Suicide and Life-Threatening BEHAVIOR
THE OFFICIAL JOURNAL OF THE AMERICAN ASSOCIATION OF SUICIDOLOGY

300 Suicide and Life-Threatening Behavior 50 (1) February 2020
Published 2019. This article is a U.S. Government work and is in the public domain in the USA
DOI: 10.1111/sltb.12589

Caring E-mails for Military and Veteran Suicide Prevention: A Randomized Controlled Trial

David D. Luxton, PhD, MS, Derek J. Smolenski, PhD, Mark A. Reger, PhD, Rona Margaret V. Relova, MD and Nancy A. Skopp, PhD

Objective: The purpose of this multisite study was to conduct a randomized controlled trial of an e-mail version of the caring letters (CL) suicide prevention intervention to determine whether the intervention is efficacious in preventing suicide behaviors among U.S. service members and veterans.
Method: Psychiatric inpatients (N = 1,318) were recruited from four military medical centers and two VA hospitals and randomized to receive either 13 caring e-mails over two years or usual care.
Results: There were 10 deaths from any cause in the CL group (three suicides) and 14 in the usual care group (seven suicides) during the individual two-year follow-up intervals. There was no statistically significant difference in the rate of all-cause hospital readmission between the study groups (RR = 1.13; 95% CI = 0.94, 1.36). There were no differences observed between groups on self-reported psychiatric hospital readmissions, self-reported suicide attempts, or other measures associated with risk for suicide.
Conclusions: No firm conclusions about the efficacy of the intervention can be made because the study was inadequately powered. There were no adverse events associated with the intervention, and implementation of the procedures was feasible in the military and veteran hospital settings. These results provide important methodological considerations for caring contact trials in military populations.

The risk for suicide and recurrent suicide attempts is significantly higher among posthospitalized psychiatric patients compared to the general population (Luxton, June, & Comtois, 2013). Most suicides occur during the first 30 days after discharge with the highest rate occurring within the first week (Appleby et al., 1999; Geddes, Juszczak, O'Brien, & Kendrick, 1997; Goldacre, Seagroatt, & Hawton, 1993; Meehan et al., 2006), and many before the first follow-up appointment (Hunt et al., 2009). The reasons

David D. Luxton, and Mark A. Reger, National Center for Telehealth & Technology, Joint Base Lewis-McChord, Tacoma, WA, USA and University of Washington School of Medicine, Seattle, WA, USA; Derek J. Smolenski, and Nancy A. Skopp, Defense Health Agency, Psychological Health Center of Excellence, Tacoma, WA, USA; Rona Margaret V. Relova, VA Palo Alto Health Care System, Palo Alto, CA, USA and Stanford University, Palo Alto, CA, USA.

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Address correspondence to David D. Luxton, University of Washington, Department of Psychiatry and Behavioral Sciences, Seattle, WA 98195; E-mail: ddluxton@uw.edu

for this increased risk include shorter lengths of inpatient treatment, lack of suicide-specific treatments, discontinuity of care, and return to stressful situations (Luxton, June et al., 2013).

Suicide risk following psychiatric hospitalization has also been examined among U.S. military members and veterans. The suicide rate among the U.S. active-duty service members with histories of psychiatric hospitalization was 71.6 per 100,000 person-years compared with the rate of 14.2 per 100,000 person-years in the general active-duty U.S. military population over an 11-year period (Luxton, Trofimovich, & Clark, 2013). Valenstein et al. (2009) examined suicide rates among 887,859 U.S. military veterans who were in treatment for depression at the Department of Veterans Affairs (VA) hospitals between 1999 and 2004 and found the suicide rate within 12 weeks after a psychiatric hospital discharge to be approximately five times that of the overall VA treatment population and 54 times the rate for the general U.S. population during the same period. Emergency departments (EDs) also discharge a significant number of patients admitted for self-inflicted injury, and up to 25% of this cohort experiences a repeat attempt (Beautrais, 2004; Larkin & Beautrais, 2010; Owens, Horrocks, & House, 2002). These data highlight the need for targeted treatments and interventions for suicidality after psychiatric inpatient stays.

One intervention that specifically targets the posthospitalized population is the caring letters or caring contact intervention. The intervention entails the routine sending of brief messages that express caring concern to patients following discharge from treatment for a circumscribed period of time (Luxton, June et al., 2013; Motto, 1976). Multiple caring messages are thought to have a protective effect against suicide by promoting a feeling of caring connection and, potentially, by facilitating a means to reconnect with treatment options (Luxton, 2017). Caring messages from health care providers may also have the potential to improve patients' attitudes toward the health care system (Luxton, June et al., 2013).

The caring contact concept was originally developed and evaluated by Motto and colleagues in the 1970s (Motto, 1976). In the original trial, civilian psychiatric inpatients were sent brief caring letters following discharge (initially monthly, decreasing to quarterly) for 5 years. Compared to a control group with no further contact (usual care, UC), the CL group had a significantly lower suicide rate for the first two years of the trial.

Subsequent studies have evaluated similar contact interventions with different contact modalities (e.g., postal mail, postcards, e-mail, texting, and telephone; Luxton, June et al., 2013). Two principal advantages of the caring contact intervention are that it addresses suicide risk during treatment gaps, and it has the potential to reach people no matter where they are located.

The research evaluating caring contacts is mixed regarding its effectiveness (Luxton, June et al., 2013; Milner, Carter, Pirkis, Robinson, & Spittal, 2015). Only the aforementioned study by Motto and the SUPRE-MISS reported by Fleischmann et al. (2008) have shown contact intervention to reduce mortality rates in a randomized controlled trial (RCT). The latter study examined brief psychoeducation and nine follow-up contacts (telephone or in-person) and reported lower suicide rates in the intervention group compared to treatment as usual at an 18-month follow-up (Fleischmann et al., 2008).

While there are several RCTs that support the efficacy of caring contact interventions in reducing rates of a variety of suicide behaviors (Carter, Clover, Whyte, Dawson, & D'Este, 2005, 2013; Hassanian-Moghaddam, Sarjami, Kolahi, & Carter, 2011), several trials have reported null results (Cedereke, Monti, & Ojenhagen, 2002; Comtois et al., 2019; Larkin & Beautrais, 2010). For example, Comtois et al. (2019) conducted a randomized controlled trial of a caring texting intervention that included 658 U.S. Soldiers and Marines. The caring messages were sent as an adjunct to outpatient treatment. The results did not show a

reduction in suicidal ideation or suicide risk events at 12-month follow-up. The caring texts did, however, reduce the probability of retrospectively reporting either suicidal ideation (80% vs. 88%) or a suicide attempt (9% vs. 15%).

Other studies have reported beneficial results for some self-harm and clinical utilization outcomes. Carter et al. (2013) have conducted a series of studies that have followed a cohort randomized to a 12-month caring postcard intervention or treatment as usual. Although they found no difference in the percentage of participants with a repeated admission for self-harm at a five-year follow-up, there was a difference in rates of readmission. Similar results were found for any psychiatric admission. Other studies have also reported partially successful results for self-harm or other suicide behaviors, while others have reported null results (see Luxton, June, Comtois, 2013). A recent meta-analysis of a variety of brief contact interventions including CL found a nonstatistically significant reduction in subsequent self-harm or suicide attempt compared with control (Milner et al., 2015). The number of repeated acts of self-injury per person was significantly reduced with brief contact interventions. There was no statistically significant reduction in the odds of suicide in intervention compared with control.

To date, there have not been any published replications of the original CL intervention or tests of the intervention among military personnel or veterans in a large randomized controlled trial. Our goal with this study was thus to conduct a RCT that tested the efficacy of the caring contact intervention to prevent suicide and suicidal behavior among U.S. service members and veterans. The study tested the following hypotheses: (1) During a two-year follow-up after the index hospital discharge, the frequency of suicide will be lower among participants in the CL group compared to those in the UC group; (2) the frequency of medically admitted, self-inflicted injuries will be lower in the CL group compared to the UC group; and (3) the time to suicidal act, among those who do subsequently exhibit one, will be longer among participants in the CL group compared to the UC group. The trial is registered on the United States National Institutes of Health Clinical Trials Registry (ClinicalTrials.gov Identifier # NCT01473771) available online at: https://clinicaltrials.gov/ct2/show/NCT01473771. The study was conducted in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) and approved by applicable U.S. Army, U.S. Navy, and Department of Veteran's Affairs Institutional Review boards.

METHOD

Participants

The study sites include Madigan Army Medical Center (MAMC), Tripler Army Medical Center (TAMC), Landstuhl Regional Medical Center (LRMC), Navy Medical Center San Diego (NMCSD), VA Palo Alto, and VA Western New York. These study sites were selected because they represent diverse military populations (the military sites serve Army, Navy, Air Force and Marine Corps) and because there were no other competing clinical trials recruiting at the inpatient psychiatry units at these sites.

The initial sample size calculation focused on the suicide-specific mortality identified in the first hypothesis. The conditions used in the calculation include a two-tailed $\alpha = .05$, $\beta = .20$, and a target odds ratio of 0.50. The base mortality proportion of suicide in the study population was hypothesized to be 0.02. With an even allocation ratio between study groups and a small amount of variance in the outcome explained by covariates of 0.01, the required sample size was 4,730 participants. We also considered all-cause mortality to be an appropriate secondary outcome for this study given competing risks and the potential for underestimating suicide rates due to the misclassification of deaths by suicide. We calculated a sample size estimate (Luxton et al., 2014) that used an all-cause mortality

proportion of 0.04 that revealed a minimum sample size requirement 2,300 for this secondary outcome. There was not a study termination protocol if the target recruitment sample size was not attained.

The time to attain Institutional Review Board (IRB) and DoD research regulatory approval took between 6 months and more than a year for all sites, thus significantly delaying recruitment start. The study team recruited participants from February 2012 to December 2014. A total of 1,318 (27.9% of the planned sample size of 4,730) participants were enrolled in the study. Follow-up for participants began in 2014 and continued until December 2016 to coincide with the end of 2 years of observation for the last-enrolled participants. A total of 421 participants (31.9% of enrolled participants) were able to be contacted (mail or telephone) for follow-up survey data collection. Data on mortality through the end of calendar year 2015 were acquired in February 2018 for final data analysis. Mortality data for this time period were included for all participants, regardless of the availability of other follow-up data. Record reviews for hospital readmission data were completed for 1,303 (98.9%) of participants.

Research Design

The study was a two-group, multisite, randomized controlled trial. The Consolidated Standards of Reporting Trials (CONSORT) design for the trial is shown in Figure 1. Eligible participants were randomized to either of two groups: a CL intervention group or a no-contact UC group. All participants received standard care. Randomization schedules for the study conditions were created for each study site using the Research Randomizer program (Urbaniak & Plous, 2007). Randomization of eligible participants occurred after screening, consent, and the baseline, self-report data collection. Study staff at each site provided the random assignment to participants by following the generated randomization sequence. There was no concealment of the order of study group assignments to the study coordinators. Participants in the CL group were eligible to receive e-mail communications from study staff for the prescribed exposure period detailed below. For consistency, an e-mail template was used and customized based on the interview. Participants in the UC group did not receive additional contact from study staff until the follow-up assessment two years after randomization.

Measures

Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001). The PHQ-9 is the depression scale of the PHQ, and it consists of nine items that specifically target the DSM-IV diagnostic criteria for major depressive disorder. Items are rated on a 4-point scale (0 = not at all; 1 = several days; 2 = more than half the days; 3 = nearly every day), and possible scores range from 0 to 27. Internal consistency reliability at baseline was 0.85.

Rudd Suicide Ideation Scale (RSIS; Rudd, 1989). The ten-item RSIS provides critical information about the presence or absence of suicidal thinking, the intensity of those thoughts, and the presence or absence of prior suicide attempts. Respondents were asked to read each item and then select the response that best describes the way they felt or behaved in the past year on a 5-point scale (1 = "never," 2 = "infrequently," 3 = "sometimes," 4 = "frequently," and 5 = "always"). The total score ranges from 10 to 50. Strong support for the construct validity and reliability of the RSIS tested in a clinical military sample has been reported (Luxton, Rudd, Reger, & Gahm, 2011). The internal consistency reliability at baseline was 0.93.

Interpersonal Needs Questionnaire (INQ; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). The 18-item INQ is intended to measure the constructs of thwarted belongingness and perceived burdensomeness. Respondents were asked to read each item and then select the response that best described the way they felt recently (including the present day) on a 7-point scale (1 = "not

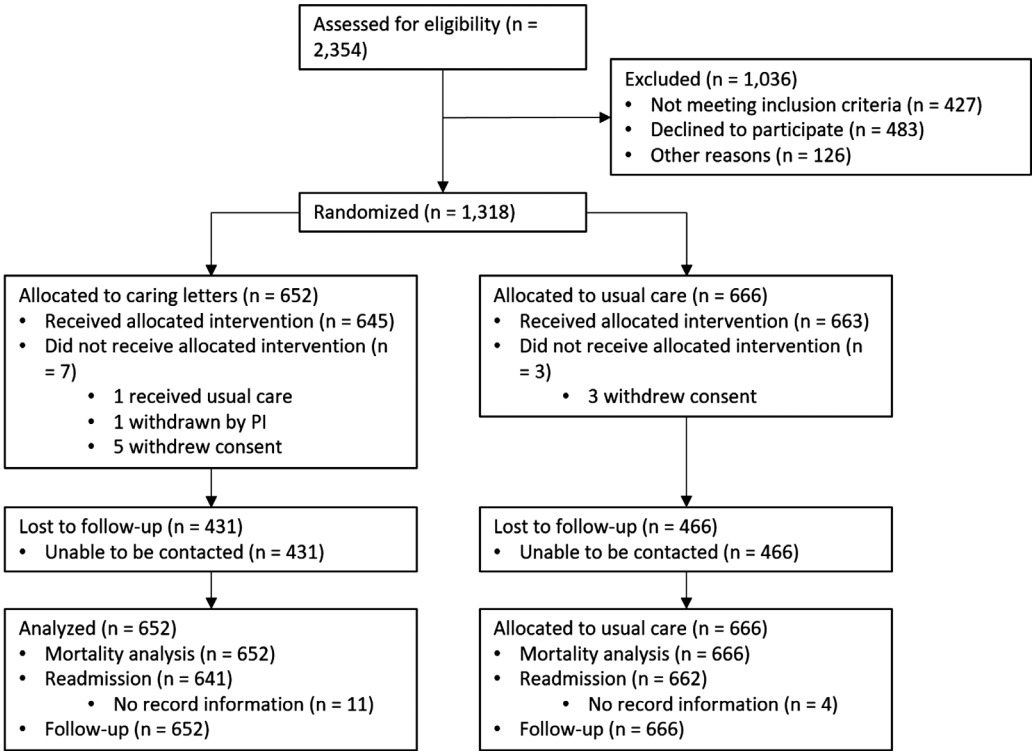

Figure 1. CONSORT diagram for the caring letters (CL) intervention study.

at all like me," 2, 3, 4 = "somewhat true for me," 5, 6, 7 = "very true for me"). The internal consistency reliability for the perceived burdensomeness subscale was 0.91, and for the thwarted belongingness subscale was 0.89.

Acquired Capability for Suicide Scale (ACSS; Van Orden et al., 2008). The 20-item ACSS measured the construct of acquired capability for lethal self-injury. Responses to items were scored on a 5-point scale (0 = "not at all like me," 1, 2, 3, 4 = "very much like me"). Internal consistency reliability for this sample at baseline was 0.81.

Positive Assets Search Semi-Structured Interview Tool (PASSIT; Luxton, Armstrong & June, unpublished). The PASSIT is a semi-structured interview comprising 27 questions with additional open-ended follow-up questions intended to help identify positive aspects in a person's life. The content domains are social support/activities, school and work, religion/spirituality, recreation/leisure activities, and personal attributes. Subdomains include coping skills, giving/benevolence, past successes, and hope. The PASSIT provided personalized information for personalization of the caring e-mails. Items and content domains of the PASSIT were developed and piloted in the initial CL pilot study (Luxton et al., 2012).

The following data were collected at the 2-year follow-up mail survey or phone call:

Final Survey. The final survey consisted of a phone interview and assessed participant suicidal behaviors and medical/psychiatric treatment utilization over the previous two years. Participants completed a Web form version of the PHQ-9, the RSIS, the INQ, and the ACSS. Participants were asked if any suicide attempt or any psychiatric hospital readmission occurred during the two

years since study enrollment. Finally, participants in the CL condition were asked to complete a patient satisfaction survey.

All-cause Mortality. Deaths from any cause were ascertained from death certificates as recorded in the Center for Disease Control and Prevention's National Death Index Plus. Data were available through December 31, 2015. Suicide-specific mortality (primary outcome measure) was defined as any death with a primary International Classification of Diseases, Tenth Revision cause-of-death code of X60-X84, Y87.0, or U03 (Heron, 2018). In prior studies of military samples, the overall sensitivity of NDI results to official determinations made by the Armed Forces Medical Examiner System was 97.1% (Skopp et al., 2017). Diagnostic estimates of measurement agreement between the NDI-Plus and the AFMES cause-of-death groups were high.

Hospital Readmission. Medical encounter data from the VA and the military records were reviewed to identify any readmissions to a hospital. Data were not consistently available regarding the nature of the readmission. Therefore, the readmission for any cause was used in the analysis.

Additional Data. Additional data included rates of undeliverable addresses, psychiatric care re-admittance rates, length of participant stay on the unit, feedback from the inpatient unit and CL staff about the process, and counts of adverse events (i.e., suicide, nonfatal suicide events, indications of self-harm or harm to others in communication with study staff or the treatment team). We also recorded unsolicited narrative feedback in e-mails from study participants.

Procedure

Inpatient unit staff identified potential participants based on study inclusion/exclusion criteria (see Table 1). The unit staff informed study staff at each study site of potential patients who could be approached for enrollment. After the informed consent process and verification of inclusion/exclusion criteria, the research coordinators completed a semi-structured, psychosocial interview with each participant. The centralized project coordinator provided the randomization assignment from the master list as each participant was enrolled in the study.

Participants randomized to the CL group were sent a total of 13 e-mails based on a predetermined schedule that began when the participant was discharged from the inpatient psychiatry unit. The e-mails were sent from site-specific e-mail addresses created for the study and sent to an e-mail address of each participant's choosing. The schedule of e-mail contacts replicated the first two years of the original Motto (1976) trial (monthly for 4 months, then every 2 months for 8 months, and then every 3 months); however, we sent one additional e-mail during the first week after hospital discharge when suicide risk was assumed to be highest. The e-mails were prepared and sent by the research coordinator at each site who met with and interviewed the patient during their hospital stay. An example

TABLE 1
Inclusion and Exclusion Criteria for Participant Enrollment

Inclusion criteria
(a) Current psychiatric inpatients
(b) Possess an active e-mail account
(c) Informed consent
(d) Active-duty military, veteran, retiree, National Guard or reserve status
Exclusion criteria
(a) Not competent to consent
(b) Adverse behavioral problems (e.g., aggressive/hostile behavior on the unit/could not be safely approached by research coordinator)
(c) The primary psychiatric nurse or attending psychiatrist considers the study to be clinically inappropriate (e.g., due to paranoia about mail/email)
(d) Currently under arrest/incarceration. A person in any form of detention will immediately be withdrawn from the study, and no data will be used during the period of detention/incarceration
(e) Involuntarily committed for psychiatric care status (72-h hold) unless released by provider or changed to voluntary status

caring e-mail is shown in Figure 2. Patients randomized to the UC group did not receive the caring e-mails. Participants in both study groups were able to continue standard treatment protocols within the health systems.

Follow-up with both groups was planned at 2 years after index hospital discharge in the form of a survey. We limited the contact period to 2 years because it was in the first two years of the original study (Motto & Bostrom, 2001) that a statistically significant effect was found. There was no additional planned contact made with participants in either group (i.e., for trial retention) beyond the scheduled caring contacts and 2-year follow-up contact.

Analysis. Poisson regression models were used for intent-to-treat comparisons of the incidence rate of all-cause mortality, suicide-specific mortality, and time-to-first hospital readmission between the study groups. Time at risk for mortality began at study randomization and was censored at the date of death, the end of the 2-year observation window, or December 31, 2015, whichever occurred first. Time at risk for hospital readmission began at study randomization and was censored at the date of first readmission,

Subject line: Hope all is well

Date [ ]

Dear [NAME],

We appreciated the chance to talk with you during your visit at [Site location. i.e., Madigan Army Medical Center]. We hope things are going well for you.

When we talked on the unit, it sounded like you were dealing with transitions and challenging circumstances. This can be a difficult for some folks, so we hope that you are able to do some fun activities that can help you refocus and relax.

If you wish to drop us a note, we would be glad to hear from you.

Best wishes,

[Signatures]

Please note that the following resources are always available to you:

Military OneSource: www.militaryonesource.com **1-800-833-6622**
Many helpful resources for active duty and families.

Suicide Prevention Lifeline: www.suicidepreventionlifeline.org **1-800-273-TALK (8255)**
A crisis line for anyone (Press 1 for Military).

The Defense Centers of Excellence (DCoE) Outreach Center: **1-866-9660-1020**
or www.dcoe.health.mil/24-7help.aspx

DoD/VA Suicide Outreach: www.suicideoutreach.org

Please know that I make every attempt to respond to my emails each business day. If for some reason you need immediate assistance, please reach out to the resources listed above.

Also, you should refrain from replying with any sensitive personally identifiable material or confidential information to include medical information over the internet. If you choose to send such information via email, you do so at your own risk.

If you will be changing your contact information (email address, phone number, postal address), feel free to let us know so that we can stay in contact with you.

Figure 2. Example Caring Email. [Color figure can be viewed at wileyonlinelibrary.com]

the date of the last medical encounter of any kind in the record system (to account for individuals with less than 2 years of observed interaction with the military or VA medical systems), date of death, or the end of the 2-year observation window, whichever occurred first. Data were jointly aggregated by treatment assignment and study recruitment site. The natural logarithm transformation of total person-time in each stratum was included as an offset variable in the models. Effect size estimates from these models were the incidence rate ratio (IRR) and the associated 95% confidence intervals (CI). The participant recruitment location was included as a nominal covariate in all models.

We used a negative binomial regression model to compare the overall occurrence of hospital readmission between the study groups. Time at risk was censored at death, the end of the 2-year observation period, or the date of the last observed encounter in the medical record, whichever occurred first. This model also included the natural logarithm of time at risk for each individual as an offset variable in the model. Effect size estimates from these models were the IRR and the associated 95% CIs.

The final analyses used data from the self-report measures collected at baseline and at the 2-year follow-up assessment. We used a binomial regression with a log link function to compare proportions of participants who reported either a psychiatric readmission or a suicide attempt during the observation period. This produced an estimate of the risk ratio and its associated 95% confidence interval. For the scale measures, we used linear mixed-effects regression models to estimate the difference in the rate of change between the two study groups. All participants who provided data at either time point were included in the models. A second set of models was restricted to participants who provided data at both the baseline and the 2-year follow-up assessments. The regression coefficients, associated 95% CIs, and regression coefficients standardized to the baseline standard deviation of each of these measures (Feingold, 2009) are reported.

RESULTS

The characteristics of study participants at baseline, by assigned treatment condition, are shown in Table 2. The primary outcome of the study was suicide mortality. As of December 31, 2015, there were three deaths from suicide in the CL group and seven in the UC group (Table 3). There was no statistically significant difference in the rate of suicide. The post hoc power to detect an IRR of 0.50 or stronger was 0.25. More broadly, there were a total of 10 deaths from any cause in the CL group and 14 in the UC group. Again, there was no statistically significant difference in the mortality rate. The post hoc power to detect an IRR of 0.50 or stronger was 0.45.

The medical record review identified 566 hospital readmissions in the CL group (741 PY) and 608 in the UC group (751 PY). There was no statistically significant difference in the rate of all-cause hospital readmission between the study groups. The IRR was 1.13 [95% CI = 0.94, 1.36]. The post hoc statistical power to detect a rate ratio of 0.50 or greater was effectively 1.00. There was no difference between the study groups in the rate of first hospital readmission after study enrollment with an IRR of 1.10 [95% CI = 0.91, 1.32].

Self-report data at two years post-randomization provided a similar finding to the medical record review (Table 3). Similar proportions of participants in both study groups reported a psychiatric hospital readmission and/or a suicide attempt at any time during the follow-up time period. Data on additional self-report measures are provided in Table 4. There were no statistically significant differences identified between the study groups on any of the outcome measures. A total of 131 out of 210 participants (62.38%) in the CL group who provided data at follow-up reported that they remembered receiving e-mails over the course of the study. Twenty-three participants (21 in the CL group; 2 in the UC group) contacted study personnel during the observation period in a state of crisis.

TABLE 2
Characteristics of Study Participants at Baseline, by Assigned Treatment

	CL		UC	
Variable	*n*	*M* (*SD*, min, max	*n*	*M* (*SD*, min, max)
Age	651	32.46 (12.55, 18, 70)	666	33.74 (13.79, 18, 70)
			%	%
Sex				
Male	485	74.39	514	77.18
Female	165	25.31	152	22.82
Missing	2	0.31	0	0.00
Race/ethnicity				
Not Hispanic				
American Indian/ Alaska Native	10	1.53	10	1.50
Asian/Pacific Islander	32	4.91	37	5.56
Black/African American	88	13.50	92	13.81
White/Caucasian	382	58.59	366	54.95
Other	35	5.37	22	3.30
Hispanic, any race	102	15.64	137	20.57
Missing	3	0.46	2	0.30
Rank/grade				
E1-E3	247	37.88	250	37.54
E4-E6	370	56.75	375	56.31
E7-E9	8	1.23	16	2.40
Officer	18	2.76	17	2.55
Missing	9	1.38	8	1.20
Highest education level				
High school	241	36.96	222	33.33
Some college	330	50.61	366	54.95
Four-year college graduate	42	6.44	45	6.76
Postgraduate	29	4.45	28	4.20
Other	8	1.23	4	0.60
Missing	2	0.31	1	0.15
Marital status				
Never married	254	38.96	270	40.54
Married	221	33.90	222	33.33
Legally separated	42	6.44	33	4.95
Divorced	125	19.17	126	18.92
Widowed	6	0.92	12	1.80
Missing	4	0.61	3	0.45
Number of previous psychiatric hospitalizations				
0	402	61.66	380	57.06
1	113	17.33	121	18.17
2	46	7.06	53	7.96
3	22	3.37	28	4.20
4 or more	56	8.59	75	11.26
Missing	13	1.99	9	1.35
Number of deployments				
0	250	38.34	248	37.24
1	204	31.29	220	33.03
2	98	15.03	91	13.66
3 or more	87	13.34	99	14.86
Missing	13	1.99	8	1.20

CL, caring letters; UC, usual care.

DISCUSSION

This study describes the results from the first RCT of an e-mail version of the CL intervention. Prior research on caring messages has reported promising, but mixed results with a variety of outcomes (Comtois et al., 2019; Luxton, June et al., 2013). One trial conducted in the United States in the 1970s with postal mail reported reduced suicide rates compared to a group that did not receive letters, but only for the first two years of the intervention (Motto, 1976; Motto & Bostrom, 2001). The mortality results in the current study were disappointing since the observed effect sizes were in the hypothesized direction, although the sample size was insufficient to provide a statistically stable rate and more deaths in either group would have significant effects on conclusions. The planned sample size used a population rate of suicide that was approximately double what was observed in the study sample. One explanation may be that service members and veterans who consent to suicide prevention studies are healthier than the broader population or those who are receiving health services are at

TABLE 3
Mortality and Hospital Readmission Frequencies, by Treatment Group

	CL		UC		
Outcome	Events	PY	Events	PY	IRR [95% CI]
All-cause mortality	10	1169.50	14	1197.59	0.77 [0.34, 1.73]
Suicide mortality	3	1169.50	7	1197.59	0.42 [0.11, 1.64]
First all-cause hospital readmission	223	505.43	233	498.14	1.10 [0.91, 1.32]
	n	%	*n*	%	
Psychiatric hospital readmission, last two years, self-report					
No	133	62.15	112	59.89	Ref.
Yes	81	37.85	75	40.11	0.93 [0.74, 1.18]
Suicide attempt, last two years, self-report					
No	181	84.19	162	86.63	Ref.
Yes	34	15.81	25	13.37	1.15 [0.71, 1.86]

CL, caring letters; UC, usual care; PY, person-years; IRR, incidence rate ratio; CI, confidence interval.

TABLE 4
Self-report Outcome Measures at Baseline and Follow-up, by Treatment Assignment

	CL		UC					
Outcome	*n*	*M* (*SD*)	*n*	*M* (*SD*)	*b* [95% CI][a]	*B*[a]	*b* [95% CI][b]	*B*[b]
Suicide ideation								
Baseline	648	21.82 (8.67)	664	22.39 (9.05)				
Follow-up	221	16.84 (8.63)	199	17.39 (8.67)	−0.01 [−1.61, 1.59]	0.00	−0.02 [−1.80, 1.76]	.00
PHQ-9								
Baseline	649	24.69 (6.43)	665	24.66 (6.54)				
Follow-up	221	20.12 (7.08)	200	19.88 (7.30)	0.20 [−1.13, 1.53]	0.03	0.29 [−1.30, 1.89]	.04
Perceived burdensomeness								
Baseline	648	4.87 (1.46)	659	4.86 (1.45)				
Follow-up	221	5.36 (1.47)	199	5.37 (1.47)	0.06 [−0.22, 0.34]	0.04	0.16 [−0.16, 0.49]	.11
Thwarted belongingness								
Baseline	648	4.34 (1.50)	659	4.30 (1.47)				
Follow-up	221	4.61 (1.62)	199	4.54 (1.55)	0.05 [−0.24, 0.35]	0.04	0.07 [−0.27, 0.40]	.04
ACSS								
Baseline	647	50.42 (13.85)	661	50.65 (13.47)				
Follow-up	221	50.76 (14.76)	199	48.84 (14.49)	1.97 [−0.21, 4.16]	0.14	1.99 [−0.37, 4.35]	.15

CL, caring letters; UC, usual care; PHQ-9, patient health questionnaire 9; ACSS, acquired capability for suicide scale.
[a]Model includes all participants who provided data on the measures at either assessment.
[b]Model includes participants who completed both the baseline and follow-up assessments.

less risk than others who do not seek care and die by suicide. In addition, the study recruited approximately one-quarter of the planned sample. These two issues resulted in inadequate power to provide a definitive answer to the primary research question. These results

may be helpful to future researchers seeking to examine mortality outcomes in military populations.

In the current study, we found no difference between treatment conditions in self-reported suicide attempts, hospital readmission (psychiatric or any admission), or rate of first hospital readmission after enrollment. The measurement of these variables suffered from some limitations (e.g., self-report biases, no access to medical records that documented care provided outside the military/VA systems). It is not possible to determine whether improved methods would have resulted in different findings.

It is unclear why the results in the current study differed from some prior studies. In the current study, the e-mail delivery of the messages differed from all prior studies. A possible advantage of e-mailed caring messages, like text messages, is that they can be accessed at any time and everywhere on mobile devices (Luxton, June, & Chalker, 2015). While initial data suggest that military personnel prefer e-mailed CL over postal mail (Luxton et al., 2012), it is possible that the modality is less effective than other delivery methods. Many people receive a variety of "junk" e-mails that may impact how the intervention is received. It is possible that postal mail or other delivery methods receive more attention. Furthermore, our e-mail intervention included unique safety information, such as details about how quickly e-mail replies will be read (see Figure 2). Such information is important in an e-mail version of CL since participants could write when in crisis and expect immediate access to help. The e-mails also included cautions about including personal information in replies, since e-mail cannot be considered private. Furthermore, the e-mails contained a variety of resources and a request to notify the researchers if their e-mail address changes. All of these methodological decisions were carefully considered in collaboration with our IRBs, but there were very little data available to guide our choices. Overall, the content in our intervention differed significantly from the simple caring messages used in some successful prior studies (Carter et al., 2005; Fleischmann et al., 2008; Motto & Bostrom, 2001). It is possible that these features impacted acceptability of the intervention; we do not know how many e-mails were received and read.

Furthermore, the intervention utilized in this trial attempted to personalize some aspects of the caring messages. References were made to hobbies, pets, or similar information discussed during the baseline visit with the goal of increasing the participants' perceptions that they were remembered and cared for. This personalization approach is debated in the field, however, and some experts have noted that such efforts could have unexpected and negative effects (Comtois, 2016). For example, it is possible that a message may inadvertently remind a recipient of something deleterious in their life, such as a now failed relationship or other negative situation in a person's life. Also, if a message included personal information that the participant did not recall sharing, the well-intentioned message could create confusion or even suspicion or paranoia.

The results of the current study showed no differences between treatment conditions in measures of thwarted belongingness or burdensomeness. The mechanisms that have led to beneficial results in some prior CL studies are largely unknown. A recent review of the mechanisms described in caring contact studies or similar brief contact interventions found that social support, suicide prevention knowledge, or learning alternative behaviors are the most frequently discussed mechanisms (Milner et al., 2016). However, one of the primary conclusions of the review was that researchers need to better articulate and measure potential mechanisms. A strength of the current study included well-articulated and measured mechanisms related to the interpersonal theory of suicide (Joiner, 2005); however, there was no evidence that the intervention impacted these mechanisms as measured by the INQ and with this study sample. Therefore, the mechanisms underpinning caring contact interventions require additional research.

Along with the Comtois and colleagues study (2019), ours was one of the first to examine the CL intervention with a military or veteran population. All prior published trials were conducted with civilian populations. A military sample is significantly younger than the general population and contains more men, both of which are demographic risk factors for suicide. Veterans, however, are older than active-duty military personnel, and new research suggests that preferences for the CL intervention may differ between service members and veterans, with veterans preferring conventional postal mail, rather than e-mail (Reger et al., 2017). Our study included both service members and veterans. While the intent of our recruitment strategy was to develop an intervention with broad applicability for these similar populations that both need improved suicide prevention options, it is possible that effects of the intervention could differ between the groups. Additional research is needed to examine how the effects of different caring contact interventions may differ between veterans and active-duty service members.

It is also possible that the significant improvements that the DoD and VA have made in suicide prevention practices in recent years impacted the effectiveness of CL in the current trial. Both the DoD and the VA have been intensely focused on suicide prevention and have made numerous improvements across their systems (U.S. Department of Veteran's Affairs, 2018). CL was originally developed and successfully tested with a subgroup of psychiatric inpatients who failed to follow-up with outpatient care (Motto & Bostrom, 2001); it is possible that CL are more effective in patients experiencing gaps in care or with less support. The sample tested in the current trial likely benefited from the comprehensive suicide prevention programs in place in the DoD/VA.

A final potential explanation of the results of this study is that there is little, if any, direct benefit of the CL intervention as operationalized. The evidence provided from other trials indicates that there may be some benefit on outcomes that are considered mechanisms of suicidal behaviors or that are considered proxies for suicide mortality, such as suicide ideation. Any total effect on suicide mortality, both direct and indirect through various processes, would likely be of smaller magnitude than the associations observed with more proximal outcomes. This may render the detection of a small effect infeasible for a clinical trial setting and also indicates that the small amount of benefit may not be worth pursuing as an intervention choice. As such, the value of CL may be in its overall contribution to other measures of well-being, but not specific to suicide.

The trial did provide some useful information regarding the practical application of the CL intervention. There were no adverse events associated with the intervention, and implementation of the procedures was generally feasible in the military and veteran hospital settings. While the trial provided research assistants to send the caring e-mails, this task can be reasonably done by existing hospital staff. Moreover, the requirement to manage replies from participants who were in crisis was minimal. The ability of caring contacts to reconnect people who were disconnected from care is an extra benefit of this intervention that should not be overlooked. These results provide important methodological considerations for planning future caring contact trials in military populations.

This study has several strengths that add to the value of the results. A large sample of over 1,300 participants was recruited from populations known to be at elevated risk of suicide. The methods updated traditional postal mail approaches to CL that were developed in the 1970s to test a modern communication method. Many of the primary study limitations have been noted above and include an insufficient sample size to analyze mortality outcomes, insufficient discrimination of the type of postrandomization hospitalizations, a low follow-up rate for the survey-based outcome data, and an inability to determine how many e-mail messages were received and read. It is possible that participants e-mail addresses changed during the trial.

A final limitation is the inability to directly address new occurrences of medically admitted, self-inflicted injuries in the study population. Although we used DoD and VA medical encounter data, information was not consistently available regarding the nature of the readmission. Although we also analyzed similar self-report data, this also suffers from limitations (low response rate). All-cause readmission was used as a proxy, and it allowed for competing risks or potential misclassification; however, we cannot provide an answer as to any direct effect on medically admitted nonfatal suicide behaviors.

In the present study, some participants, who communicated distress, were immediately reconnected to their treatment providers. Others responded with expressions of gratitude and appreciation. While this is observational data, it does suggest that the CL intervention can provide the additional benefit of active crisis intervention and that the CL program is valued by participants. The study does help to establish the groundwork for implementation of this simple and inexpensive intervention at VA and military health care settings.

CONCLUSION

Interest in caring contacts has been growing, as national strategic initiatives such as the Zero Suicide framework have emphasized the importance of suicide prevention during gaps in care and periods of transition within health care systems (Brodsky, Spruch-Feiner, & Stanley, 2018). In addition, the Joint Commission recently highlighted caring contacts as a suicide prevention intervention worthy of consideration across health care settings (The Joint Commission, 2014). The results of this study did not support the efficacy of an e-mail version of a caring contacts intervention in a military and veteran sample. There are multiple methodological features of our study that may have contributed to our results. Some prior studies have reported beneficial effects, including the reduction of suicide attempts in a military sample (Comtois et al., 2019). Therefore, additional research is warranted to help determine which characteristics of caring contact interventions are effective and for whom.

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Manuscript Received: February 4, 2019
Revision Accepted: June 11, 2019