



ORIGINAL ARTICLE

Pilot study of the Collaborative Assessment and Management of Suicidality—Group

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Abstract

Introduction: Few evidence-based options exist for outpatient treatment of patients at risk of suicide, and to-date almost all research has focused on individually delivered psychotherapy. Group therapy for veterans at risk of suicide is a promising alternative.

Methods: Thirty veterans receiving care at an urban Veterans Affairs Medical Center in the southern United States were randomized to either care as usual (CAU) or to CAU plus the Collaborative Assessment and Management of Suicide-Group (CAMS-G). Veterans were assessed prior to randomization to condition and at 1, 3, and 6 months post-randomization on a range of suicide-specific measures, burdensomeness, belonging, treatment satisfaction, and group cohesion.

Results: Across measures and follow-up assessments, veterans in CAMS-G reported good satisfaction with the intervention, a sense of cohesion with other members of the group, and reduced symptom distress. Veterans in both conditions reported decreases in suicidal ideation and behavior, with CAMS-G participants potentially improving slightly faster.

Conclusion: This description of CAMS-G for veterans adds to the growing literature on suicide-specific interventions and supports the need for additional research to determine if wide-spread rollout is justifiable.

KEYWORDS

acceptability, feasibility, suicide-specific group therapy, veterans

BACKGROUND AND SIGNIFICANCE

Our military and veteran population are presently at increased risk for suicide when compared to the general population (Sher & Yehuda, 2011; Ursano et al., 2015). Research into the veteran population and clinicians' approaches to treating those at elevated risk of suicide is essential. To date, the existing studies on treatments

for suicide are dominated by empirical investigations of those with a history of attempting suicide identified and treated in hospital emergency departments or on inpatient units. Remarkably limited attention has been focused on outpatient-based identification and treatment. However, the best current evidence for treating suicide risk lies in highly structured suicide-focused outpatient care (Brown et al., 2005; Jobes et al., 2015). Thus,

a promising strategy for preventing suicide would be to respond effectively to those seeking outpatient care for suicidal thoughts, feelings, and/or behaviors (Comtois & Linehan, 2006).

This pilot study was designed to assess the use of the Collaborative Assessment and Management of Suicidality (CAMS; Jobes, 2016) in a group setting. CAMS is a therapeutic framework designed to modify how clinicians engage, assess, and provide suicide-specific/problem-focused treatments and interventions with patients who are at risk of suicide (Jobes, 2016). CAMS is predicated on two important theoretical considerations: (1) collaborating is the key to a strong clinical alliance and good clinical care, and (2) focusing on suicide as a target of treatment can help create *patient* motivation to live which is critical to success. This second consideration is receiving increasing attention (Tucker et al., 2015), suggesting that aggressively treating those factors which most make patients want to die (i.e., patient-defined suicide “drivers”) may be the most important component of successful CAMS care.

To the best of the authors’ knowledge, no research has been published on group treatments for individuals at risk of suicide beyond the CAMS-G development work cited. The first groups for veterans at risk of suicide offered in a VA clinical setting were informed by both VA’s extensive experience with group therapy for a range of clinical issues (e.g., post-traumatic stress disorder) and the seminal work of group therapy researchers (Yalom & Leszcz, 2005). Yalom warns to not mistake the appearance of efficiency, such as that which is seen in highly structured, manual driven group therapy, for true effectiveness, which is attained by including the crucial component of the interpersonal interaction in the here-and-now.

CAMS-G offers an efficient goal-directed approach that also harnesses the effectiveness of the interpersonal process. Yalom readily accepts that naming specific therapeutic factors impacting change are somewhat arbitrary in that the process is enormously complex, and different therapists and participating individuals may all cite different things as being the most impactful. However, he identified eleven therapeutic factors that, based on research, experience, observations, and participant feedback, he believes constitute an effective group therapy approach.

Prior to adding the group dynamic, the CAMS philosophy (Jobes, 2016) already overlaps with some of Yalom’s endorsed therapeutic factors like installation of hope, helping the client realize that he is not unique in his experiences, imparting information about the nature of suicidality, and collaborating with the client to develop coping skills like socializing techniques. The CAMS-G group derivation of the CAMS approach maintains each

of these factors and strengthens their effectiveness by adding the impact of the group members and their interactions with each other. With the addition of the group members, and the focus on finding commonalities between them, offering assistance to each other, learning from each other, and building relationships, the CAMS-G approach further overlaps with Yalom & Leszcz’s (2005) therapeutic factors of altruism, imitative behavior, interpersonal learning, and group cohesiveness. Like in Yalom’s writings, the CAMS-G approach capitalizes on the ability of the group members to validate each other’s worthiness. These approaches also both help increase group members’ comfort with self-disclosure and willingness to try new ways to cope with ongoing problems while also deactivating negative beliefs about themselves and the world, thus impacting changes in their thoughts, behaviors, and actions.

CAMS AND CAMS-G

Most relevant to the current study, CAMS was evaluated in a randomized controlled trial of 148 suicidal US Army Soldiers. Although patients in both CAMS and treatment as usual (TAU) demonstrated significant clinical improvement, the CAMS patients’ suicidal ideation was significantly reduced more rapidly than TAU, in 6–8 sessions at the 3-month assessment and sustained at 6 and 12 months (Jobes et al., 2017). It appears that CAMS may produce faster treatment effects and associated decreases in distress, but that TAU produces similar overall effects eventually.

A group version of CAMS (CAMS-G) evolved after VA treatment providers showed an interest in offering group treatment for veterans at risk for suicide. Based on Joiner’s (2005) theory that implicates failed belongingness and a sense of burdensomeness as main contributors to suicidality, a group setting offers opportunities for group members to develop relationships, a sense of belonging, and perhaps a sense of purpose (in helping one another). The group setting also allows for the ultimate collaborative experience while working directly on individuals’ drivers of suicide in that the collaboration would not just be with a therapist, but with a group of peers with similar experiences as related to suicidality. The developers of the CAMS-G treatment manual hypothesize that collaborating with group members and group facilitators to first understand why they want to die by suicide and how to address those reasons is supported by decreases in burdensomeness and failed belonging. Burdensomeness is addressed by contributing to group members’ understanding of their own suicidality and development of healthy coping strategies. Failed belonging

is addressed by feeling like an important and valued member of the group.

This group process has been described previously (Johnson et al., 2014, 2019). A feasibility trial conducted at a VA community-based outpatient clinic (Gutierrez et al., 2020) supported the utility of the clinician manual and training model. CAMS-G is an open-enrollment group generally capped at 6–8 participants who attend weekly 90-min groups until meeting resolution criteria as assessed with the Suicide Status Form (SSF; Jobes, 2016) described in detail below. As members meet resolution criteria, they are replaced with new eligible members. Group sessions are co-facilitated by two trained clinicians who ensure SSF ratings are completed each week, sessions stay focused on the participants' drivers of suicide, and that crisis response and treatment plans are reviewed and updated as needed.

METHODS

Participants

Veterans from an urban Veterans Affairs Medical Center (VAMC) in the southern United States who were identified as suicidal by VA clinicians were referred to study staff for determination of eligibility. Potential participants were informed that they could volunteer to participate in an unfunded study of group therapy for veterans experiencing suicidal thoughts, feelings, and/or behaviors. They were told the weekly groups would focus identifying and treating the factors contributing to their suicidal thoughts, feelings, and/or behaviors. The study duration and nature and timing of assessments were also explained. Finally, they were told that regardless of condition, they would continue to have access to all other treatments offered at the VAMC. Following the consenting process, each participant was randomly assigned to care as usual (CAU) or to CAU plus CAMS-G. CAU could have included any combination of individual and group therapy for specific disorders and medication management. No other suicide-specific group interventions were available as CAU. Baseline assessments took place before the participant was assigned to a treatment condition. Follow-up assessments were completed at 1-, 3-, and 6 months post-assignment to condition. Study staff administering the assessments were blind to condition and the blind was not broken over time. In addition to outcome measures, data were also gathered on clinicians' adherence to the CAMS-G treatment manual. All study procedures and materials were reviewed and approved by the relevant VA and university institutional review boards.

Because veterans could not be compensated for their time and other challenges related to conducting unfunded research (e.g., relying on volunteer staff), recruitment was not as successful as would have been ideal and ultimately 30 veterans were consented and randomized to condition; 16 to CAMS-G and 14 to CAU. Given the limitations of the sample size, a minimization randomization algorithm was used that matched on sex, history of suicide attempts, and recruitment from inpatient or outpatient setting. Minimization randomization has been encouraged as an alternative to a stratification random strategy in clinical trials with limited sample size, as it requires fewer combinations on matching variables (Comtois et al., 2011). Groups were conducted as described in Gutierrez et al. (2020). Due to the much smaller than planned sample size, the research team decided to proceed with all planned assessments and comparisons, but findings are presented with the caveat that most if not all analyses are under-powered. Results should therefore be considered descriptive and not stringent hypothesis tests.

Baseline measures

The following measures were completed by participants when they met with study staff to sign the consent form.

Military Suicide Research Consortium Demographic Form (Ringer et al., 2018)

This form provides broad coverage of individual demographic information, such as age, birth sex, gender, racial background, employment status, and income, as well as military service information.

Self-Harm Behavior Questionnaire (SHBQ; Gutierrez et al., 2001)

The SHBQ was designed as a self-report measure composed of four sections, each assessing different facets of suicidality (Gutierrez & Osman, 2008). However, it was administered as an interview, so that follow-up questions could be asked, as it was during initial development of this instrument. Reliability analyses suggest high Cronbach alpha estimates for scores on all SHBQ subscales (Gutierrez & Osman, 2008) and Fliege et al. (2006) reported strong test-retest reliability estimates for each subscale over intervals of 7–150 days for adult psychiatric inpatients. Analyses of data from a large study of active duty U.S. service members at risk of suicide support reliability, validity (Gutierrez et al., 2019), and

predictive validity (Gutierrez et al., in press) of the SHBQ total score. Internal consistency reliability estimates (alpha) for the total score (0.79), suicide attempt (0.91), and self-harm subscales (0.90) in the current sample were all consistent with previous research. This measure provided data for determining the impact of CAMS-G on suicide-specific behaviors over time. The suicidal ideation and suicide threats subscale scores were not used in analyses.

Beck Scale for Suicidal Ideation (BSS; Beck & Steer, 1991)

The BSS is a self-report 21-item survey that explores behaviors, attitudes, and suicidal intent over the course of the last week (Brown, 2002). The first 19 items have scores ranging from 0 to 2 and assess the intensity of suicidality. The total score is a sum of these 19 items and ranges from 0 to 38. The last two items explore history of suicide attempts and the intention to die and do not factor into the total score. The internal consistency reliability has been consistently high, with a coefficient alpha at 0.87 or higher (Brown, 2002). Validity, reliability, and predictive validity of the total score are also supported for service members at risk of suicide (Gutierrez et al., 2019; in-press). The internal consistency reliability estimate (alpha) in the current sample (0.65) was acceptable. This measure provided data for determining the impact of CAMS-G on suicidal ideation over time.

Interpersonal Needs Questionnaire-12 (INQ-12; Van Orden et al., 2008)

The INQ is a measure of two main components of Joiner's (2005) interpersonal-psychological theory of suicide: perceived burdensomeness and thwarted belongingness. All statements are rated on a 7-point scale from 1 (not at all true for me) to 7 (very true for me). Consistent with Van Orden et al. (2008), the items assessing belongingness were reverse scored, such that a higher score for the obtained subscale reflects a higher degree of thwarted belongingness. Van Orden et al. (2008) reported good estimates of internal consistency reliability for the Thwarted Belongingness and Perceived Burdensomeness subscale scores. Gutierrez et al. (2016) found strong support for the reliability and validity of the INQ-12 in veterans receiving care at a VHA medical center. In the current sample, the internal consistency reliability estimate (alpha) for perceived burdensomeness (0.89) and thwarted belonging (0.94) were both consistent with previous research. This measure provided data on the hypothesized facilitators of

change due to CAMS-G increasing participants' understanding of why they are suicidal and how they can cope more effectively.

Beck Hopelessness Scale (BHS; Beck & Steer, 1988)

The BHS is a 20-item true-false self-report scale that measures the level of negative expectations about the future held by respondents over the previous week. Scores range from 0 to 20 representing nil (0–3), mild (4–8), moderate (9–14), and severe (>14) levels of hopelessness. The scale has excellent internal consistency reliability (Cronbach's $\alpha = 0.93$) and strong concurrent validity with clinical ratings of hopelessness ($r = 0.74$) and other measures of hopelessness ($r = 0.60$, Beck & Steer, 1988). The internal consistency reliability estimate in the current sample was 0.96. This measure was included as an indicator of a potential effect of CAMS-G on a known suicide risk factor.

Reasons for Living Inventory (RFL; Linehan et al., 1983)

The RFL is a 48-item measure of buffers against suicidal ideation, based on reasons individuals gave for not killing themselves when they were thinking about it. Items are rated in terms of their importance as a reason for living on a scale from 1 (not at all important) to 6 (extremely important). It assesses six domains: Survival and Coping Beliefs, Responsibility to Family, Fear of Suicide, Fear of Social Disapproval, Moral Objections, and Child Related Concerns. Acceptable reliability and validity have been reported for the RFL (Bonner & Rich, 1991; Strosahl et al., 1992). Internal consistency reliabilities (alpha) in the current sample ranged from 0.85 (moral objections) to 0.97 (survival and coping beliefs). This measure was included to determine if CAMS-G has the potential to increase participants' reasons for living.

Outcome Questionnaire-45 (OQ-45; Lambert et al., 1996)

The OQ-45 is a 45-item instrument measuring client progress throughout treatment and afterward. It has been shown to have good psychometric properties with adult psychiatric inpatients (Lambert et al., 1996, 1999; Umphress et al., 1997). The internal consistency reliability estimate (alpha) in the current sample was 0.95. In this study, the OQ-45 was used to address questions about overall symptom distress.

Optimism and Hope Scale (OHS)

The OHS is a 14-item self-report measure combining a measure of dispositional optimism (Life Orientation Test—Revised; Scheier et al., 1994) and trait hopefulness (the Hope scale; Snyder et al., 1991), both of which show high reliability and construct validity (Scheier et al., 1994; Snyder et al., 1991). Combining these two scales in this way is based on work of Bailey et al. (2007). In the current sample, the internal consistency reliability estimate (alpha) was 0.87. This measure was included as a complement to measuring decreases in hopelessness with the BHS.

Follow-up Measures for CAMS-G Participants

In addition to the repeated administration of the baseline measures described above, except for the demographics form, the following measures were administered to all participants in the CAMS-G condition at 1-, 3-, and 6 months following randomization to condition. To decrease participant burden and provide more flexibility in scheduling follow-up assessments, these measures were all administered by phone.

Client Satisfaction Questionnaire (CSQ-8; Larsen et al., 1979)

The CSQ-8 is a general measure of individual satisfaction with health and human services. It is a self-administered Likert response-based questionnaire with good internal consistency reliability (coefficient alpha 0.83–0.93) and good predictive validity (Brown, 2002). The alpha estimate in the current sample was 0.80. This measure was used to address questions about client satisfaction with CAMS-G.

Group Cohesion Subscale (GCS; Lese & MacNair-Semands, 2000)

The GCS of the Therapeutic Factors Inventory was used in this study to assess participants' perceptions of how well the group members formed feelings of interpersonal bonds in the group. Participants respond on a 1 (strongly disagree) to 7 (strongly agree) scale such that higher scores indicate greater bonds. Items on this scale have been demonstrated to contain strong internal consistency. In the current sample, the internal consistency reliability estimate (alpha) was 0.80. It was included as another way to assess belongingness.

Suicide Status Form Qualitative Outcome Questions (from the SSF; Jobes, 2016)

At the 6-month follow-up assessment, CAMS-G participants were asked two open-ended questions from the SSF (described below)—“Were there any aspects of your treatment that were particularly helpful to you? If so, please describe these. Be as specific as possible.” and “What have you learned from your clinical care that could help you if you became suicidal in the future?” These items were used to examine the participants' perceptions of treatment effects and mechanisms of change.

Measures Administered During CAMS-G Treatment

Suicide Status Forms (SSFs; Jobes, 2016)

Three versions of the SSF are administered (initial, tracking, and outcome) as part of the course of care in CAMS-G. The SSF has six core rating assessments with good to excellent psychometric properties for suicidal outpatients and inpatients (Conrad et al., 2009; Jobes et al., 1997). Scores on this measure are used to determine if participants have met resolution criteria and are ready to discontinue group. Specifically, participants who report three consecutive weeks with a score of 2 or lower on a 5-point (extremely low to extremely high) scale for current overall risk of suicide, no suicidal behaviors, and if thoughts/feelings of suicide are present they have successfully managed them meet the minimum criteria. However, co-facilitator clinical judgment is the deciding factor based on how well the participant meeting criteria can articulate what they learned in group and plan to apply it in a future suicidal crisis if needed.

CAMS-G Rating Scale (CRS.G)

The CRS.G is based on the CAMS Rating Scale (CRS.3) developed for the first clinical trial of individual CAMS (Jobes et al., 2017). It contains three sections, representing what are considered the key components of CAMS care. The rating scale ranges from 0 (poor) to 6 (excellent). The CRS.G is organized the same as the CRS.3 and is designed to use while rating the adherence of the co-facilitator dyad to the essential components of CAMS-G (Gutierrez et al., 2020). All CAMS-G sessions were audio recorded, and adherence scores were assigned by two study staff members who later listened to and rated sessions.

Data analysis plan

The overall acceptability of CAMS-G was evaluated through repeated administration of the CSQ and GCS. Additional information was derived from the SSF qualitative outcome responses from those participants who met CAMS-G resolution criteria during the study period. These results are presented descriptively as this was not a qualitative study designed to identify themes within participant responses. Adherence of the facilitators to the manual was evaluated by examining CRS-G scores for each CAMS-G session. Patient outcomes were explored with Wilcoxon signed-rank tests for categorical change in counts for suicidal behaviors (increase, decrease, or no change). Linear mixed models quantifying within- and between-group differences from baseline to each follow-up assessment point were utilized for continuous measures.

RESULTS

Group composition

Demographic characteristics of the sample are presented in Table 1. No significant differences in any of the demographic distributions were observed between the CAMS-G condition and CAU. At baseline, participants in the CAMS-G and CAU conditions also did not significantly differ in measure scores of symptom distress, $\Delta M_{OQ-45-sd} = 4.2$, $t(28) = 0.74$, $p = 0.463$; optimism and hope, $\Delta M_{OHS} = 2.3$, $t(28) = 0.85$, $p = 0.400$; reasons for living, $\Delta M_{RFL} = 0.5$, $t(28) = 1.50$, $p = 0.144$; hopelessness, $\Delta M_{BHS} = 0.9$, $t(28) = 0.33$, $p = 0.740$; current suicidal ideation, $\Delta M_{BSS} = 1.4$, Welch $t(25.86) = 0.82$, $p = 0.420$; history of self-harm behaviors, $\Delta M_{SHBQ} = 1.5$, $t(28) = 0.30$, $p = 0.766$; or suicide attempt history, 12 out of 15 participants in CAMS-G vs. 12 out of 14 participants in CAU, Fisher's Exact $p > 0.999$.

CAMS-G participant acceptance and treatment retention

Client Satisfaction Questionnaire (CSQ) ratings for CAMS-G participants were generally high at 1-month follow-up, $n = 8$, $M = 27.75$, $SD = 2.43$. Results from 3-month and 6-month follow-up surveys were consistent with the participants' 1-month responses. At each time point, no CSQ item had an average score < 3 . The generally lowest rated item was the extent to which the service met the participant's needs, $M = 3.13$, $SD = 0.35$,

such that most participants reported (3), that "most of my needs have been met" as opposed to (2) "only a few," or (4) "almost all of my needs." The CSQ items assessing quality of service and whether participants would come back to this service were generally the highest rated CSQ items. Responses to the CSQ open-ended questions described general satisfaction (e.g., "seems to be going pretty well," "overall it's pretty effective"), effectiveness of CAMS-G specific components (e.g., "it doesn't just focus on one thing, it focused on drivers," "I don't relate to everything in there but when we sit down and talk it makes me look at things differently and it helps"), and a desire for more intensive intervention (e.g., "more reinforcement/check-ins throughout the weeks," "more sessions per week would be nice so patients have more flexibility when things happen during the week").

Group Cohesion Subscale ratings for CAMS-G participants were also generally high at 1-month follow-up, $n = 7$, $M = 56.00$, $SD = 7.14$. At each time point, no GCS item had an average score less than 5 (7 = Strongly Agree). The generally lowest rated items were the extent to which the participant felt a sense of belonging to the group, $M = 5.43$, $SD = 1.27$, and the extent to which the group members trusted each other, $M = 5.86$, $SD = 1.68$. The GCS item assessing whether the participant felt generally accepted in the group was overall the highest rated CSQ item, $M = 6.86$, $SD = 0.38$.

Six of the participants in the CAMS-G arm met resolution criteria and provided responses to the two qualitative questions on the SSF outcome version. All reported that aspects of the treatment were useful, including "getting my thoughts out," "getting out of repetitive thought process of wanting to die," "realizing we have similar problems and there are solutions," "thought about suicide as a choice and not prescribed," and "talking about issues and different ways to understand them." In response to the question regarding what they learned in the group veterans reported "I can talk to people and they won't judge me," "eventually things will get better," "use my coping strategies, trust the people on my safety plan," "I am not alone," and "try not to just stuff issues." Although equivalent data were not gathered for participants who did not meet resolution criteria, the group co-facilitators provided summary information about the status of these participants at the conclusion of the study. One participant did not like group and chose to stop attending; one returned to college classes and could no longer attend due to scheduling conflicts but was doing well at their last session; one reduced their overall risk of suicide score from 4 to 3 but did not reach 3 consecutive sessions of a 2; and one's worsening mental status required more intensive services.

TABLE 1 Participant characteristics

	Total		CAU		CAMS-G		p
	M/n	(SD/%)	M/n	(SD/%)	M/n	(SD/%)	
Age	48.6	(12.9)	51.5	(12.4)	46.0	(13.1)	0.249
Years of active duty	6.0	(4.7)	7.1	(5.6)	5.0	(3.6)	0.233
Number of deployments	1.9	(1.8)	1.9	(1.6)	1.9	(2.0)	0.983
Number of combat tours	0.9	(1.0)	0.7	(0.8)	1.0	(1.1)	0.397
Gender							
Male	25	(83%)	12	(86%)	13	(81%)	0>.999
Female	5	(17%)	2	(14%)	3	(19%)	
Race							
White	20	(67%)	9	(64%)	11	(69%)	0.510
Black	8	(27%)	3	(21%)	5	(31%)	
Other	2	(7%)	2	(14%)	0	(0%)	
Hispanic							
Yes	3	(10%)	3	(21%)	0	(0%)	0.090
No	27	(90%)	11	(79%)	16	(100%)	
Level of education							
High School	7	(23%)	4	(29%)	3	(19%)	0.675
College and Higher	23	(77%)	10	(71%)	13	(81%)	
Relationship status							
Married/Cohabiting	14	(47%)	8	(57%)	6	(38%)	0.714
Unmarried living alone	8	(27%)	3	(21%)	5	(31%)	
Div/Wid/Sep	8	(27%)	3	(21%)	5	(31%)	
Sex orientation							
Gay/Lesbian	1	(3%)	0	(0%)	1	(6%)	0>.999
Straight	27	(90%)	14	(100%)	13	(81%)	
Bisexual	1	(3%)	0	(0%)	1	(6%)	
Decline	1	3%)	0	(0%)	1	(6%)	
Employment status							
Employed	6	(20%)	4	(29%)	2	(13%)	0.438
Unemployed	16	(53%)	6	(43%)	10	(63%)	
Retired	8	(27%)	4	(29%)	4	(25%)	
Household income							
<\$25k	13	(43%)	5	(36%)	8	(50%)	0.575
\$25k to \$74k	14	(47%)	8	(57%)	6	(38%)	
>\$74k	3	(10%)	1	(7%)	2	(13%)	
War Era							
Pre-9/11	19	(63%)	11	(79%)	8	(50%)	0.142
Post-9/11	11	(37%)	3	(21%)	8	(50%)	

Note: Means were compared using *t* tests. Proportions were compared using Fisher's exact tests.

Facilitator adherence

The first 6 CAMS-G sessions and a randomly selected 25% subset of the remaining sessions were rated for facilitator adherence to the manual using the CAMS-G

Rating Scale. In total, 12 sessions were rated. The group facilitators maintained fidelity (i.e., every CRS-G item > 3) for each session that was rated. Across sessions, the facilitators had an average CRS-G item score of 4.9, *SD* = 0.3. The lowest fidelity item was related to

updating CAMS stabilization plans, $M = 4.3$, $SD = 0.9$, such that “stabilization plans were discussed and the co-facilitators suggested changes/updates to be made on the plan.” Specifically, stabilization plans were not always completely revisited, and feedback from other group members was not always included in the process. Nearly all of the other CRS-G scale items had consistently high fidelity and are not described here.

Patient outcomes

Of the 30 participants who completed baseline measurement and random assignment to a treatment condition, 14 (47%) provided survey data at the 1-month follow-up, 13 (43%) provided survey data at the 3-month follow-up, and 10 (33%) provided survey data at the 6-month follow-up. Within-subjects, 6 participants had complete survey data across all waves, 11 participants had at least three waves of data, and 20 participants had at least two waves of data (10 participants had baseline data only). Follow-up survey participation rates did not significantly differ between the CAMS-G vs. CAU conditions for Month 1, 56% vs. 36%, respectively, Fisher’s Exact $p = 0.299$, Month 3, 38% vs. 50%, Fisher’s Exact $p = 0.713$, or Month 6, 38% vs. 29%, Fisher’s Exact $p = 0.709$. Also, participant dropout overall and at each wave was generally not associated with any differences in demographics or baseline scores, with the exception that participants who were not successfully reached for the Month 3 follow-up had significantly lower baseline BSS scores, $n = 17$, $M = 22.9$, $SD = 3.84$, than those who provided Month 3 survey data, $n = 13$, $M = 26.8$, $SD = 5.23$, Welch $t(21.2) = 2.3$, $p = 0.032$.

Among survey participants for each wave, item-level missingness was rare (1.4%) and was not associated with treatment condition, demographics, or any baseline measures. Participant subscales with missing data (4.2%) were excluded pairwise from analyses. No significant univariate or multivariate outliers were identified.

Dichotomous outcomes

History of suicidal behaviors as measured by the SHBQ was examined at baseline and for each follow-up period. Due to the general rarity and dispersed distribution of these outcomes, Wilcoxon signed-rank tests were used to quantify categorical change in counts of participant reports (i.e., increase, decrease, or remain the same) for each of the SHBQ behaviors by treatment condition. Participants across both conditions reported fewer incidents of all suicidal behaviors for each follow-up period relative to baseline history, though differences were generally not statistically significant. Of exception and as shown in Table 2, in the CAMS-G condition a significant number of participants reported a decrease in new suicide attempts at the 1-month follow-up compared to baseline, $n = 6/7$, $Z = -2.45$, Exact $p = 0.031$. In contrast, participants in the CAU condition did not show a significant decrease in new suicide attempts, $n = 3/5$, $Z = -1.73$, Exact $p = 0.250$; however, these proportions across the treatment conditions were not significantly different, Exact $p = 0.682$. By Month 3, both conditions had comparable decreases in new suicide attempts, and these decreases were sustained in both groups through Month 6. Across all assessment points, no new suicide attempts were reported in the CAMS-G condition, $n = 0/17$, while two new suicide attempts were reported in the CAU condition, $n = 2/15$. However again, this difference was not statistically significant, Exact $p = 0.212$.

Continuous outcomes

Linear mixed models (LMM) with restricted maximum likelihood estimation were used to quantify within- and between-group mean differences in subscale scores from baseline to each follow-up period. A significant strength of this modeling approach for these data is its ability to handle missing data with minimal bias and increased

TABLE 2 Number of participants by report of a new suicide attempt at each wave relative to baseline

Months from baseline	CAU						CAMS-G						CAU vs. CAMS-G p
	Y,N	N,N	Y,Y	N,Y	Z	p	Y,N	N,N	Y,Y	N,Y	Z	p	
1	3	1	1	0	-1.73	0.250	6	1	0	0	-2.45	0.031*	0.682
3	5	1	1	0	-2.24	0.063	3	2	0	0	-1.73	0.250	0.735
6	3	0	0	0	-1.73	0.250	3	2	0	0	-1.73	0.250	0.464

Note: Y,N = Reported history of a lifetime suicide attempt at baseline and denied any new suicide attempts since previous assessment. N,N = Denied history of a lifetime suicide attempt at baseline and denied any new suicide attempts since previous assessment. Y,Y = Reported history of a lifetime suicide attempt at baseline and reported a new suicide attempt since previous assessment. N,Y = Denied history of a lifetime suicide attempt at baseline and reported a new suicide attempt since previous assessment. Within-subject differences assessed using Wilcoxon signed-rank Z tests with Fisher’s exact p -values. Between-group differences assessed using 2x4 Fisher’s exact tests.

* $p < 0$.

power. Study condition, follow-up period (coded as a multinomial variable with three levels), and their interactions were included as fixed effects in all models. All models also included random intercepts and random slopes. Residuals for all the final models met normal-distribution assumptions, though cell sizes were small. All models used a variance components covariance structure. Intra-Class Correlations (ICCs) ranged from 0.12 for the Suicidal Ideation subscale of the SHBQ to 0.69 for the Interpersonal Relations subscale of the OQ-45, $M_{ICC} = 0.45$. ICCs for the BSS and SHBQ models were artifactually negative because the within-subject variance was greater than the between-subject variance for these measures. However, fixing the intercept in these models resulted in significantly worse model fits, so random intercepts were maintained for all final models.

Most of the LMMs showed a clinical improvement in scale means for participants across both study conditions from baseline to each follow-up period; however, many change scores were not significant. For example, as illustrated in Figure 1, suicidal ideation and behaviors (i.e., BSS and the SHBQ) had significant overall decreases across follow-up periods within both treatment conditions (TC). However, interactions between TC and score changes were not significant, $F_{SSIXTC}(3,13.49) = 0.94$, $p = 0.447$, $F_{SHBQxTC}(3,46.85) = 0.12$, $p = 0.946$, suggesting that improvements in suicidal ideation and behaviors in the CAMS-G condition were generally equivalent to improvements in the CAU condition over time. That said, Month 1 BSS scores among the CAMS-G group showed a statistically significant and clinically meaningful decrease from baseline, $M_{BL} = 23.94$, $M_{M1} = 12.90$, dM 95% CI $[-16.67, -5.41]$, $p = 0.001$, but BSS scores in the CAU condition did not show the same change, $M_{BL} = 25.36$, $M_{M1} = 20.47$, dM 95% CI $[-12.37, 2.60]$, $p = 0.178$. Instead, the CAU condition did not show a significant BSS score decrease until the Month 3 time point, $M_{M3} = 13.06$, dM 95% CI $[-19.13, -5.46]$, $p = 0.002$.

Score trends for OQ-45 symptom distress and social role subscales, as well as for the hopelessness (BHS), and optimism and hope scales, showed the same pattern as the BSS and SHBQ scores described above. In the interest of space, model parameters for each of the above scales are available upon request. In summary, participants in the CAMS-G condition generally showed better outcomes on these scales at Month 1 relative to those in the CAU condition. In particular, Month 1 scores on symptom distress, optimism, and hope agency were significantly different between groups, though all such differences went away by Month 3. Across all outcomes, both groups generally maintained within-subject improvements through Month 6.

Participant scores across the RFL subscales and other tested scales (i.e., INQ, OQ-45 Interpersonal Relations

subscale of the OQ-45) indicated no clinically significant within- or between-group trends over time. Some of the subscales showed within-group changes between various time points, but differences were small and inconsistent, suggesting the potential for Type I error. Specific findings for these scales are not presented here due to space constraints but are available upon request.

DISCUSSION

The results of this small pilot study of CAMS-G support that it is a feasible and acceptable outpatient intervention for veterans at risk of suicide. In line with previous research (Gutierrez et al., 2020), the intervention was delivered by the co-facilitators with fidelity and no drift over time was noted. Veterans receiving CAMS-G were positive about their experience and provided descriptions of how they learned new skills, felt supported by the other veterans in the group, and would have been amenable to a higher dose of treatment than the weekly 90-min group sessions they received. Perhaps most important, there was no evidence of veterans becoming more suicidal or indeed experiencing more clinical symptoms in general as a result of participating in CAMS-G. Although it is premature to endorse wide-scale rollout of this intervention in the VA or other clinical settings until a well-powered randomized controlled trial can be conducted, the results of this pilot study suggest additional work in that direction is warranted.

The theory on which the CAMS-G approach is based suggests that receiving suicide-specific treatment in a group setting should foster a greater sense of belonging and reduced sense of burden. We did not find statistical evidence to support that CAMS-G acted on those two Joiner (2005) mechanisms any more than CAU, although veterans who fully completed the course of CAMS-G care (i.e., met resolution criteria) mentioned important aspects of care to include being able to talk without being judged and feeling that they were not alone. These comments raise questions about whether Joiner's mechanisms might be more salient in a larger sample and/or between participants who complete treatment and those who drop out early. Future research is needed to better understand these hypothesized mechanisms of change in the CAMS-G process.

Consistent with results from the most relevant clinical trial of individual CAMS (Jobes et al., 2017), veterans in the CAMS-G condition appeared to experience faster clinically significant decreases in suicidal ideation relative to CAU and the only new suicide attempts were recorded in the CAU condition. Patterns of results were consistent across all other outcome measures such that

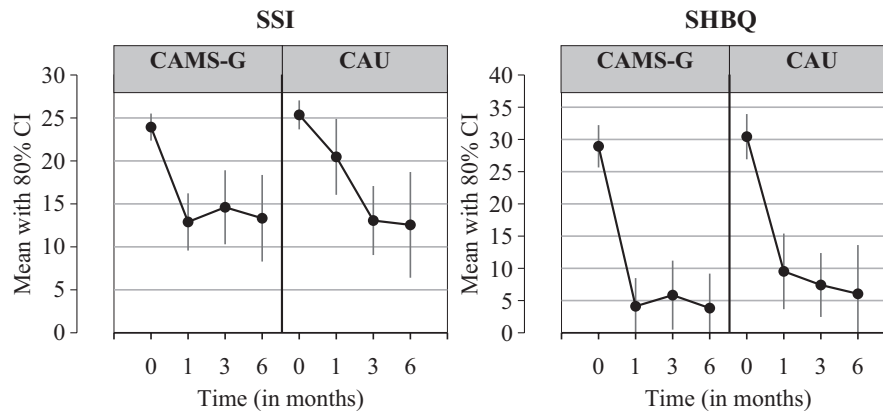


FIGURE 1 Model trajectories for suicidal ideation and behavior outcomes by treatment. Note. BSS = Beck Scale for Suicidal Ideation, SHBQ = Self-Harm Behavior Questionnaire. With the usual 95% confidence intervals, there's a certain degree that the confidence intervals for two groups can overlap, but there can still be a statistically significant between-group difference. The downward adjustment of the CI to roughly 80% was to make non-overlapping errors directly interpretable as a $p < .05$ difference (D. Huh, personal communication, April 8, 2020).

veterans in CAMS-G seemed to improve faster than those in CAU and then the latter eventually caught up. For example, at the 1-month follow-up, CAMS-G participants reported significantly more optimism and hope agency than those in CAU, which is also consistent with previous individual CAMS studies. The results do not necessarily support that CAMS-G is more effective than CAU overall, as many of the between-condition differences were not statistically significant. However, this could be a power issue due to the small sample, and apparently faster improvement would certainly be noteworthy if supported by future well-powered studies. Indeed, Jobes and Joiner (2019) have recently argued that the 10.6 million Americans experiencing thoughts of suicide each year in the United States are suffering significantly and interventions that can decrease that suffering are needed. CAMS-G appears to, at a minimum, to hold promise of fitting that bill.

Despite the promising results of this study, several limitations must be noted. It was a small sample, and only half of what was originally planned. The research team worked very hard to try to reach the original sample size, but finally decided to stop enrolling new participants when it became clear that randomizing 50 veterans to condition was likely to extend the study timeline beyond what could be feasibly managed by the all-volunteer staff (several of whom moved to other duty stations prior to completion of data collection). The study was conducted in one VA medical center with mostly older white male veterans and the results may not generalize to other veterans. Finally, the group co-facilitators were both CAMS experts who have been involved with the development of CAMS-G from the beginning.

None of those limitations detract from the fact this was a well-designed study, utilized valid and reliable measures of all study constructs, included useful participant reports providing context for the quantitative results, relied on rigorous statistical tests (albeit likely under-powered) of all outcomes, and generated outcome patterns similar to a large clinical trial of individual CAMS (Jobes et al., 2017).

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AUTHOR CONTRIBUTIONS

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