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Impact of a Suicide-Specific Intervention within Inpatient Psychiatric Care: The Collaborative Assessment and Management of Suicidality

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A growing body of literature indicates that suicidal patients differ from other psychiatric patients with respect to specific psychological vulnerabilities and that suicide-specific interventions may offer benefits beyond conventional care. This naturalistic controlled-comparison trial (n = 52) examined outcomes of intensive psychiatric hospital treatment (mean length of stay 58.8 days), comparing suicidal patients who received individual therapy from clinicians utilizing the Collaborative Assessment and Management of Suicidality (CAMS) to patients whose individual therapists did not utilize CAMS. Propensity score matching was used to control for potential confounds, including age, sex, treatment unit, and severity of depression and suicidality. Results showed that both groups improved significantly over the course of hospitalization; however, the group receiving CAMS showed significantly greater improvement on measures specific to suicidal ideation and suicidal cognition. Results are discussed in terms of the potential advantages of treating suicide risk with a suicide-specific intervention to make inpatient psychiatric treatment more effective in reducing risk for future suicidal crises.

Although various authors have rightly commented on the paucity of evidence for therapeutic interventions for suicidal patients (Leenaars, 2011; Linehan, 2000), the evidence base has shown accelerating growth in recent years (Ellis & Goldston, 2012). These studies have demonstrated the effectiveness in reducing suicidality with dialectical behavior therapy (DBT; Linehan et al., 2006), cognitive therapy (CT; Brown et al., 2005), and mentalization-based therapy (MBT; Bateman & Fonagy, 2008, 2009), among others.

The Collaborative Assessment and Management of Suicidality (CAMS), in development over the past two decades (e.g., Jobes, 2006, 2012), is not considered a brand of psychotherapy, but rather is a collaborative framework for working with suicidal patients, independent of therapeutic orientation. Research evidence thus far suggests promise. For example, in one nonrandomized control comparison study, CAMS was associated with rapid reductions in suicidal

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ideation in comparison with usual treatment (Jobes et al., 2005). Moreover, compared to usual care, CAMS was also significantly linked to decreases in primary care and emergency department utilization room settings in the 6-month follow-up. Additional support for the impact of CAMS was demonstrated in a recent randomized clinical trial (Comtois et al., 2011) which showed that patients who received a fairly brief course of outpatient CAMS care had significant reductions in suicidal thinking and overall symptom distress, with increased hope and reasons for living at 12-month follow-up in comparison with enhanced care as usual patients. In addition, CAMS patients were significantly more satisfied with their care in comparison with usual care and showed better overall retention to treatment.

In a related development, our team has modified CAMS for a unique form of inpatient suicide-specific care (see Ellis, Allen, Woodson, Frueh, & Jobes, 2009; Ellis, Daza et al., 2012; and Ellis, Green et al., 2012 for descriptions of the modifications, implementation, and protocol). In an open pilot trial with 20 patients (Ellis, Daza et al., 2012; Ellis, Green et al., 2012), we demonstrated safety and feasibility of this approach within an inpatient environment, acceptability by patients and staff, and significant symptom improvement among participants. Treatment effect sizes were large: 2.28, 0.92, and 1.38 for depression, hopelessness, and suicidal ideation, respectively.

Because the lack of a comparison group precluded attributing causation to CAMS, the current study was designed to replicate and extend the pilot findings, consistent with Rounsaville's stage model of treatment research development (Rounsaville, Carroll, & Onken, 2001). In this model, treatment research progresses from feasibility testing (open trial), to "tinkered" pilot testing, to larger randomized efficacy trials. In the current study, we sought specifically to address the question of whether the use of CAMS with suicidal psychiatric inpatients would meaningfully supplement the therapeutic benefits above and beyond those already obtained from intensive, psychotherapeutic, milieu-based inpatient treatment. This multimodal inpatient treatment has been shown to be highly effective in reducing depression severity over a hospital course of 4 to 6 weeks (Clapp et al., 2013). In the current investigation, because randomization of patients to conditions is not possible due to the nature of the treatment setting, we used propensity score matching (Austin, 2011; Rosenbaum & Rubin, 1983) to create a comparable control sample of patients matched on variables related to suicide risk and treatment response. This methodology enabled us to approximate many of the virtues of a randomized control trial design by statistically managing a range of possible "third variables" that could cloud understanding of the causal impact of the treatment conditions (i.e., the differential impact of CAMS-informed care in comparison with existing care).

METHOD

Setting

The Menninger Clinic is a private, not-for-profit, 120-bed psychiatric hospital in Houston, Texas. Patients typically manifest multiple comorbid conditions, prominently mood disorders, anxiety disorders, substance-related disorders, and personality disorders. Most patients are referred following unsatisfactory response to prior medical and/or psychological treatments. Approximately 60% of patients are from outside of Texas. Typical lengths of stay in the hospital range from 4 to 8 weeks. The treatment program includes general medical care, pharmacotherapy, physical activities (as tolerated by the individual), twice weekly individual and twice weekly group psychotherapy, daily psychoeducational groups, family work, and leisure-time social/recreational activities. These interventions are employed in the context of a therapeutic milieu that includes continuous nursing care as well as

patient government and ample opportunity for spontaneous interactions among patients. Data for this study were aggregated for three adult treatment programs, including one for young adults (Compass), one for professionals in crisis (PIC), and one for adults with relatively chronic disorders (HOPE).

Participants

This study included 52 participants ranging from 18 to 68 years of age (M = 32.87, SD = 13.57). Most participants (69.2%) were female, and a large majority (92.3%) were Caucasian. The greatest number of participants reported completing a Bachelor's degree (38.5%) followed by some college (30.8%) and a professional degree (13.5%). The average length of stay for the present sample was 58.8 days. All individuals in the current study reported some form of suicidality (ideation or attempts) within weeks of admission. The number of reported lifetime suicide attempts ranged from zero to seven (M = 1.81, SD = 1.71). Fourteen participants (26.9%) reported no lifetime attempts, 12 (23.1%) reported one attempt, and 26 (50.0%) reported multiple attempts.

Measures

The *Columbia-Suicide Severity Rating Scale* (C-SSRS; Posner et al., 2011) is a clinician-administered rating scale measuring past and current suicidal ideation and behavior. It measures four constructs: severity, intensity, behavior, and lethality; it has shown excellent internal reliability and good convergent, divergent, and predictive validity (Posner et al., 2011).

The *Patient Health Questionnaire* (PHQ-9; Spitzer, Kroenke, & Williams, 1999) is a 9-item self-report measure assessing the presence of depressive symptoms in the prior 2 weeks, via four Likert-type answer choices ranging from *not at all* to *nearly every day* (Spitzer et al., 1999). The PHQ-9 is considered a reliable and valid measure of depressive symptoms (Löwe, Kroenke et al., 2004; Löwe, Unützer et al., 2004; Löwe, Gräfe et al., 2004).

The *Beck Scale for Suicide Ideation* (BSS; Beck & Steer, 1991) is a self-report instrument consisting of 21 sets of statements containing content such as wish to live, wish to die, frequency of ideation, perceived capability to carry out an attempt, and extent of actual preparation. Statements within each item are graded according to severity and scored from 0 to 2. Possible scores range from 0 to 38 (a sum of the 19 items included in the total). The BSS is widely used in suicide research and has demonstrated predictive validity for suicide attempts and deaths by suicide (Brown, Jeglic, Henriques, & Beck, 2006).

The *Beck Hopelessness Scale* (BHS; Beck & Steer, 1993) is a 20-item self-report instrument intended to measure negative future thinking. Items are rated as true or false, with approximately half of the items reverse coded. Hopelessness as measured by the BHS has been shown to be a key mediator between depression and suicidal ideation and has proven predictive validity for deaths by suicide (Brown et al., 2006).

The *Suicide Cognitions Scale* (SCS; Bryan et al., 2014) is a self-report instrument consisting of 18 items that are rated on a 5-point scale according to strength of belief. The items were constructed to be consistent with the suicidal schemas of unbearability (e.g., "I can't stand this pain anymore") and unlovability (e.g., "I am completely unworthy of love"). The instrument is scored by summing ratings across items, resulting in a range of possible scores from 18 to 90. The SCS has excellent psychometric qualities, having been shown to exhibit several forms of reliability and validity (Ellis & Rufino, 2014; Rudd et al., in press).

Procedures

This study was approved by the institutional review board of Baylor College of Medicine, with the oversight of a data safety monitoring board. Eligibility for the study

was determined by patients' responses to the C-SSRS, which is administered routinely to all patients as part of baseline and follow-up assessments. Patients were invited into the study if they endorsed any of the following within 2 months of admission: suicidal intent with or without a plan, frequency of suicidal ideation two to five times a week or more, duration of suicidal ideation 1 to 4 hours or more, or controllability of ideation endorsed as "with a lot of difficulty" or "unable to control." Patients with active psychosis or cognitive impairment (assessed by means of a thorough review of each patient's psychiatric and psychological evaluations) were excluded. Patients who met inclusion criteria were approached and invited to participate in the study. Among patients approached, 82% consented to participate. Following consent, the remaining measures (described earlier) were administered at admission, at 2-week intervals, and prior to discharge.

Treatment Conditions. This was a nonrandomized, naturalistic comparison study (see Figure 1 for CONSORT diagram). This was a convenience sample, with participant selection closed after a reasonable number of CAMS cases had been completed, after which the matching TAU sample was selected. Group membership was determined via clinical referrals made through a combination of request by the patient's treatment team and availability of a CAMS-trained therapist at the time of referral for individual therapy. All participants received intensive inpatient treatment, as described earlier. In addition to other interventions, the hospital plan of care includes two 50-minute individual psychotherapy sessions per week. The two treatment conditions for this study differed only in that patients in the CAMS condition received individual therapy from a therapist trained in a version of CAMS adapted for use at the Menninger Clinic (Ellis, Daza et al., 2012; Ellis, Green et al., 2012), whereas patients in the TAU condition received individual therapy from a therapist who had not been trained in CAMS. Therapists in both conditions consisted of experienced doctoral level psychologists and masters level clinical social workers. Patients who received less than a "minimal dose" of four CAMS sessions were excluded from the analysis; the actual number of sessions ranged from 10 to 29 ($M = 14.62$ $SD = 4.40$).

As described in previous publications (Ellis, Daza et al., 2012; Ellis, Green, et al., 2012), CAMS refers to a structured, collaborative approach to risk assessment, treatment planning, alliance-building, and risk reduction with suicidal patients, created by Jobes (2006). CAMS is not construed as a therapy per se, but more as a "platform" or framework for treatment, regardless of therapeutic orientation. Special emphasis is placed on cultivating a spirit of collaboration with the patient on tasks such as developing a shared understanding of the suicidal episode and planning for safety, both during the hospital stay and postdischarge. It also directly addresses specific psychological vulnerabilities to suicidality, such as hopelessness and self-hatred.

CAMS conceptualizes suicidality as a dysfunctional coping response, and thus as a primary problem rather than a symptom of illness. Therefore, suicidal ideation and behavior are kept at the forefront of therapy. A major agenda item for the therapy is developing a shared understanding of how the suicidal experience unfolds for the patient in terms of the contributing psychological factors and typical situational triggers, cognitions, impulses, behaviors, and emotions. Particular attention is paid to patient-defined suicidal "drivers" that impel the patient to consider suicide. Treatment is thus driver-focused, emphasizing the development of skills and techniques that address the drivers. Within the CAMS framework, the full range of clinical techniques can be incorporated to develop alternate coping responses in the pursuit of a postsuicidal life defined by purpose and meaning. A variety of interventions are thus used to these ends; clinicians' own

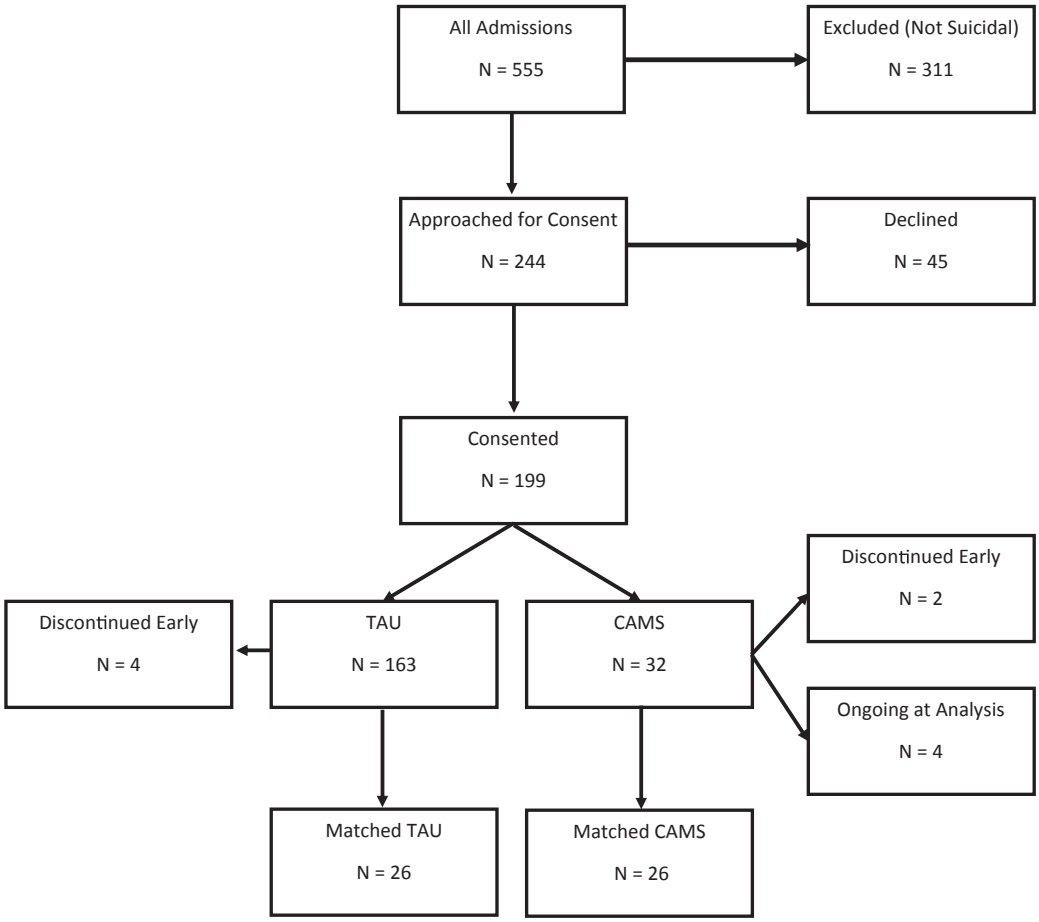

Figure 1. Consort table.

techniques or others borrowed from DBT, CT, or mentalization approaches may be imported into the patient's care (e.g., the use of coping cards, chain analysis, safety planning, a Hope Kit, and other self-soothing techniques; Linehan, 1993; Wenzel, Brown, & Beck, 2009).

Data Analysis

Propensity Score Matching. As previously noted, the current study used propensity score matching (PSM), in which the groups were matched based on a propensity score, or balancing score, so the distribution of baseline covariates was similar in both groups (Austin, 2011; Rosenbaum & Rubin, 1983). Once the groups were matched based on the propensity score, the treatment effects could be directly compared, ensuring results related causally to treatment, not to baseline third variable confounds (Austin, 2011).

The use of PSM has expanded considerably in recent years. A review by Stürmer et al. (2006) found a total of eight published studies using propensity scores prior to 1998, yet that number increased to 71 in 2003 alone. While this methodology was originally more popular in a traditional medical model (Stürmer et al., 2006), it has recently gained popularity among psychiatric (Hansen et al., 2012; Marangell et al., 2008) and psychotherapy treatment researchers as

well (Bartak et al., 2010; Barth et al., 2007; Ye & Kaskutas, 2009).

Reliable Change Index. A Reliable Change Index (RCI) was calculated to help ensure that the magnitude of change over the course of treatment was due to treatment provided in each condition and not merely measurement error (Jacobson et al., 1999). The RCI divides the magnitude of change over the course of treatment by the standard error of the difference score (see Jacobson et al., 1999). Per the developers' criteria, an individual with a reliable change index score above 1.96 is classified as showing clinically significant improvement.

RESULTS

Propensity score matching was used to match the CAMS and treatment as usual (TAU) groups for age and gender. Groups also were matched by hospital treatment program to ensure that roughly equal numbers of participants came from each of the three participating programs within the hospital. In addition, because the most severely suicidal patients often are referred for treatment by a CAMS-trained therapist, groups also were matched for suicide severity and prior suicide attempts. Descriptive statistics for each of these variables are provided in Table 1.

Comparison of CAMS to TAU

As a result of PSM, comparisons of scores at admission revealed no significant differences between the CAMS and TAU groups for any of the control variables, including BSS: $F(1,50) = 1.90$, p = ns; SCS: $F(1,50) = 0.08$, p = ns; BHS: $F(1,50) = 0.00$, p = ns; and PHQ-9: $F(1,50) = 0.08$, p = ns.

Next, 2 × 2 mixed model ANOVAs were conducted to determine the effect of treatment condition. Results revealed significant interactions for time and treatment course for both of the suicide-specific measures. More specifically, for the BSS, results revealed that patients receiving CAMS showed greater improvement at a faster rate, $F(1,49) = 6.88$, $p < .05$, $\eta^2 = .12$, with CAMS accounting for 12% of the variance (see Figure 2). On the BSS, mean scores for the CAMS group decreased from 12.88 (SD = 8.70) to 1.58 (SD = 3.25) from admission to discharge, whereas mean scores for the TAU group changed from 9.44 (SD = 9.60) to 3.60 (SD = 6.71). Similarly, for the SCS, results showed that patients treated with CAMS showed significantly more improvement with regard to suicidal cognitions compared with patients receiving TAU, $F(1,49) = 4.26$, $p < .05$, $\eta^2 = .08$, with CAMS accounting for 8% of the variance (see Figure 3). On the SCS, mean scores for the CAMS group decreased from 52.27 (SD = 16.21) to 26.69 (SD = 9.94) from admission to discharge, whereas mean scores for the TAU group changed from 50.68 (SD = 14.89) to 33.40 (SD = 15.84).

For the nonsuicide-specific measures, the BHS and the PHQ-9, the main effects for time were significant [BHS: $F(1,49) = 68.80$, $p < .001$, $\eta^2 = .58$; PHQ-9: $F(1,49) = 117.58$, $p < .001$, $\eta^2 = .71$]. On the BHS, mean scores for the CAMS group improved from 12.35 (SD = 4.68) to 4.35 (SD = 4.20) from admission to discharge, while mean scores for the TAU group decreased from 12.68 (SD = 4.86) to 7.28 (SD = 5.30). On the PHQ-9, mean scores for the CAMS group improved from 18.96 (SD = 5.37) to 6.88 (SD = 4.48) from admission to discharge, while mean scores for the TAU group decreased from 18.40 (SD = 7.57) to 9.04 (SD = 7.27). However, the interaction of time and treatment course was not significant [BHS: $F(1,49) = 2.59$, p = ns, $\eta^2 = .05$; PHQ-9: $F(1,49) = 1.89$, p = ns, $\eta^2 = .04$], indicating that although patients treated with CAMS improved significantly over time, they did not improve to a significant degree beyond the TAU group with regard to depression and hopelessness. Table 2 provides means, standard deviations, and Cohen's d effect sizes for all

TABLE 1
Descriptive Statistics on Matching Variables

	CAMS	TAU
Gender	n = 17 female; n = 8 male, n = 1 transgender	n = 19 female; n = 7 male
Age	M = 32.42; SD = 14.19	M = 33.31; SD = 13.19
Previous attempts	M = 1.85; SD = 1.32	M = 1.77; SD = 2.07
Ideation intensity	M = 15.15; SD = 5.39	M = 14.54; SD = 3.89
Treatment program	PIC; N = 4	PIC; N = 8
	HOPE; N = 9	HOPE; N = 7
	Compass; N = 13	Compass; N = 11

Note. PIC, Professionals in Crisis program; HOPE, Hope Program for Adults; Compass, Compass Program for Young Adults.

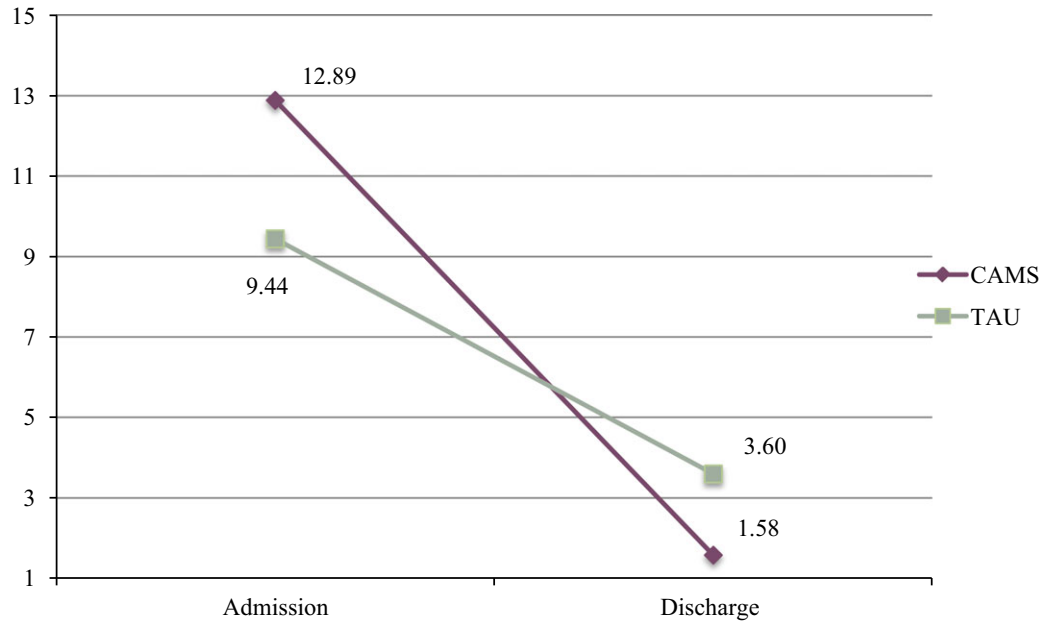

Figure 2. Change in suicidal ideation by treatment group (Beck Scale for Suicidal Ideation).
Note. CAMS, Collaborative Assessment and Management of Suicidality; TAU, treatment as usual.

measures, allowing for a direct comparison between the CAMS and TAU groups.

Reliable Change Index

As shown in Table 3, on the RCI, 12 patients in the CAMS group showed clinically significant improvement on the BSS compared with only two patients in the TAU group. On the SCS, 15 patients in the CAMS group showed clinically significant improvement compared with 12 patients in the TAU group. For the PHQ-9, 21 CAMS patients displayed clinically significant improvement compared with 18 patients in the TAU group. No patient in either group showed clinically significant deterioration on the BSS, SCS, or PHQ-9. Twelve patients in the CAMS group showed clinically significant improvement on the BHS, while no patients deteriorated; 11 patients in the TAU group had an RCI evidencing clinically significant

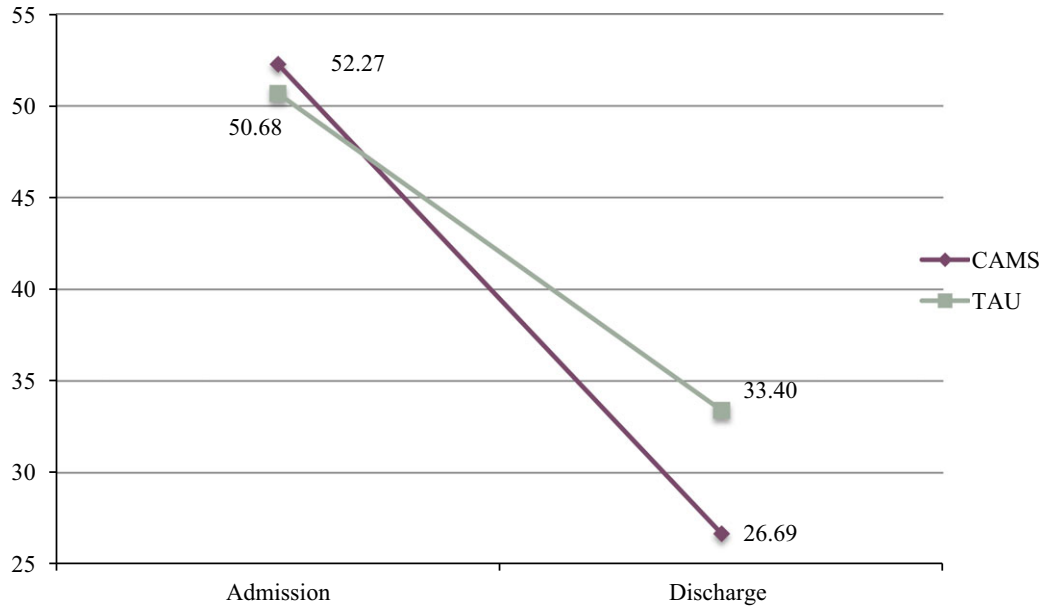

Figure 3. Change in suicide cognitions by treatment group (Suicide Cognitions Scale total scores).
Note. CAMS, Collaborative Assessment and Management of Suicidality; TAU, treatment as usual.

TABLE 2
Pre–Post Means Comparisons on Main Outcome Measures

	CAMS			TAU		
	Admission	Discharge	Cohen's *d*	Admission	Discharge	Cohen's *d*
BSS	12.88 (8.70)	1.58 (3.25)	1.72	9.44 (9.60)	3.60 (6.71)	0.71
BHS	12.35 (4.68)	4.35 (4.20)	1.80	12.68 (4.86)	7.28 (5.30)	1.06
SCS	52.27 (16.21)	26.69 (9.94)	1.90	50.68 (14.89)	33.40 (15.84)	1.12
PHQ-9	18.96 (5.37)	6.88 (4.48)	2.44	18.40 (7.57)	9.04 (7.27)	1.26

Note. BSS, Beck Scale for Suicide Ideation; BHS, Beck Hopelessness Scale; SCS, Suicide Cognitions Scale; PHQ-9, Patient Health Questionnaire, depression subscale; CAMS, Collaborative Assessment and Management of Suicidality; TAU, treatment as usual.

TABLE 3
Number of Patients Meeting Criteria for the Reliable Change Index

	BSS		SCS		BHS		PHQ-9	
	CAMS	TAU	CAMS	TAU	CAMS	TAU	CAMS	TAU
Improvement	12	2	15	12	12	11	21	18
Deterioration	0	0	0	0	0	1	0	0

Note. BSS, Beck Scale for Suicide Ideation; BHS, Beck Hopelessness Scale; SCS, Suicide Cognitions Scale; PHQ-9, Patient Health Questionnaire, depression subscale; CAMS = Collaborative Assessment and Management of Suicidality; TAU, Treatment as usual.

improvement on the BHS, while one patient displayed deterioration.

DISCUSSION

This naturalistic comparison study replicates and extends findings from an earlier pilot study (Ellis, Daza et al., 2012; Ellis, Green et al., 2012), showing that patients who received multimodal inpatient treatment with CAMS showed significantly greater improvement in suicidal ideation and suicidal cognition at discharge compared with patients receiving similar inpatient treatment, although with conventional individual therapy. This outcome occurred in the context of a relatively low-powered sample and despite the fact that patients referred for CAMS trended toward more severe suicidal ideation at admission relative to the comparison group. Overall, these findings are consistent with prior studies indicating that CAMS is a safe and effective approach to working with suicidal individuals (e.g., Comtois et al., 2011; Ellis, Daza et al., 2012; Ellis, Green et al., 2012). Patients receiving individual psychotherapy from CAMS and non-CAMS-trained therapists showed similar improvements on more general measures of depression and hopelessness; yet, consistent with the suicide-specific focus of the psychotherapy, patients receiving CAMS showed a selective additional impact in the domain of suicidal ideation. The lack of differences on nonsuicide-specific measures suggests that the better outcomes on suicide-specific measures are not attributable to a difference in general clinical skills between the two groups of therapists.

Evidence of added benefit from CAMS is especially noteworthy inasmuch as large treatment effects were expected for both groups, given a multifaceted, intensive treatment program that included various psychotherapeutic interventions together with nursing care, medication, a therapeutic milieu, and passage of time. All else being equal, the CAMS emphasis on a consistent collaborative therapeutic relationship with a focus on contributors to suicidal states, along with routine assessment of progress with regard to problems associated with suicide, evidently makes a significant difference. These findings are consistent with those of Comtois et al. (2011), whose brief CAMS intervention in a randomized trial resulted in significant advantages 12 months later.

These findings, while promising, must be considered in light of several limitations. Most obviously, patients were not assigned to treatment groups randomly. As a relatively small, clinically oriented facility, the Menninger Clinic is not situated for randomization of treatments. However, this limitation is moderated through the use of propensity score matching, which controlled for a number of possible confounds, including prior suicide attempts, treatment unit, and severity of suicidal ideation. Another caveat pertains to generalizability. Patients in this study were predominantly White, with above average socioeconomic status. It is possible (perhaps likely) that educational level, cultural differences, and related issues affect response to this psychotherapeutic intervention. Replication studies with more diverse populations are therefore essential before these results can be generalized. Finally, as noted previously, the average 6 week length of stay at Menninger is highly unusual for inpatient psychiatric settings. Additional studies at more typical facilities with more diverse patient populations will be needed before generalizability of the CAMS benefit can be inferred.

In conclusion, these data provide solid support for the supplemental benefit of using a suicide-specific intervention for suicidal psychiatric inpatients. The life or death implications of effective treatment for suicidal patients and their families are profound, particularly in relation to the known risk period following psychiatric inpatient discharge. To this end, it behooves clinicians to make every possible effort to target and treat suicide specifically as a means of maximizing therapeutic benefit for a most concerning population.

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