Published in final edited form as:

Suicide Life Threat Behav. 2011 October ; 41(5): . doi:10.1111/j.1943-278X.2011.00051.x.

Predictors of Suicide-Related Hospitalization among U.S. Veterans Receiving Treatment for Comorbid Depression and Substance Dependence. Who is the Riskiest of the Risky?

Jennifer Mrnak-Meyer, Ph.D.¹, Susan R. Tate, Ph.D.², Jessica C. Tripp, B.A.¹, Matthew J. Worley, B.A.³, Archana Jajodia, Ph.D.², and John R. McQuaid, Ph.D.⁴

¹VA San Diego Healthcare System 3350 La Jolla Village Dr., San Diego, CA 92161

²VA San Diego Healthcare System and University of California, San Diego 3350 La Jolla Village Dr., San Diego, CA 92161

³San Diego State University/University of California, San Diego Joint Doctoral Program in Clinical Psychology 3350 La Jolla Village Dr., San Diego, CA 92161

⁴San Francisco VA Medical Center and University of California, San Francisco 4150 Clement St., San Francisco, CA 94121

Abstract

This study examined whether widely accepted suicide risk factors are useful in predicting suicide-related hospitalization, beyond history of a suicide attempt, in high-risk treatment-seeking veterans with depression and substance dependence. Negative mood regulation expectancies were the only significant predictor of hospitalization during six-months of outpatient treatment. History of a suicide attempt was the only significant predictor of hospitalization during the one-year follow-up period. Results suggest that within high-risk populations, standard suicide risk factors may not identify individuals who will engage in suicidal behaviors resulting in hospitalization. Assessing negative mood regulation expectations may assist in identifying those most at risk.

It is generally agreed upon that individuals at risk for suicide are more likely to be male, over 60 years of age, have a history of previous suicide behavior, and experience relationship instability (Rudd, 2006). History of suicide attempt(s) is known to be one of the most robust predictors of future attempts (Harris & Barraclough, 1997; Miranda, Scott, Hicks, Wilcox, Munfakh, et al., 2008). It is also well established that depression is a significant risk factor for suicide attempt and completed suicide (Brown, Beck, Steer, & Grisham, 2000; Sokero, Melartin, Rytsala, Leskele, Lestela-Mielonen, et al., 2005). Substance use and substance use disorders are a known suicide risk factor as well (Johnson & Fridell, 1997; Pruess, Schuckit, Smith, Danko, & Bucholz, 2003). Further, self-reported intent to commit suicide has been associated with co-morbid depression and substance use (Richardson-Vejlgaard, Sher, Oquendo, Lizardi, & Stanley, 2009).

Another construct that has been significantly associated with increased suicide risk is an individual's belief in his/her ability to regulate or modify his/her negative mood state (Marquart, Overholser, & Peak, 2009). A current theory regarding mood regulation expectancies and suicidality posits that people with low negative mood regulation beliefs are

less prone to use adaptive coping strategies and more prone to use ineffective strategies to manage negative affective states, such as suicide (Catanzaro, 2000).

The total number of U.S. veterans in 2010 is estimated to be 22.7 million (NCVAS, 2010) and veterans account for approximately one in five of the over 30,000 completed suicides in the United States each year (Center for Disease Control and Prevention, 2007, 2008). Nationally, five suicide-related deaths occur per day and 950 suicide attempts occur per month among veterans receiving care within the VA healthcare system (Veterans Health Administration, 2010). Research indicates that a large majority of veterans do well after leaving the military (Iversen, Nikolaou, Greenberg, Unwin, Hull, et al., 2005) and relative to the general population veterans have lower mortality rates (Kang & Bullman, 1996, 2001). However, recent literature also suggests that subgroups of military veterans are at an increased risk for attempting and completing suicide relative to the general population; specifically younger veterans (Kapur, While, Blatchley, Bray, & Harrison, 2009) and veterans with mental health disorders, including depressive disorders and substance use disorders (Kang & Bullman, 2008). Veterans are also likely to have other suicide risk factors, such as male sex, low social support, other psychiatric conditions associated with suicide (i.e. posttraumatic stress disorder), and access to and knowledge of firearms (Lambert & Fowler, 1997). Recent research has suggested that military training and combat exposure may result in an increased capability of completing suicide, in part due to habituation to fear of a lethal injury (Selby, Anestis, Bender, Ribeiro, Nock, et al., 2010).

In the current study, we examine whether commonly accepted predictors of suicide risk pertain to a high-risk sample of veterans with co-occurring depression and substance use disorders. The goal of the present study was to investigate factors at treatment entry that predict suicide-related hospitalization and completed suicide, over and above history of past suicide attempts, during the process of treatment, as well as during the year following treatment in a sample of veterans receiving either Integrated Cognitive Behavioral Treatment (ICBT) or Twelve-Step Facilitation (TSF) group treatment. Suicide-related hospitalization was defined as hospitalization because of an actual suicide attempt or severe ideation in which the individual was judged to be a danger to self. Intake factors examined included previously established suicide risk predictors such as demographics (age, gender, marital status, ethnicity), social support, depression and substance use severity, as well as less established predictors including negative mood regulation expectancies and posttraumatic stress disorder (PTSD) diagnosis.

METHODS

Participants

The sample consisted of 269 veterans participating in a clinical trial evaluating two psychotherapy interventions recruited between March 2000 and March 2008 from referrals to a dual diagnosis outpatient clinic at the Veterans Affairs San Diego Healthcare System (VASDHS). A total 2,595 individuals were referred to this dual diagnosis clinic and assessed for study eligibility. Of those, 2,324 individuals were excluded: 2,246 did not meet inclusion criteria, 59 had schedule conflicts or other treatment was more appropriate, and 19 declined to participate in the study. As confidentiality prevents us from gathering data on individuals who decline participation and do not consent, we cannot state if the 19 individuals who declined were systematically different from those who chose to participate. Suicide-related hospitalization data was missing for 56 participants at all treatment and follow-up assessment time points, resulting in a sample of 213 for the current analyses. The sample was predominantly male (88.7%), Caucasian (69%), and unmarried (83.6%). Mean age of the sample was 49.1 (SD = 7.7). At intake, 46% of the sample reported attempting suicide previously and 33.8% of the sample was diagnosed with PTSD.

Inclusion criteria for study enrollment included the presence of current DSM-IV diagnosis of alcohol, cannabinol, and/or stimulant dependence and major depressive disorder (MDD) independent of alcohol/substance use. Substance-independent MDD was defined as meeting criteria for a current major depressive episode, in addition to a lifetime diagnosis of MDD with at least one major depressive episode independent of substance use. Exclusion criteria included: (1) DSM-IV diagnosis of bipolar disorder, psychotic disorder, or opiate dependence through intravenous administration, (2) residing approximately 50 miles or more away from the VASDHS, or (3) documented cognitive deficits that would impair accurate recall for assessments.

Procedures

Following referral to the dual diagnosis outpatient clinic, veterans who met the inclusion/exclusion criteria and expressed interest in the study were provided detailed information about study procedures by research staff and written informed consent was obtained. Participants consented to: (1) assignment to 24 weeks of either ICBT or TSF, (2) assessment interviews at intake, mid-treatment, end of treatment, and quarterly thereafter for a total of 18 months, (3) random toxicology screens at group sessions and follow-up interviews, (4) VA standard protocol medication management appointments with a clinic psychiatrist, and (5) not participate in other formal treatment for depression or substance dependence during the 24 week intervention period, other than the VA psychiatrist medication appointments and Twelve-Step meetings in the community. The study was approved by the VASDHS and University of California, San Diego Institutional Review Boards and was funded via a VA Medical Research Merit Review Grant.

Interventions

Both study interventions were administered in group format, consistent with standard care provided in the outpatient substance abuse, depression, and dual diagnosis clinics in this healthcare setting. Both interventions were administered by two therapists, a more senior clinician and a doctoral-level practicum student. Therapists changed every one to two years.

Integrated Cognitive Behavioral Therapy (ICBT)—Newly developed for this study, ICBT combined two empirically validated treatments: Cognitive-Behavioral Depression Treatment (Munoz, Ying, Perez-Stable, & Miranda, 1993) and Cognitive-Behavioral Coping Skills Training of Addiction evaluated in Project Matching Alcoholism Treatments to Client Heterogeneity (Project MATCH; Kadden, Carroll, Donovan, Cooney, Monti, et al., 1994). The Project MATCH intervention was modified to allow group (versus individual) delivery and entry points at the beginning of any module. Phase I of ICBT included three modules (managing cognitions, increasing healthy behaviors, and improving interpersonal skills), with each module consisting of eight sessions delivered over four weeks. Each module topic addressed managing symptoms of depression as well as increasing skills for sobriety and relapse prevention. In Phase II, the skills introduced in Phase I were reviewed and reinforced.

Twelve-Step Facilitation (TSF) Therapy—TSF is a formal therapist-guided group intervention that was based on the Project MATCH TSF treatment (Nowinski, Baker & Carroll, 1994). As with ICBT, the manual was modified to allow for group delivery, entry at the beginning of each module, three modules in Phase I, and review and reinforcement of skills in Phase II. The three modules included: Alcoholics Anonymous/Narcotics Anonymous (AA/NA) Steps 1-3, topics common in AA/NA meetings and Twelve-Step literature, and AA/NA Steps 4 and 5. If participants raised issues related to depression symptoms, TSF themes were utilized or participants were advised to discuss depression symptoms at medication appointments with their psychiatrist.

Consecutive admissions to the dual diagnosis clinic that provided consent were sequentially assigned to the treatment group with the next entry date. Groups had entry times every four weeks and the ICBT and TSF entry times were staggered. Therefore, participants entered with a maximum of a two-week waiting period. The feasibility of this design has been evaluated (Drapkin, Tate, McQuaid, & Brown, 2008). Both interventions had two consecutive 12-week phases of treatment. The initial phase involved twice weekly 60-minute group sessions and the second phase consisted of once weekly 60-minute group sessions. Treatment dropout was defined as attending less than 7 of the 36 possible treatment sessions and approximately 10.8% of the sample were classified as early dropouts using this cut-off. Participants attended an average of 20.4 sessions ($SD = 9.7$).

Individuals in both interventions received monthly individual medication management appointments with a psychiatrist using standard VA medication protocol. Veterans were also eligible to receive social work services, such as housing, financial, and educational assistance, and referrals to community resources.

Measures

Research staff that conducted assessments changed over the eight years that the study was conducted. To ensure research personnel were trained to criterion on all assessments, review of training materials, observation of senior assessors, joint interviewing, observation of independent interviewing, and recorded agreement on scoring was conducted. Predictor variables were assessed at treatment entry using the following measures:

Diagnoses—The Composite International Diagnostic Interview (CIDI), developed by the World Health Organization, utilizes a structured interview to evaluate independent psychiatric symptoms separately from psychiatric symptoms associated with medical conditions or substance use/withdrawal (Robins, Wing, Wittchen, Helzer, Babor, et al., 1988). The CIDI assessed lifetime and current DSM-IV Axis I psychiatric and substance use disorder diagnoses. The CIDI provided current PTSD diagnosis, coded as absent (0) or present (1).

History of Lifetime Suicide Attempts/Demographics/Pretreatment Substance Use—The Addiction Severity Index (ASI) evaluates the nature and severity of problems associated with substance use (McLellan, Kushner, Metzger, Peters, Smith, et al., 1992). For the present study, the ASI provided the number of days participants reported using alcohol and other drugs in the 30 days prior to beginning treatment, demographic factors (gender, age, ethnicity, marital status), and history of lifetime suicide attempts (0 = no, 1 = yes).

Pretreatment Depression Severity—The Beck Depression Inventory-II (BDI-II) is a 21-item self-report instrument that assesses the affective, cognitive, behavioral, somatic, and motivational symptoms of depression over the most recent two-week period (Beck, Steer, & Brown, 1996; Steer & Beck, 2000). Items are rated on 4-point scale (0 to 3), with higher scores indicating more severe depression.

Social Support—The Social Support Questionnaire (SSQ) assesses perceived social support via a structured interview (Cahalan, Cisin, & Crossley, 1969; Sarason, Levine, Basham, & Sarason, 1983). Individuals are asked to identify social supports in four categories: partner/spouse, family members, friends, and other (i.e. boss, co-worker, neighbor). For each identified support, the number of days of contact with that person over an average 30-day period in the prior three months is assessed. Total social contact was calculated by summing the days of contact for each social support listed. Due to distributional characteristics, social support was dichotomized into two categories: low

social support (0-29 contacts reported in the assessment timeframe; 46.5% of sample) and high social support (30-173 contacts reported in the assessment timeframe; 46.5% of sample).

Negative Mood Regulation—The Negative Mood Regulation (NMR) scale is a 30-item self-report measure that assesses an individual's belief in their ability to alleviate their negative mood states (Catanzaro & Mearns, 1990). The total NMR score is composed of three subscales (cognitive, behavioral, general) and items are rated on a 5-point Likert scale (1 to 5), with higher scores suggesting greater belief in one's ability to self-regulate their negative mood. The cognitive subscale assesses expectations regarding the effectiveness of cognitive strategies to alleviate negative moods ("I'll feel okay if I think about more pleasant times"). The behavioral subscale assesses beliefs about the effectiveness of behavioral mood regulation strategies ("Doing something nice for someone else will cheer me up"). The general subscale assesses other broad beliefs regarding one's ability to lessen negative mood states ("I can usually find a way to cheer myself up"). The mean item score for each subscale and the total NMR was utilized in analyses.

Suicide-related Hospitalizations—The suicide outcome variable was assessed at each quarterly assessment for a total of 18 months (24 weeks of treatment and 12 months following treatment completion). Suicide-related hospitalizations resulting from an attempt or severe ideation were assessed as part of a standardized global life stress assessment interview and verified by review of hospital records. Participants indicated the stressors they had experienced during the assessment time-frame using a checklist of 133 stressors from the Psychiatric Epidemiological Research Interview-Modified (Hirschfield, Lerman, Schless, Endicott, Lichtenstaeder, et al., 1977). The research interviewer then gathered additional information regarding each endorsed stressor. Suicide-related hospitalizations reported in the interview were subsequently verified by electronic medical chart review. For current analyses, suicide-related hospitalization was dichotomized to reflect presence (1) or absence (0).

Data Analytic Plan

Chi-square tests were conducted to examine if a significant difference in suicide-related hospitalizations existed between treatment conditions during the six-month treatment period and one-year post treatment period. Significant differences were not found and consequently analyses were conducted using the total sample. Next, as history of prior suicide attempts (SA) is known to be one of the most robust predictor of future attempts (Harris & Barraclough, 1997) a binary logistic regression with history of lifetime SA (0=no, 1=yes) as the independent variable versus a constant only model was conducted. A series of independent, sequential binary logistic regression analyses were then conducted to examine if the addition of other well-documented predictors significantly added to the prediction of suicide-related hospitalization above and beyond history of prior SA. Lastly, a combined model was run including any predictor variables that were significant at the univariate level using forced entry. Analyses were conducted separately for the 6-month treatment period and the 12-month post-treatment follow-up period

RESULTS

Intake Characteristics and Frequency of Hospitalizations

Intake characteristics of the sample are reported in Table 1. Participants reported an average of two psychiatric hospitalizations and five outpatient psychiatric treatment episodes prior to the current treatment intervention. During the six-month treatment period, 27 individuals (12.7%) were hospitalized for suicidality; 13 (6.1%) were hospitalized for suicidal ideation

and 14 (6.6%) for an actual suicide attempt. During the 12-months following treatment, 27 people (12.7%) were hospitalized; 15 (7.0%) for suicidal ideation and 12 (5.6%) for a suicide attempt. Two participants completed suicide (~1%), one while in treatment and one during the follow-up period, and both were included in the analyses (coded 1). One participant died of an accidental overdose during treatment and was not included in the treatment or follow-up analyses. Another participant, who died of an accidental overdose during the follow-up period, was included in the treatment analyses, but excluded from the follow-up analyses. There was no evidence of clustering of suicidal ideation/attempts within the sample.

Predictors of Treatment Hospitalizations

History of Lifetime Suicide Attempts—History of a prior SA contributed significantly to the prediction of suicide-related hospitalization during treatment, Nagelkerke $R^2 = 0.052$, $^2(1, 195) = 5.736$, $p = 0.017$, $O.R. = 2.807$ [95% C.I. = 1.164-6.767]. Individuals with a history of a prior SA were approximately three times more likely to have a suicide-related hospitalization during the six-month treatment period compared to individuals without a prior SA.

Addition of Hypothesized Predictors—The addition of the total NMR, Nagelkerke $R^2 = 0.089$, $^2(2, 181) = 5.801$, $^2 p = 0.048$, the cognitive NMR, Nagelkerke $R^2 = 0.093$, $^2(2, 181) = 5.793$, $^2 p = 0.038$, and pretreatment alcohol use, Nagelkerke $R^2 = 0.102$, $^2(2, 178) = 6.433$, $^2 p = 0.022$, to the equation with history of SA each resulted in significant model improvement. The addition of age, gender, ethnicity, marital status, social support, pretreatment drug use, the BDI, and the general and behavioral NMR did not significantly improve prediction of suicide-related hospitalizations beyond that of history of lifetime suicide attempts.

Combined Model—A combined model was run with lifetime SA, the total NMR scale, and alcohol use, as predictors to investigate the relative importance of each variable in the prediction of suicide-related hospitalization. Due to the item overlap between the total NMR and NMR cognitive subscale, only the total NMR scale was entered into the combined model. Table 2 summarizes results of the combined model. According to the Wald criterion, the only statistically significant predictor of suicide-related hospitalization was the total NMR scale. Findings suggest that for every point increase in the average item score on the NMR scale, odds of suicide-related hospitalization are decreased by approximately 73%.

Predictors of Post-Treatment Hospitalizations

History of Lifetime Suicide Attempts—History of a pretreatment SA contributed significantly to the prediction of suicide-related hospitalization during post-treatment, Nagelkerke $R^2 = 0.090$, $^2(1, 143) = 8.316$, $p = 0.004$, $O.R. = 3.635$ [95% C.I. = 1.433-9.220]. Individuals with a pretreatment SA were approximately 3.6 times more likely to have a suicide-related hospitalization during the one-year post treatment compared to individuals without a pretreatment SA.

Addition of Hypothesized Predictors—The addition of social support, Nagelkerke $R^2 = 0.200$, $^2(2, 140) = 0.007$, $^2 p = 0.001$, and pretreatment drug use, Nagelkerke $R^2 = 0.139$, $^2(2, 131) = <.001$, $^2 p = 0.012$, to the equation with pretreatment SA each resulted in significant model improvement. The addition of age, gender, ethnicity, marital status, pretreatment alcohol use, the BDI, and the total, general, cognitive, and behavioral NMR did not significantly improve prediction of suicide-related hospitalizations beyond that of pretreatment SA.

Combined Model—A combined model was conducted with lifetime history of SA, social support, and pretreatment drug use as predictors. Table 3 summarizes the results of the combined model for the follow-up period. According to the Wald criterion, the only statistically significant predictor of suicide-related hospitalization was lifetime history of SA. Findings suggest that individuals with a lifetime SA are 2.7 times more likely to have suicide-related hospitalization during the one-year post treatment follow-up period compared to those without a lifetime SA.

DISCUSSION

The goal of the present study was to identify pretreatment factors and baseline characteristics predictive of suicide-related hospitalization or completed suicide within a high-risk population of veterans with comorbid depression and substance dependence during treatment and one-year post-treatment. Approximately 13% of the sample was hospitalized for suicidality during treatment and 13% during the one-year follow-up period. This finding suggests that suicidal behaviors continue to be prevalent among veterans with depression and substance dependence who are engaged in treatment, which is consistent with prior research (Kausch & McCormick, 2002).

History of a suicide attempt continued to be a robust predictor of suicide-related hospitalization within the high-risk population examined in the present study. Individuals with a history of a SA were 3 to 3.6 times more likely to exhibit suicidal behaviors resulting in hospitalization relative to individuals without a history of a SA, suggesting that within a population at high risk for suicide, past behavior continues to be one of the best predictors of future behavior.

During treatment, negative mood regulation expectancies and alcohol use added to the prediction of suicide-related hospitalization beyond that of past SA. Interestingly, when past SA, mood regulation expectancies, and alcohol use were put into a combined model, only negative mood expectancies were significantly predictive of suicidality. During the one-year follow-up period, drug use and social support added to the prediction of suicide-related hospitalization beyond that of past SA, but past SA was the only significant predictor in the combined model.

Of note, we found that many common suicide risk factors (i.e., age, gender, ethnicity depression severity) were not predictive of suicide-related hospitalization beyond past SA. This finding illustrates that within a high-risk clinical population several of the widely used risk factors may not prove useful in identifying individuals at risk of exhibiting suicidality that merits hospitalization. This finding is consistent with Herman (2006) who found the SADPERSONS Scale poorly predicted actively suicidal individuals within a predominantly male, elderly, alone, and ill veteran population. Clearly, additional replication of these findings in other high-risk samples would be beneficial for informing this essential element of clinical practice.

A pretreatment factor that was found to be useful in predicting suicide-related hospitalization (above past SA) during treatment was negative mood expectancies. This is consistent with the findings of others (Marquart, Kushner, Metzger, Peters, Smith, et al., 2009) and adds support to Catanzaro's (2000) theory that risk for suicidality may be greater among individuals who believe they cannot modify their negative moods, as these individuals may utilize more ineffective and avoidant coping strategies.

This finding also suggests that negative mood regulation expectancies may be an important factor for clinicians to assess, in addition to history of past SA, when treating individuals in

a high-risk population. Doing so may help to identify individuals at greatest risk of developing suicidal ideation or making a suicide attempt. Clinical interventions focused on improving negative mood regulation skills, either via coping skills training or cognitive restructuring, may also aid in reducing suicidality within high-risk populations by strengthening negative mood regulation expectancies. Dialectical behavior therapy (DBT; Linehan, 1993), consists of many of these therapeutic elements and has demonstrated effectiveness in reducing suicidality (Stanley, Brodsky, Nelson & Dulit, 2007). Of note, negative mood expectancies assessed pretreatment were not predictive of suicide-related hospitalization in the year following treatment completion. We speculate that expectancies regarding mood regulation improved as a result of the interventions provided in the treatment phase of this study, and thus intake expectancies were no longer predictive post-treatment. Thus, research is needed to clarify whether assessing negative mood expectancies at the end of treatment may be advisable for identifying individuals at high risk for suicidal behaviors after treatment completion.

The current study has limitations. Due to low numbers of actual suicide attempts during the timeframes studied, the suicide outcome variable was collapsed to include hospitalizations resulting from severe suicidal ideation, in addition to actual attempts. Therefore, results may differ if the outcome variable is limited to only attempts or completed suicide. Further, low levels of pretreatment substance use in the 30 days preceding treatment entry within the sample may have limited our investigation of the impact of alcohol and other drugs on future suicidality. Thus, although non-significant odds ratios suggested a reduced risk of suicidality during treatment was associated with higher pretreatment alcohol use, this finding should be interpreted with caution. Limited days of use in the 30 days preceding treatment entry may be confounded with time in constrained settings preceding treatment in this severe comorbid sample (i.e., inpatient hospitalization averaged more than 16 days; Worley et al., 2010), rather than reflecting commitment to abstinence in non-constrained settings. Although non-significant, the direction of odds ratios for drug use and social support in predicting post-treatment suicidality contrasts with prior literature. Similar to negative mood regulation expectancies, we speculate that it may be informative to re-assess pretreatment factors that are targets for change in treatment to enhance prediction of post-treatment suicidality. As previously noted, replication of these results in other high-risk samples and settings is also needed.

Finally, we did not assess, and therefore did not to examine, other potential factors that may be of relevance to the prediction of suicidality, such as rank of veteran when discharged, length of military service/deployments, length of time since discharge, discharge status (i.e. due to medical condition), history of suicide in social network (i.e. family/friends/colleagues), and previous injuries/medical treatment. Standard vetting procedures utilized during military recruitment suggest the sample was free of documented mental health, substance use, and major physical health problems prior to entrance into U.S. military service.

Possible future clinical and research directions include the development of preventative interventions for high-risk populations that target increasing negative mood regulation skills and expectancies, followed by an investigation of their efficacy and effectiveness. Further investigation into the different types of negative mood regulation expectancies (i.e. cognitive, behavioral, general) and their impact on suicidality may also provide useful information in the development of clinical interventions for high-risk populations.

In conclusion, standard suicide risk factors may not be decidedly useful in identifying individuals who will exhibit suicidal behaviors that result in hospitalization or complete suicide within high-risk populations, specifically veterans with comorbid depression and

substance dependence. Incorporating a brief self-report measure of negative mood regulation may assist in identifying the riskiest of the risky and inform future intervention development.

REFERENCES

- Beck, AT.; Steer, RA.; Brown, GK. Manual for Beck Depression Inventory-Second Edition. Psychological Corporation; San Antonio, TX: 1996.
- Brown GK, Beck AT, Steer RA, Grisham JR. Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. *Journal of Consulting and Clinical Psychology*. 2000; 68:371–377. [PubMed: 10883553]
- Cahalan, D.; Cisin, IH.; Crossley, HM. American drinking practices: A national study of drinking behavior and attitudes. Rutgers Center of Alcohol Studies; New Brunswick, NJ: 1969. Monograph No. 6
- Catanzaro, SJ. Mood regulation and suicidal behavior. In: Joiner, T.; Rudd, MD., editors. *Suicide Science Expanding the Boundaries*. Kluwer Academic Publishers; Norwell, Massachusetts: 2000. p. 81-104.
- Catanzaro SJ, Mearns J. Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. *Journal of Personality Assessment*. 1990; 54:546–563. [PubMed: 2348341]
- Center for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. National Center for Injury Prevention and Control, CDC (Producer); 2008. Available from URL: www.cdc.gov/injury/wisqars/index.html [Accessed 2010 Jan 20]
- Center for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. National Center for Injury Prevention and Control, CDC (Producer); 2007. Available from URL: www.cdc.gov/injury/wisqars/index.html [Accessed 2010 Jan 20]
- Drapkin ML, Tate, Susan R, McQuaid, John R, Brown SA. Does initial treatment focus influence outcomes for depressed substance abusers? *Journal of Substance Abuse Treatment*. 2008; 35:343–350. [PubMed: 18295436]
- Harris EC, Barraclough B. Suicide as an outcome for mental disorders: A meta-analysis. *British Journal of Psychiatry*. 1997; 170:205–228. [PubMed: 9229027]
- Herman SM. Is the SADPERSONS scale accurate for the veterans affairs population? *Psychological Services*. 2006; 3:137–141.
- Hirschfield, RMA.; Lerman, GL.; Schless, AP.; Endicott, J.; Lichtenstaeder, S.; Clayton, PJ. Modified Life Events sections of the Psychiatric Epidemiology Research Interview (PERI-M). National Institute of Mental Health; Bethesda, MD: 1977.
- Iverson A, Nikolaou V, Greenberg N, Unwin C, Hull L, Hotopf M, Dandeker C, Ross J, Wessely S. What happens to British veterans when they leave the armed forces? *European Journal of Public Health*. 2005; 15:175–184. [PubMed: 15755777]
- Johnson E, Fridell M. Suicide Attempts in a Cohort of Drug Abusers: a 5-Year Follow-up Study. *Acta Psychiatrica Scandinavica*. 1997; 96:362–366. [PubMed: 9395154]
- Kadden, K.; Carrol, K.; Donovan, D.; Cooney, N.; Monti, P.; Abrams, D.; Litt, M.; Hester, R. National Institute on Alcohol Abuse and Alcoholism. Vol. Vol. 1. National Institute of Health; 1994. Cognitive-Behavioral Coping Skills Therapy Manual. Project MATCH Monograph seriesPublication No. 94 – 3724
- Kang HK, Bullman TA. Mortality among U.S. veterans of the Persian Gulf war. *The New England Journal of Medicine*. 1996; 335:1498–1504. [PubMed: 8890102]
- Kang HK, Bullman TA. Mortality among US veterans of the Persian Gulf war: 7-year follow-up. *American Journal of Epidemiology*. 2001; 154:399–405. [PubMed: 11532780]
- Kang HK, Bullman TA. Risk of suicide among US veterans after returning from the Iraq or Afghanistan war zones. *Journal of the American Medical Association*. 2008; 300:652–653. [PubMed: 18698062]
- Kapur N, While D, Blatchley N, Bray I, Harrison K. Suicide after leaving the UK armed forces – A cohort study. *PloS Med*. 2009; 6:e10000026. doi10.1371/journal.pmed.10000026.

- Kausch O, McCormick RA. Suicide prevalence in chemical dependency programs: Preliminary data from a national sample and an examination of risk factors. *Journal of Substance Abuse Treatment*. 2002; 22:97–102. [PubMed: 11932135]
- Lambert MT, Fowler DR. Suicide Risk Factors Among Veterans: Risk Management in the Changing Culture of the Department of Veterans Affairs. *Journal of Mental Health Administration*. 1997; 24:350–358. [PubMed: 9230576]
- Linehan, M. Cognitive behavioral treatment of borderline personality disorder. Guilford Press; New York: 1993.
- Marquart AL, Overholser JC, Peak NJ. Mood regulation beliefs in depressed psychiatric inpatients: Examining affect, behavior, cognitive, and social strategies. *International Journal of Psychiatry in Clinical Practice*. 2009; 13:265–272.
- McLellan AT, Kushner H, Metzger D, Peters RH, Smith I, Grissom G, Pettinati H, Argeriou M. The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment*. 1992; 9:119–213.
- Miranda R, Scott M, Hicks R, Wilcox HC, Munfakh JLH, Shaffer D. Suicide attempt characteristics, diagnoses, and future attempts: Comparing multiple attempters to single attempters and ideators. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2008; 47:32–40. [PubMed: 18174823]
- Munoz, RF.; Ying, Y.; Perez-Stable, EJ.; Miranda, J. The prevention of depression: Research and practice. John Hopkins University Press; Baltimore, MD: 1993.
- National Center for Veterans Analysis and Statistics (NCVAS. [Accessed 2011 Feb 24] Veteran population projections: FY2000 to FY 2036. [Online]. 2010. Available from URL: www.va.gov/vetdata/docs/QuickFacts/population-slideshow.pdf
- Nowinski J, Baker S, Carroll K. Twelve-Step Facilitation Therapy Manual: A Clinical Research Guide for Therapists Treating Individuals With Alcohol Abuse and Dependence. National Institute on Alcohol Abuse and Alcoholism. 1994; Vol. 1 NIH Publication No. 94 – 3722. Project MATCH Monograph series
- Preuss UA, Schuckit MA, Smith TL, Danko GP, Bucholz KK, Hesselbrock MN, Hesselbrock V, Kramer JR. Predictors and Correlates of Suicide Attempts Over 5 Years in 1,237 Alcohol-Dependent Men and Women. *American Journal of Psychiatry*. 2003; 160:56–63. [PubMed: 12505802]
- Richardson-Vejlgaard R, Sher L, Oquendo MA, Lizardi D, Stanley B. Objections to Suicide Among Depressed Patients with Alcohol Use Disorders. *Journal of Affective Disorders*. 2009; 117:197–201. [PubMed: 19223263]
- Robins LN, Wing J, Wittchen HU, Helzer JE, Babor TF, Burke J, Farmer A, Jablenski A, Pickens R, Regier DA, Sartorius N, Towle L. The Composite International Diagnostic Interview. An epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. *Archives of General Psychiatry*. 1988; 45:1069–1077. [PubMed: 2848472]
- Rudd, MD. Completing the picture: Assessing other risk factors. Professional Resources Press; Sarasota, FL: 2006. The assessment and management of suicidality; p. 35–42.
- Sarason IG, Levine HM, Basham RB, Sarason BR. Assessing social support: The Social Support Questionnaire. *Journal of Personality and Social Psychology*. 1983; 44(1):127–139.
- Selby EA, Anestis MD, Bender TW, Ribeiro JD, Nock MK, Rudd DM, Bryan CJ, Lim IC, Baker MT, Gutierrez PM, Joiner TE. Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the interpersonal-psychological theory of suicide. *Clinical Psychology Review*. 2010; 30:298–307. [PubMed: 20051309]
- Sokero TP, Melartin TK, Rytsala HJ, Leskela US, Lestela-Mielonen PS, Isometsa ET. Prospective study of risk factors for attempted suicide among patients with DSM-IV major depressive disorder. *British Journal of Psychiatry*. 2005; 186:314–318. [PubMed: 15802688]
- Stanley B, Brodsky B, Nelson JD, Dulit R. Brief Dialectical Behavior Therapy (DBT-B) for suicidal behavior and non-suicidal self injury. *Archives of Suicide Research*. 2007; 11:337–341. [PubMed: 17882621]

- Steer, RA.; Beck, AT. The Beck Depression Inventory-II. In: Craighead, WE.; Nemeroff, CB., editors. The Corsini Encyclopedia of psychology and behavioral science. 3rd ed. Vol. vol. 1. Wiley; NY: 2000. p. 178-179.
- Veteran's Healthcare Administration (VHA). Office of Patient Care Services/Office of Mental Health Services. [Accessed 2011 Jan 20] Fact sheet: VA suicide prevention program. Facts about veteran suicide. Aug. 2010 Available from URL: http://vaww.mentalhealth.va.gov/docs/Fact_Sheet_Suicide_Prevention_final--8-23-2010.doc
- Worley MJ, Trim RS, Tate SR, Hall JE, Brown SA. Service utilization during and after outpatient treatment for comorbid substance use disorder and depression. Journal of Substance Abuse Treatment. 2010; 39:124–131. [PubMed: 20598832]

Table 1

Sample intake characteristics.

Predictor	%
Past suicide attempt	46.0
Male	88.7
Caucasian	69.0
Unmarried	83.6
Low Social Support	46.5
Current PTSD	33.8
Predictor	M(SD)
Age	49.1 (7.7)
BDI	24.77 (10.48)
Days alcohol use	1.75 (5.88)
Days drug use	2.32 (5.60)
NMR total	3.16 (.40)
NMR general	3.10 (.50)
NMR cognitive	3.09 (.46)
NMR behavioral	3.29 (.49)

Note. NMR item Mean (SD) reported.

Table 2

Results of six-month treatment period combined binary logistic regression model.

Predictor	<i>B</i>	SE	Wald	<i>p</i>	Odds Ratio	95% CI	
						Upper	Lower
Lifetime SA	0.708	0.501	1.997	0.158	2.03	0.760	5.420
Alcohol Use	−0.191	0.123	2.396	0.122	0.827	0.649	1.052
NMR Total	−1.29	0.603	4.572	0.033	0.275	0.084	0.898

Note. Model results = $\chi^2(3, N = 170) = 9.689, p = 0.288; R^2 = 0.146$.

Table 3

Results of one-year post-treatment combined binary logistic regression model.

Predictor	<i>B</i>	SE	Wald	<i>p</i>	Odds Ratio	95% CI	
						Upper	Lower
Lifetime SA	0.984	0.470	4.212	0.040	2.675	1.045	6.845
Social Support	0.349	0.451	0.599	0.439	1.418	0.586	3.434
Drug Use	−0.036	0.056	0.423	0.516	0.965	0.865	1.076

Note. Model results = $\chi^2(3, N = 178) = 4.601, p = 0.596; R^2 = 0.062$.