The Moderating Role of Perceived Social Support on Alcohol Treatment Outcomes

SHAHRZAD MAVANDADI, PH.D.,^{a,b,*} AMY HELSTROM, PH.D.,^{a,b} STEVEN SAYERS, PH.D.,^{a,b} & DAVID OSLIN, M.D.,^{a,b}

^aVISN 4 Mental Illness Research, Education, and Clinical Center, Corporal Michael J. Crescenz Veterans Affairs (VA) Medical Center, Philadelphia, Pennsylvania

^bDepartment of Psychiatry, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania

ABSTRACT. Objective: This study examined the extent to which perceived social support is related to longitudinal treatment outcomes among heavy drinkers randomized to a brief, telephone-based care management intervention versus standard care. **Method:** This is a secondary analysis of data from a randomized trial comparing an enhanced, brief alcohol intervention to standard care. Participants comprised 136 male, heavy drinkers (mean age = 57.3 years) receiving primary care at Corporal Michael J. Crescenz Veterans Affairs Medical Center clinics. Participants in the intervention arm received a telephone-based care management intervention focused on helping patients reduce their alcohol use. Primary measures included the Timeline Followback method for number of heavy drinking days and the Multidimensional Scale of Perceived Social Support for self-reported baseline social support. **Results:** Although there was no significant main effect for baseline

perceived social support on number of heavy drinking days over time, there was a significant three-way interaction (Perceived Social Support $\times$ Randomization Group $\times$ Time). Specifically, among patients reporting high support, those randomized to the intervention arm experienced significantly greater declines in number of heavy drinking days over time. Conversely, among patients reporting low support, those randomized to standard care experienced more improvement over the course of follow-up. **Conclusions:** Perceived social support may be related to differential outcomes depending on whether patients are in care management or standard care. For those receiving brief intervention, certain therapy techniques may mobilize pre-existing social resources and/or enhance the ability for patients to use their social supports, suggesting the need for replication and further research in understanding this interaction. (*J. Stud. Alcohol Drugs*, 76, 818–822, 2015)

INDIVIDUALS WHO SCREEN POSITIVE for heavy alcohol use often are not in need of or receptive to specialty treatment (Bien et al., 1993; Mathews & Oslin, 2009). Evidence suggests that integrating behavioral health care into primary care settings may be more effective in yielding positive clinical outcomes among heavy and problem drinkers. For example, recent trials (Whitlock et al., 2004) have examined the efficacy of collaborative care models in which behavioral health care managers who are trained to deliver patient-centered, measurement-based care work with the primary care team to provide guideline-adherent care via frequent patient contact, monitoring of symptoms and treatment adherence, and feedback and modification of treatment as needed. Recent reports indicate that collaborative care programs, including those delivered by telephone, are associated with improved engagement rates and reduced drinking (Oslin et al., 2003, 2014).

Although the evidence base for collaborative care management is strong, the likelihood of positive outcomes following treatment and the sustainability of those outcomes

rely on a variety of factors. One such factor is the individual's social environment. Interpersonal problems and marital conflict are common among heavy drinkers (Walitzer & Dearing, 2006). Social support from family and friends has long been recognized to serve as a buffer in times of stress (Cohen, 2004). Interpersonal, supportive exchanges that provide tangible assistance, advice, companionship, nurturance, and reassurance of worth have been shown to enhance psychosocial and physical well-being both in general and in response to disruptive life events (Cohen, 2004). Because alcohol use disorder represents a stressful life circumstance that affects social relationships, a number of studies have shown a significant, positive association between both the level of social support and characteristics of the social network (e.g., size, composition, density) and treatment outcomes among individuals with alcohol use disorders (Dobkin et al., 2002; Gordon & Zrull, 1991; Humphreys et al., 1997; Moos & Moos, 2007).

The research on the association between social support and outcomes after brief intervention among heavy drinkers is less robust. Few studies have examined the association between social support and treatment outcomes among heavy drinkers—who tend to experience comorbid psychiatric conditions such as depression and anxiety—receiving care in naturalistic primary care settings. Heavy drinking, depressive symptoms, and anxiety are all correlated with social network function and quality, highlighting the value of taking social support into account when evaluating treatment outcomes among this high-risk group (Walitzer & Dearing, 2006; Whisman et al., 2004). Last, no known studies have explored

Received: October 3, 2014. Revision: May 29, 2015.

This research was supported by VA Merit IIR 02-108, Telephone Disease Management At-Risk Drinking (TDM II), and the VISN 4 Mental Illness Research, Education, and Clinical Center. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the U.S. government.

*Correspondence may be sent to Shahrzad Mavandadi at the VISN 4 Mental Illness Research, Education, and Clinical Center, Corporal Michael J. Crescenz VA Medical Center, 3900 Woodland Avenue, 116A, Philadelphia, PA 19104, or via email at: Shahrzad.Mavandadi@va.gov.

whether greater perceived support is associated with better drinking outcomes among heavy drinkers enrolled in treatment relative to usual care despite evidence to suggest that short-term interventions that do not take into account or use patients' social contexts and resources may have little long-term impact (Humphreys et al., 1997). It is possible, for example, that greater perceived support and positive, supportive behaviors from family and friends may serve as resources that are specifically mobilized, used, and enhanced in the context of brief interventions to motivate positive behaviors and reduce heavy drinking. Accordingly, social support may have a greater impact on outcomes among those receiving brief interventions.

To address this gap in the literature, the current study builds on previous work by our group in which we sought to examine the feasibility and impact of a brief, telephone-based care management intervention for heavy drinkers seen in primary care, many of whom also experienced comorbid depressive and anxiety symptoms (Helstrom et al., 2014). We were interested in examining whether perceived social support at baseline moderated the relationship between treatment assignment and outcomes. We hypothesized that patients with greater baseline social support would show more favorable outcomes over time than those with lower levels of support and that this association would be more pronounced among patients in the intervention arm.

Method

Overview

The current analyses are of data from a randomized, longitudinal study of alcohol treatment outcomes among male participants ($n = 136$) referred by their primary care providers at the Corporal Michael J. Crescenzo Veterans Affairs Medical Center (CMJCVAMC) for an assessment of their drinking and possible intervention. Details of the study procedures are available in Helstrom et al. (2014). Although multiple drinking outcomes were assessed, the parent study was specifically interested in changes in heavy drinking over time. Participants were randomly assigned to the intervention arm (i.e., up to 12 months of contact—including three brief alcohol intervention sessions at baseline, 6 weeks, and 12 weeks and monitoring/support sessions at baseline and 3, 6, 12, 18, and 24 weeks and bimonthly thereafter—with a behavioral health care manager plus standard care) or standard care alone. Research assessments were conducted at baseline and 4, 8, and 12 months after baseline. All study procedures were approved by the CMJCVAMC's Institutional Review Board.

Participants and procedures

Participants were recruited from CMJCVAMC primary care practices. Inclusion criteria for study participation in-

cluded (a) patients endorsing heavy drinking over the past week (i.e., >21 drinks for men and >14 drinks per week for men older than 65), and (b) adequate hearing to participate in scheduled telephone assessments. Exclusion criteria included (a) active suicidal ideation, (b) having received specialized addiction treatment during the prior 3 months, (c) meeting criteria for alcohol dependence or repeated use of illicit drugs in the last year, (d) current delusions or hallucinations, (e) current symptoms of posttraumatic stress disorder, or (f) a history of mania.

Upon meeting eligibility criteria and providing consent, participants were randomized to either the standard care or intervention arms. For participants randomized to standard care alone, primary care providers provided information and brief advice about the risks associated with alcohol misuse and suggestions to decrease alcohol use. Standard care participants also received written material on recommended drinking limits and a description of what constitutes a standard drink. Participants randomized to the intervention arm received all components of standard care in addition to telephone care management sessions every 6–12 weeks following baseline guided by a treatment manual that included the use of an alcohol misuse management algorithm (Barry et al., 2001). The intervention sessions were delivered by two behavioral health specialists, who were nurses trained in both motivational enhancement approaches and brief interventions for the treatment of substance misuse. These specialists worked with patients to develop an individualized behavior change treatment plan, monitor treatment effectiveness and adverse events, assess and encourage treatment adherence, and provide support and education about at-risk drinking and information about common comorbidities (e.g., depressive symptoms). Social relationships with family and friends were discussed both in the context of positive and negative consequences of excessive alcohol use as well as when identifying triggers and "risky situations" associated with heavy alcohol use.

Assessments and measures

Sociodemographic characteristics. Variables including age, marital status, financial situation, and ethnicity were considered as potential covariates.

Patient self-reported mental health/substance use symptoms and overall functioning. Clinical assessments completed at baseline included the Mini-International Neuropsychiatric Interview anxiety module (Sheehan et al., 1998); the Patient Health Questionnaire-9 for depressive symptoms (Kroenke et al., 2001); and the 12-Item Short-Form Health Survey (SF-12), which measures overall functioning and provides both a Physical Component Score and a Mental Component Score (Ware et al., 1996).

Alcohol use. The primary outcome variable was the number of days of heavy drinking (i.e., ≥ 5 drinks for men) in

the past month. Quantity and frequency of alcohol use were measured at baseline and each follow-up time point using the Timeline Followback (TLFB) method (Sobell & Sobell, 1992). Participants were asked about their drinking behavior for the past 7 days and whether the past week's report was representative of their usual drinking behavior. To compute the number of heavy drinking days in the past month, the number of drinks was multiplied by 4. Participants who indicated that the previous week was atypical completed a full 28-day TLFB.

Perceived social support. The 12-item, Multidimensional Scale of Perceived Social Support was used to assess social support from friends, family, and significant others (Zimet et al., 1990). Items were measured on a Likert scale (1 = *strongly disagree* to 5 = *strongly agree*) and summed. Continuous scores were categorized into two levels (low vs. high) based on the median value of 47.

Analytic plan

In addition to descriptive, univariate analyses, tests of significance included *t* tests for equality of means and chi-square tests for continuous and dichotomous outcomes, respectively. These analyses were conducted to identify potential covariates for inclusion in the adjusted model. To address the study's main objective, we ran a generalized linear mixed model for longitudinal data using SAS Version 9.2 (Cheng et al., 2010). A negative binomial distribution with a log link function was used to model the number of days of heavy drinking (Hinde & Demétrio, 1998). A three-way interaction (i.e., Perceived Social Support $\times$ Randomization Group $\times$ Time) and all corresponding main effects and two-way interactions were modeled as predictors. Time was included as a continuous variable, whereas randomization group (0 = standard care, 1 = intervention) and perceived social support (0 = low social support, 1 = high social support) were included as dichotomous variables. The model adjusted for mean-centered baseline heavy drinking and accounted for the nesting of observations within patients over time by specifying patient (i.e., participant) as a random effect.

Results

Sociodemographic factors, mental health/substance use symptoms (i.e., depression, anxiety), and overall functioning (as measured by the SF-12) did not statistically differ across treatment groups. Participants were on average 57.4 years old ($SD = 14.5$). The majority of participants were financially comfortable (i.e., reported having at least enough money to "get by") (80.9%), roughly half were White (56.6%), and 30.1% were married or partnered. Bivariate analyses revealed no significant differences in baseline drinking behavior between groups; participants reported an average of 10.0 ($SD = 10.0$) heavy drinking days per month.

TABLE 1. Change in heavy drinking relative to baseline as a function of perceived social support and randomization group ($n = 136$)

Variable	Estimate	SE	Pr > t
Intercept	1.90	0.21	<.001
Baseline heavy drinking ^a	0.08	0.01	<.001
Time	-0.10	0.02	<.001
Randomization group (ref. = standard care) ^b	0.09	0.27	.75
Perceived social support (ref. = support-low) ^c	-0.14	0.27	.62
Randomization Group $\times$ Time	0.04	0.03	.23
Perceived Social Support $\times$ Time	0.05	0.03	.16
Perceived Social Support $\times$ Randomization Group	-0.14	0.38	.70
Perceived Social Support $\times$ Randomization Group $\times$ Time	-0.10	0.04	.03

Notes: Estimated coefficients represent the difference (i.e., increase/decrease) in the log count of heavy drinking days as a function of a one-unit increase in the variable(s) denoted in each row, adjusting for all other variables in the model. "Intercept" equals the log count of heavy drinking days when all variables in the model are equal to 0. Ref. = reference. ^a"Baseline heavy drinking" centered around the grand mean; ^bref. group = standard care (0 = standard care, 1 = intervention); ^cref. group = low social support group (0 = support-low, 1 = support-high).

There was no significant main effect for perceived social support on treatment outcomes over time (i.e., Perceived Social Support $\times$ Time; $p > .05$). However, the longitudinal model examining the moderating role of baseline perceived social support on randomization group changes in days of heavy drinking over time revealed a significant three-way interaction (i.e., Perceived Social Support $\times$ Randomization Group $\times$ Time; Omnibus Type III Test of fixed effect), $F(1, 367) = 4.88$, $p = .03$ (Table 1). Thus, the relationship between time and randomization group varied as a function of level of support. Specifically, a plot of predicted values indicated that among patients reporting high social support, those in the intervention arm had greater declines in heavy drinking days than those in the standard care group. Conversely, among patients reporting low perceived social support, those in the standard care group experienced greater declines in drinking days over time than patients in the intervention group. Moreover, patients reporting low support and randomized to standard care showed greater declines in drinking than those reporting high support randomized to standard care.

Discussion

The results suggest that among patients reporting higher levels of perceived social support, randomization to the intervention arm was significantly associated with greater reductions in heavy drinking days over the course of follow-up. This finding supports our initial hypothesis, which was guided by the notion that supportive social relationships afford individuals with a variety of benefits both in general and, specifically, during times of stress. For example,

supportive others often are mobilized to offer practical assistance, companionship, and emotional support in times of need, all of which act to buffer the harmful impact of stressful life circumstances (Cohen, 2004). Emotional support also engenders feelings of self-worth, self-esteem, and positive views of oneself in the absence of a specific stressor, all of which may promote positive behaviors and reduced drinking (Booth et al., 1992).

Along a similar vein, the association between randomization to the intervention arm and greater reductions in drinking days among those reporting higher social support also may be attributed to the possibility that the behavioral health specialists were able to actively use and mobilize preexisting social resources and interactions to encourage positive behaviors and reduced heavy drinking. It is likely that over the course of the care management calls, the importance of maintaining supportive, meaningful social relationships was promoted within the context of the treatment's motivational enhancement and decisional balance techniques. Maintenance of social relationships is often targeted as a factor to motivate individuals with substance use issues to reduce their problematic behavior (Moos, 2007). Future studies would benefit from specifically examining the content of care management calls and examining changes in social support over the course of the intervention to more fully address this possibility.

Although the results above supported our hypotheses, an unanticipated trend was that among those reporting low perceived social support, randomization to standard care was associated with a greater reduction in heavy drinking at follow-up. Moreover, patients with low support randomized to standard care had greater reductions in drinking than those with high support in standard care. As previously mentioned, a number of studies have shown a significant association between not only social support, but also social network characteristics (e.g., size, composition, density) and treatment outcomes among those with alcohol use disorders (Moos & Moos, 2007). Specifically, there is some evidence that social networks that include substance-using peers may have a negative impact and enable heavy substance use in the absence of intervention (Tracy et al., 2010; Weisner et al., 2003). Moreover, social networks that are populated by family and friends that may often unintentionally provide support that is perceived as overprotective, critical, or unwanted may undermine efforts to reduce drinking (O'Farrell et al., 1998; Rook, 1998). Thus, to the extent that perceived social support in this study served as a proxy for social network composition, it is possible that our findings may reflect one of these processes. Nonetheless, without a clear measure of social network composition and negative aspects of interactions with otherwise supportive others, these interpretations should be considered with caution.

There are a number of limitations to this study. First, our sample of predominantly older, male veterans may

reduce the generalizability of our results to other patient populations. Second, despite the fact that we were able to longitudinally assess changes in drinking outcomes, our assessment of social support was collected only at baseline, and there were no precise measures of the extent to which social relationships were discussed during care management. These factors precluded our ability to examine more detailed mediational models that would lend support to the notion that the intervention may have ultimately affected drinking outcomes by improving social support and social interactions over time or that changes in social support independent of the intervention augmented the treatment effects. Last, our measure of social support, which primarily captured perceived emotional support, did not allow us to examine factors such as social network composition, drinking behaviors of network members, negative interactions with supportive others, and alcohol-specific support. Each of these factors has been shown to relate to drinking outcomes in previous work and may shed greater light on the mechanisms linking social environmental factors and outcomes among heavy drinkers (Longabaugh et al., 2010; Tracy et al., 2010; Zywiak et al., 2002). Despite these limitations, the findings of the current study, although tentative, may inform subsequent research. Further replication and research guided by these preliminary findings may lend additional support to the importance of assessing and using the social environment within the context of brief alcohol interventions.

Acknowledgments

The authors extend our gratitude to the research staff and clinical care managers who worked on this project. We also thank Shirley H. Leong, Ph.D., and Henry Kranzler, M.D., for their invaluable feedback regarding previous versions of this manuscript.

References

- Barry, K. L., Oslin, D. W., & Blow, F. C. (2001). *Prevention and management of alcohol problems in older adults*. New York, NY: Springer.
- Bien, T. H., Miller, W. R., & Tonigan, J. S. (1993). Brief interventions for alcohol problems: A review. *Addiction*, 88, 315–336. doi:10.1111/j.1360-0443.1993.tb00820.x.
- Booth, B. M., Russell, D. W., Soucek, S., & Laughlin, P. R. (1992). Social support and outcome of alcoholism treatment: An exploratory analysis. *American Journal of Drug and Alcohol Abuse*, 18, 87–101. doi:10.3109/00952999209001614.
- Cheng, J., Edwards, L. J., Maldonado-Molina, M. M., Komro, K. A., & Muller, K. E. (2010). Real longitudinal data analysis for real people: Building a good enough mixed model. *Statistics in Medicine*, 29, 504–520.
- Cohen, S. (2004). Social relationships and health. *American Psychologist*, 59, 676–684. doi:10.1037/0003-066X.59.8.676.
- Dobkin, P. L., De Civita, M., Paraherakis, A., & Gill, K. (2002). The role of functional social support in treatment retention and outcomes among outpatient adult substance abusers. *Addiction*, 97, 347–356. doi:10.1046/j.1360-0443.2002.00083.x.

- Gordon, A. J., & Zrull, M. (1991). Social networks and recovery: One year after inpatient treatment. *Journal of Substance Abuse Treatment*, 8, 143–152. doi:10.1016/0740-5472(91)90005-U.
- Helstrom, A., Ingram, E., Wang, W., Small, D., Klaus, J., & Oslin, D. (2014). Treating heavy drinking in primary care practices: Evaluation of a telephone-based intervention program. *Addictive Disorders & Their Treatment*, 13, 101–109. doi:10.1097/ADT.0b013e31827e206c.
- Hinde, J., & Demétrio, C. G. B. (1998). Overdispersion: Models and estimation. *Computational Statistics & Data Analysis*, 27, 151–170. doi:10.1016/S0167-9473(98)00007-3.
- Humphreys, K., Moos, R. H., & Cohen, C. (1997). Social and community resources and long-term recovery from treated and untreated alcoholism. *Journal of Studies on Alcohol*, 58, 231–238. doi:10.15288/jsa.1997.58.231.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. *Journal of General Internal Medicine*, 16, 606–613. doi:10.1046/j.1525-1497.2001.016009606.x.
- Longabaugh, R., Wirtz, P. W., Zywiak, W. H., & O'Malley, S. S. (2010). Network support as a prognostic indicator of drinking outcomes: The COMBINE Study. *Journal of Studies on Alcohol and Drugs*, 71, 837–846. doi:10.15288/jsad.2010.71.837.
- Mathews, S., & Oslin, D. W. (2009). Alcohol misuse among the elderly: An opportunity for prevention. *American Journal of Psychiatry*, 166, 1093–1095. doi:10.1176/appi.ajp.2009.09081183.
- Moos, R. H. (2007). Theory-based active ingredients of effective treatments for substance use disorders. *Drug and Alcohol Dependence*, 88, 109–121. doi:10.1016/j.drugalcdep.2006.10.010.
- Moos, R. H., & Moos, B. S. (2007). Protective resources and long-term recovery from alcohol use disorders. *Drug and Alcohol Dependence*, 86, 46–54. doi:10.1016/j.drugalcdep.2006.04.015.
- O'Farrell, T. J., Hooley, J., Fals-Stewart, W., & Cutter, H. S. (1998). Expressed emotion and relapse in alcoholic patients. *Journal of Consulting and Clinical Psychology*, 66, 744–752. doi:10.1037/0022-006X.66.5.744.
- Oslin, D. W., Lynch, K. G., Maisto, S. A., Lantinga, L. J., McKay, J. R., Possemato, K., . . . Wierzbicki, M. (2014). A randomized clinical trial of alcohol care management delivered in Department of Veterans Affairs primary care clinics versus specialty addiction treatment. *Journal of General Internal Medicine*, 29, 162–168. doi:10.1007/s11606-013-2625-8.
- Oslin, D. W., Sayers, S., Ross, J., Kane, V., Ten Have, T., Conigliaro, J., & Cornelius, J. (2003). Disease management for depression and at-risk drinking via telephone in an older population of veterans. *Psychosomatic Medicine*, 65, 931–937. doi:10.1097/01.PSY.0000097335.35776.FB.
- Rook, K. S. (1998). Investigating the positive and negative sides of personal relationships: Through a glass darkly? In B. H. Spitzberg & W. R. Cupach (Eds.), *The dark side of close relationships* (pp. 369–393). Mahwah, NJ: Lawrence Erlbaum.
- Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., . . . Dunbar, G. C. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry*, 59, Supplement 20, 22–33, quiz 34–57.
- Sobell, L. C., & Sobell, M. B. (1992). Timeline follow-back: A technique for assessing self-reported alcohol consumption. In R. Litten & J. Allen (Eds.), *Measuring alcohol consumption* (pp. 41–65). Totowa, NJ: Humana Press.
- Tracy, E. M., Munson, M. R., Peterson, L. T., & Floersch, J. E. (2010). Social support: A mixed blessing for women in substance abuse treatment. *Journal of Social Work Practice in the Addictions*, 10, 257–282. doi:10.1080/1533256X.2010.500970.
- Walitzer, K. S., & Dearing, R. L. (2006). Gender differences in alcohol and substance use relapse. *Clinical Psychology Review*, 26, 128–148. doi:10.1016/j.cpr.2005.11.003.
- Ware, J., Jr., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care*, 34, 220–233. doi:10.1097/00005650-199603000-00003.
- Weisner, C., Matzger, H., & Kaskutas, L. A. (2003). How important is treatment? One-year outcomes of treated and untreated alcohol-dependent individuals. *Addiction*, 98, 901–911. doi:10.1046/j.1360-0443.2003.00438.x.
- Whisman, M. A., Uebelacker, L. A., & Weinstock, L. M. (2004). Psychopathology and marital satisfaction: The importance of evaluating both partners. *Journal of Consulting and Clinical Psychology*, 72, 830–838. doi:10.1037/0022-006X.72.5.830.
- Whitlock, E.P., Polen, M.R., Green, C.A., Orleans, T., & Klein, J. (2004). Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults: A summary of the evidence for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, 140, 557–68. doi:10.7326/0003-4819-140-7-200404060-00017.
- Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S., & Berkoff, K. A. (1990). Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, 55, 610–617. doi:10.1080/00223891.1990.9674095.
- Zywiak, W. H., Longabaugh, R., & Wirtz, P. W. (2002). Decomposing the relationships between pretreatment social network characteristics and alcohol treatment outcome. *Journal of Studies on Alcohol*, 63, 114–121.