first, followed by SR without intent. This stance also fits with mindfulness- and acceptance-based approaches, such as acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 2012), which argue that well-practiced thoughts may continue to occur almost in an automatic fashion, but the key is to learn to relate to such thoughts in a different manner. Thus, occasional suicidal thoughts that are well-managed by clients (no intent/rehearsal/recent actions) can be considered on track for "resolution."

Resolution of Suicidal Risk But Continued Suicidal Risk Factors. A challenge counselors encountered when rating treatment response was whether to focus on SR and behaviors or on risk factors that may be related to suicidality (e.g., depression, anxiety, substance abuse). We opted to focus on suicidal thoughts and behaviors to rate treatment response for several reasons. First, NIMH recommends a focus on specific issues, not diagnoses (National Institute of Mental Health (NIMH), 2015). Second, the CCC setting is often restricted to brief therapy (CCMH, 2017); therefore, creating ATSs focused on resolving all SR-related risk factors might not be useful or easily disseminated. In a CCC setting, a practical solution might be to focus on SR and behaviors and then to make community referrals if risk factors remain. This may be an easier to implement system because finding community referrals willing to accept actively suicidal students is far more difficult than finding referrals to treat continuing depression/anxiety. Thus, the choice was made to focus on resolution of SR and behavior as the main criterion for gauging response to treatment.

CONCLUDING REMARKS

The "Zero Suicide" policy movement calls for raising the standard of care for SR (Hogan & Goldstein-Grumet, 2016). Suicide is the second leading cause of death on college campuses and with limited resources, CCCs must find better ways of effectively identifying, assessing, and

treating suicidal clients in cost-effective and least-restrictive ways. Experts are becoming increasingly critical of the over-use of very brief and non-suicide focused hospitalizations and the over-reliance on medications for SR, both of which may be iatrogenic in some cases (Jobes, Rudd, Overholser, & Joiner, 2008; Large, Ryan, Walsh, Stein-Parbury, & Patfield, 2013; Linehan, 2015b). Furthermore, experts believe that it is protective for suicidal college students to remain on campus if possible, staying engaged in classes and student life (Lamis & Lester, 2011).

Given these considerations, the goal of this research program is to learn how to effectively manage the spectrum of suicidal presentations, by developing well-matched sequences of effective interventions that can be disseminated and are cost-effective. These issues are well-suited to SMART designs that "can be used to test strategies that mimic sequences that are commonly used in practice and used to inform practice guidelines" (Sherrill, 2016, p. 524).

A thoroughly powered SMART may be able to elucidate for whom more intensive, multimodal treatments like comprehensive DBT are needed, and in what sequence first line treatments should be deployed (e.g., TAU or CAMS first?). By examining the baseline or early treatment response characteristics that can inform these crucial clinical decisions, limited CCC resources might be used more efficiently and effectively to decrease suicidal suffering and help save lives.

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