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Dually diagnosed patients' responses to substance use disorder treatment

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Abstract

Few studies have investigated whether dually diagnosed patients with co-occurring substance use and psychiatric disorders (DD) respond as well to substance use disorder (SUD) treatments as patients with SUD do. Here we assessed whether male veteran DD and SUD patients with alcohol dependence diagnoses differed in the process and outcomes of residential SUD treatment. The main findings showed that (a) DD patients did not perceive SUD programs as positively as patients with SUD did and had worse proximal outcomes at discharge from treatment; (b) DD patients did as well as SUD patients on 1- and 5-year substance use outcomes but had worse psychiatric outcomes; and (c) patients who perceived treatment more positively and had better outcomes at discharge had better longer term outcomes. Thus, residential SUD programs are relatively effective in reducing DD patients' substance use problems; however, they are less successful in engaging DD patients in treatment and addressing their psychiatric problems.

Keywords

Dual diagnosis; Substance use disorder treatment; Alcoholism

The prevalence of psychiatric disorders among individuals with substance use disorders (SUDs) is quite high, with estimates ranging from 18% to 70% among those seeking treatment for SUDs (Center for Substance Abuse Treatment, 2005; McGovern, Xie, Segal, Siembab, & Drake, 2006; Watkins, Burnam, Kung, & Paddock, 2001). Psychiatric comorbidity is associated with more severe functional impairment, more interpersonal and social problems, a more chronic and protracted course of illness, and less likelihood of completing and benefiting from treatment (Hirschfeld, Hasin, Keller, Edicott, & Wunder, 1990; Schafer & Najavits, 2007; Soyka, 2000; Soyka, Albus, Immler, Kathmann, & Hippus, 2001). Thus, psychiatric comorbidity may hamper dually diagnosed (DD) patients' responses to SUD treatment.

Prior studies have pointed to DD patients' more severe SUD symptoms and unique problems that contribute to SUD or interfere with the treatment of SUD as indicators of their need for integrated treatment, that is, treatment that targets both substance use and psychiatric disorders at the same time (e.g., Mattson & Allen, 1991; also see McHugo et al., 2006). Notwithstanding these issues, treatments that reduce substance use among patients who have only SUDs also appear to reduce substance use among patients with substance use and

psychiatric disorders (for reviews, see Drake, O'Neal, & Wallach, 2008; Flynn & Brown, 2008; Tiet & Mausbach, 2007).

However, with the exception of some research that focused specifically on patients with posttraumatic stress disorders (PTSD; Ouimette & Brown, 2003), most prior studies in this area have been conducted in integrated treatment settings, have not had SUD patient comparison groups, and have not focused on whether DD patients do better or worse than patients with SUD in standard (nonintegrated) SUD treatment, the context in which DD patients are often treated (Timko, Dixon, & Moos, 2005). Accordingly, it is important to examine the extent to which patients with co-occurring substance use and psychiatric disorders respond to SUD treatments and whether they respond as well as patients with SUD do (Flynn & Brown, 2008).

In general, greater psychiatric severity tends to predict worse substance use outcomes (McKay & Weiss, 2001). However, the few studies that have directly compared DD and SUD patients' responses to standard SUD treatment have obtained contradictory findings. According to Kadden, Cooney, Getter, and Litt (1989), compared to alcohol-dependent patients with less severe psychiatric symptoms, those with more severe psychiatric symptoms had poorer 6-month alcohol-related outcomes after interaction-oriented treatment. A study of residential SUD treatment programs showed that SUD patients with or without comorbid psychiatric disorders had comparable 1-year SUD outcomes; however, DD patients had worse psychiatric outcomes (Moos, Moos, & Andrassy, 1999).

We address these issues here by examining whether SUD patients with additional Axis 1 disorders (subsequently dual-diagnosis patients—DD) differ from SUD patients without additional Axis 1 disorders (subsequently SUD patients) in the process and outcomes of residential SUD treatment. To achieve these aims, we follow a conceptual framework which posits that treatment process variables, especially patients' perceptions of the treatment program, are associated with their proximal outcomes at discharge from treatment, such as self-efficacy for abstinence and reliance on approach coping. We posit further that these treatment process variables and proximal outcomes at discharge affect longer term treatment outcomes (Moos, 1997).

1. Treatment process

One key set of treatment process variables involves patients' perceptions of the treatment program, especially its levels of support, directedness, and structure and their overall satisfaction with treatment. To our knowledge, no studies have considered whether DD and SUD patients perceive these salient characteristics of residential treatment setting similarly, that is, whether DD patients react as positively as SUD patients to SUD treatment.

We focus here on the levels of support and structure (specifically clarity) in treatment, which have been associated with better SUD outcomes among DD and/or SUD patients (Fontana, Ford, & Rosenheck, 2003; Kaspro, Frisman, & Rosenheck, 1999; Moos, 1997). In addition, we consider an especially salient aspect of goal direction in SUD programs, that is, the emphasis on spirituality (Lillis, Gifford, Humphreys, & Moos, 2008; Pardini, Plante, Sherman, & Stump, 2000). We also focus on patients' satisfaction with treatment, which tends to be associated with better treatment outcome (e.g., Carlson & Gabriel, 2001; Chan, Sorensen, Guydish, Tajima, & Acampora, 1997; Donovan, Kadden, DiClemente, & Carroll, 2002; Zhang, Gerstein, & Friedmann, 2008). Because standard SUD treatment may be less well targeted toward DD than toward SUD patients' needs (Flynn & Brown, 2008), we expect that DD patients will perceive the treatment program less positively and be less satisfied with treatment.

2. Proximal outcomes at discharge from treatment

A related issue is whether DD patients obtain as much immediate benefit from treatment as SUD patients do, that is, whether they improve as much on important proximal outcomes measured at discharge from treatment. Proximal outcomes refer to beliefs and skills that SUD treatments target for change. We focus on several proximal outcomes that have been associated with better SUD-related outcomes, including perceived benefits of quitting substance use (Connors, Tarbox, & Faillacem, 1993), self-efficacy for continued abstinence (Carbonari & DiClemente, 2000; Rychtarik, Prue, Rapp, & King, 1992; Stephens, Wertz, & Roffman, 1995), substance-specific coping (Forys, McKellar, & Moos, 2007), more reliance on general approach coping, and less reliance on general avoidance coping (Chung, Langenbucher, Labouvie, Pandina, & Moos, 2001; Forys et al., 2007).

Again, because SUD treatment may be less well suited for DD than for SUD patients (Flynn & Brown, 2008), we expect DD patients to show less positive change in these proximal outcomes. Because a positive reaction to treatment tends to be associated with better outcomes (Moos, 1997), we also expect that patients who perceive the treatment program more positively will experience better proximal outcomes at discharge. In addition, we examine whether the associations between patients' perceptions of treatment and their outcomes at discharge differ for DD versus SUD patients.

3. One-year and 5-year substance use and psychiatric outcomes

With respect to 1-year and 5-year outcomes, we focus on two substance use outcomes directly targeted in SUD treatment: heavy or maximum alcohol consumption and substance-related problems. We also consider psychiatric symptoms, an outcome that is likely to be less well addressed in SUD treatment. Based on prior findings in integrated treatment (see Drake et al., 2008), we expect that DD and SUD patients will have comparable SUD outcomes but that DD patients will have worse psychiatric outcomes. We also expect that positive perceptions of treatment and better proximal outcomes at discharge will be moderately associated with better 1-year and perhaps 5-year outcomes. In addition, we examine whether these associations differ for DD versus SUD patients.

The data for this study were drawn from a larger project on the outcome of SUD treatment (for details, see Ouimette, Finney, & Moos, 1997; Ouimette, Finney, & Moos, 1999; Ouimette, Gima, Moos, & Finney, 1999). This study expands on this prior work by considering four questions: (a) Do DD patients perceive SUD residential treatment programs as positively as SUD patients and do they benefit as much during treatment, as shown by their proximal outcomes at discharge? (b) Do DD patients do as well as SUD patients in residential SUD treatment with respect to 1- and 5-year substance use and psychiatric outcomes? (c) Are patients' perceptions of the treatment program associated with their proximal outcomes at discharge; are these associations comparable for DD patients and SUD patients? (d) Are indices of patients' perceptions of treatment and their proximal outcomes at discharge associated with their 1- and 5-year substance use and psychiatric outcomes; are these associations comparable for DD patients and SUD patients?

4. Methods

4.1. Participants

Overall, 4,193 patients seeking treatment at 1 of 15 residential SUD treatment programs affiliated with the Department of Veterans Affairs (VA) were invited to participate, and 494 (12%) declined, leaving 3,699 patients. Of these, the 3,048 alcohol-dependent male patients provided the overall sample for this study. Treatment programs had a primarily 12-step or

cognitive-behavioral orientation and (a) were designed to last between 21 and 28 days, (b) included individual and group treatment, (c) were multidisciplinary in staffing, and (d) encouraged and provided referrals for continuing care and 12-step self-help group participation (for more information, see Moos et al., 1999; Ouimette et al., 1997).

Of the 3,048 patients, 2,496 (81.9%) were assessed at discharge from treatment and at the 1-year follow-up. There was no difference in the percentage of DD and SUD patients who participated in the 1-year follow-up ($\chi^2 = 2.2$, $df = 1$, ns). Of the 3,048 patients, 404 had died by the 5-year follow-up. Of the remaining 2,644 patients, 2,126 (80.4%) were assessed at the 5-year follow-up. Patients who were followed did not differ significantly from those not followed in age, education, race, marital status, employment, recent arrest history, or alcohol use at intake; however, they had more psychiatric symptoms at intake ($M = 34.7$ and 32.7 , respectively; $F(1, 3046) = 5.1$; $p < .05$).

Patients' diagnoses based on the *International Classification of Diseases, Ninth Revision* (United States National Center for Health Statistics, 1988) were obtained from VA administrative records. Patients diagnosed with alcohol dependence in the index episode and with an Axis I non-substance-related anxiety, mood, or psychotic disorder in the index episode or in the 1 year prior to the index episode were classified as DD patients ($n = 691$, 28% of the sample). Among the DD sample, 64% patients were diagnosed with a mood disorder (e.g., major depressive disorder), 46% with an anxiety disorder (e.g., generalized anxiety disorder), and 26% with a psychotic disorder (e.g., schizophrenia). Patients who had no such Axis I diagnosis were classified as SUD patients ($n = 1,805$, 72% of sample).

Table 1 shows the demographic characteristics of the two groups of patients. Compared to SUD patients, DD patients were more likely to be Caucasian, had more education, and were less likely to be employed. There was no significant difference in the percentage of DD and SUD patients who were also diagnosed with a drug abuse or dependence disorder.

After completing medical detoxification and being admitted to 1 of the 15 residential treatment programs, patients were asked to participate in the study. Research staff members who were independent of the treatment program obtained informed consent, and patients were then asked to complete an inventory at baseline, discharge, and 1- and 5-year follow-ups. The inventories were completed using a combination of in-person, telephone, and mail procedures (for more details, see Moos et al., 1999; Ouimette et al., 1997).

5. Measures

5.1. Treatment process

Three aspects of the treatment environment were assessed: the level of support, structure (clarity), and directedness (spirituality). These indices were based on two subscales (support and clarity) drawn from the Community Programs Environment Scale (Moos, 1996) and a newly developed measure of program emphasis on spirituality. Each of these three constructs was assessed by patients' perceptions of 10 true-false items.

Support ($\alpha = .69$) measures the extent to which patients are encouraged to support each other and how much staff supports patients (e.g., "Patients are given a great deal of individual attention here").

Clarity ($\alpha = .63$) measures the extent to which patients understand the day-to-day routine of the program and the rules and procedures (e.g., "The patients always know when the staff will be around").

Spirituality ($\alpha = .77$) was measured by the Treatment Spirituality/Religiosity Scale, which contains 10 true–false items that assess a program’s emphasis on spirituality or spiritual practices (“Staff encourage patients to attend religious services”; Lillis et al., 2008).

Satisfaction with treatment ($\alpha = .92$; range = 0–33) was measured by 11 items adapted from the Client Satisfaction Questionnaire (Attkinson & Zwick, 1982). Participants responded to each item (e.g., “How would you rate the quality of the treatment you received”) on a 4-point scale ranging from 0 to 3.

Intensity of treatment—To measure the extent of treatment provided for DD and SUD patients, we assessed the intensity of treatment by the sum of individual therapy or counseling sessions patients attended during treatment.

5.2. Proximal outcomes at discharge

Perceived benefits of quitting substance use ($\alpha = .85$; range = 0–24) were measured by the sum of six items from the outcomes expectancies scale (Solomon & Annis, 1989, 1990). Each item (e.g., “If you quit using substances, you expect your future to look good”) was rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*); higher scores reflect more positive expectancies for quitting substance use.

Substance-related self-efficacy ($\alpha = .96$; range = 0–5) was measured by patients’ self-efficacy related to their ability to control their drinking and drug use in tempting situations. This variable is composed of the average rating of 14 items (e.g., “If something good happened and I felt like celebrating”) responded to on a scale from 0 (0% *confident*) to 5 (100% *confident*). Items were adapted from the Situational Confidence Scale (Annis & Davis, 1988; Miller, Ross, Emmerson, & Todd, 1989).

Substance-specific coping ($\alpha = .88$; range = 0–60) measures the extent to which patients engage in various behaviors when they want to refrain from using alcohol and/or drugs. It was assessed by the sum of 15 items from the Process of Change Inventory (DiClemente & Prochaska, 1982; Fitzgerald & Prochaska, 1990). Participants rated each item (e.g., “Tell myself I am able to quit if I want”) on a scale from 0 (*never*) to 4 (*often*). Higher scores reflect more coping directed toward refraining from substance use.

Approach coping (approach; $\alpha = .85$; range = 0–36) assessed a general approach orientation to coping with stressful life circumstances. The sum of 12 items from the positive reappraisal and problem-solving subscales of the Coping Responses Inventory (CRI; Moos, 1993) comprises this scale. Participants rated each item (e.g., “Tell yourself things to feel better”) on a scale of 0 (*no*) to 3 (*yes, fairly often*). Higher scores reflect higher levels of approach coping.

Avoidance coping (avoid; $\alpha = .78$; range = 0–36) assessed a general avoidance orientation to coping with stressful life circumstances. It was based on 12 items from the cognitive avoidance and emotional discharge subscales of the CRI (Moos, 1993). Participants rated each item (e.g., “Deny how serious the problem really was”) on a scale of 0 (*no*) to 3 (*yes, fairly often*). Higher scores reflect higher levels of avoidance coping.

5.3. One-year and 5-year outcomes

Three outcomes were assessed at baseline and at the 1-and 5-year follow-ups.

Maximum alcohol use is the largest amount of alcohol consumed on any one day in the last 3 months. Patients were asked, “During the past 3 months, what was the largest amount you drank of each of the following beverages in any one day?” Responses, obtained for beer,

wine, and hard liquor were multiplied by their ethanol content and summed to provide a total score. We chose this measure because we have generally found that it is a sensitive index of change during and after treatment and tends to be relatively well correlated with other measures of alcohol consumption.

Substance use problems were assessed by a 15-item scale developed for this overall project to reflect the negative consequences of substance use. The items measure a comprehensive array of problems that may result from alcohol or drug use, including health problems, legal problems (e.g., “Problems with the police,” “Been arrested”), money problems, occupational problems (e.g., “Problems with your job,” “Lost a job or nearly lost one”), residential problems (e.g., “Lost a place to live”), and interpersonal problems (e.g., “Arguments with your spouse/partner,” “Problems with friends”). Each item is assessed according to how often the substance use problem occurred in the previous 3 months as rated on a 5-point Likert scale (0 = *never*, 4 = *often*; alpha at baseline = .84; range = 0–60).

Psychiatric symptoms (symptoms) were measured by 22 items from the Brief Symptom Inventory (Derogatis, 1993). The items refer to psychiatric symptoms (e.g., “Feelings of worthlessness,” “Spells of terror and panic”) that occurred in the previous 3 months and were rated on a 5-point scale (0=*not at all*, 4 = *extremely*; alpha at baseline = .94; range = 0–88).

5.4. Analytic plan

We used analyses of covariance (ANCOVAs) to examine whether DD and SUD patients differed in their perceptions of and intensity of treatment and had different proximal outcomes at discharge or longer term outcomes following SUD treatment. Patient status (DD vs. SUD) was the independent variable predicting each of the criteria. The ANCOVAs controlled for the demographic variables that significantly differentiated the two groups (i.e., race/ethnicity, education, employment), the intake value of the dependent variable (see Table 2 for comparison of intake values of proximal and distal outcomes), and program treatment orientation (12-step or cognitive-behavioral). Because initial analyses showed that DD and SUD patients responded similarly to the 12-step and cognitive-behavioral programs, we combined them in subsequent analyses.

To examine the extent to which patients’ perceptions of treatment predicted proximal outcomes at discharge and to find out whether DD and SUD patients differed on the strength of association between patients’ perceptions of treatment and discharge outcomes, we conducted hierarchical linear regressions (HLRs) in which patient status and the indices of patients’ perceptions of treatment were the predictors and each of the proximal outcomes were the criteria. In each HLR, control variables (i.e., demographic factors, intake value of the outcome, program orientation) were entered in Step 1; patient status (DD or SUD) and patients’ perceptions of treatment were entered in Step 2; and the interaction of patient status and perceptions of treatment were entered in Step 3.

A final set of analyses was conducted to investigate whether patients’ perceptions of treatment and proximal outcomes at discharge were associated with 1- and 5-year outcomes and whether any such associations differed by patient group. To examine this issue, we conducted HLRs in which patient status (DD or SUD), patients’ perceptions of treatment and proximal outcomes at discharge, and the interaction of patient status and these perceptions of treatment and discharge outcomes predicted 1- and 5-year outcomes. We used the same method described earlier except that in Step 1, we entered intake values of both proximal and distal outcomes, along with demographic factors and program orientation.

6. Results

6.1. Differences between DD and SUD patients

As shown in Table 3, DD patients perceived the programs as less supportive and clear and were less satisfied with treatment. Treatment intensity did not differentiate the two groups and was not consistently associated with any outcomes and thus was dropped from further analyses.

Compared with SUD patients, DD patients changed less during treatment. More specifically at discharge from treatment, DD patients saw fewer benefits to quitting, had less self-efficacy in regard to staying abstinent, and relied less on approach coping and more on avoidance coping (Table 3). On average, these four significant differences accounted for 1% of the between group variance.

With respect to longer-term outcomes, DD and SUD patients were comparable on 1- and 5-year alcohol consumption and substance use problems; however, DD patients reported more psychiatric symptoms at both time points (Table 4). On average, these two significant differences accounted for 3% of the between group variance.

6.2. Associations between patients' perceptions of treatment and proximal and distal outcomes

We next conducted a series of HLRs to determine whether patients' perceptions of treatment were associated with their proximal outcomes at discharge. Consistent with our earlier findings (Table 3), DD patients reported fewer expected benefits of quitting, less self-efficacy, less reliance on approach coping, and more reliance on avoidance coping. More important, patients who perceived more emphasis on support, clarity, and spirituality and who were more satisfied with treatment showed more positive changes during treatment. These patients were more likely to report expected benefits from quitting substance use, self-efficacy to remain abstinent, reliance on substance-specific and general approach coping, and less use of avoidance coping (Table 5). Spirituality and satisfaction were the strongest independent predictors of better discharge outcomes. However, only 2 of 20 interactions between patient status and a treatment-related factor predicting these proximal outcomes were significant.

As shown in Table 6, DD patients reported more psychiatric symptoms at the 1- and 5-year follow-ups (see also Table 4). There were small but consistent relationships indicating that patients who perceived more support, clarity, and spirituality in their program and who were more satisfied with treatment tended to experience better 1-year outcomes. As expected, these relationships were relatively weak at the 5-year follow-up; however, satisfaction with treatment was associated with fewer substance use problems and psychiatric symptoms; support and spirituality were associated with fewer psychiatric symptoms.

With respect to proximal outcomes at discharge, patients who reported more benefits from quitting substance use, more self-efficacy, greater reliance on approach coping, and less reliance on avoidance coping at discharge tended to consume less alcohol and to experience fewer substance use problems and psychiatric symptoms at the 1-year follow-up. In general, these discharge outcomes were also predictably associated with patients' 5-year substance use problems and psychiatric status.

Our analyses also focused on whether any of the associations between patients' perceptions of treatment, outcomes at discharge, and longer term 1- and 5-year outcomes were moderated by patients' diagnostic group. Only 7 of 54 of these interactions were significant; more important, the direction of the findings was inconsistent.

7. Discussion

Our findings show some differences between DD and SUD patients in their reactions to SUD treatment. DD patients did not perceive SUD treatment as positively and they had poorer proximal outcomes of treatment than SUD patients did. Although DD patients did as well as SUD patients with respect to longer term substance use outcomes, they experienced worse psychiatric outcomes. We also found that patients who perceived treatment more positively had better proximal outcomes at discharge and that patients who had more positive perceptions of treatment and better discharge outcomes tended to have better 1- and 5-year substance use and psychiatric outcomes. In general, however, these associations were comparable for DD and SUD patients as indicated by the fact that patients' diagnostic group did not consistently moderate the associations between patients' perceptions of treatment, outcomes at discharge, or 1- and 5-year outcomes.

7.1. Treatment process and proximal outcomes

As expected, DD patients perceived treatment less positively and did not experience as much immediate benefit from treatment as SUD patients did. More specifically, DD patients perceived the programs to be less supportive and clear and were less satisfied with treatment. In addition, at discharge from treatment, DD patients saw fewer benefits to quitting, had less self-efficacy in regard to staying abstinent, and relied less on approach coping and more on avoidance coping than SUD patients did.

DD patients' less positive perceptions of treatment and poorer discharge outcomes likely reflect both patient and treatment factors. With respect to patient factors, DD patients tend to have more social deficits and difficulty establishing trusting relationships, find it harder to obtain and maintain social support, are prone to suspiciousness and interpersonal avoidance, and typically have more emotional and cognitive deficits that impair their functioning (e.g., Dickinson, Bellack, & Gold, 2007; Koren, Seidman, Goldsmith, & Harvey, 2006). Because of these interpersonal deficits, DD patients may have been less able to establish a therapeutic alliance with their counselors and less able to relate to other patients in the program, which led to their perceptions of program as less supportive, clear, spiritually oriented, and satisfying. Furthermore, DD patients may have had less positive perceptions of treatment because of the strong focus of treatment programs on SUD and lack of focus on psychiatric symptoms.

7.2. Predictors of proximal outcomes at discharge

Patients who perceived more emphasis on support, clarity, and spirituality in treatment and who were more satisfied with treatment showed more positive changes during treatment. These patients were more likely to report expected benefits from quitting substance use, more self-efficacy to remain abstinent, more reliance on substance-specific and general approach coping, and less reliance on avoidance coping. These findings are consistent with prior studies showing that patients who perceive the treatment environment more positively (Fontana et al., 2003; Kasproff et al., 1999; Moos, 1997) and are more satisfied with it (Carlson & Gabriel, 2001; Chan et al., 1997; Donovan et al., 2002; Zhang et al., 2008) tend to have better outcomes at discharge. They support the idea that characteristics of the treatment milieu are associated with patients' engagement in and positive reactions to treatment and thereby lead to better proximal outcomes of treatment (Dearing, Barrick, Dermen, & Walitzer, 2005).

The associations between indices of patients' perceptions of treatment and proximal outcomes at discharge were comparable for DD and SUD patients. Accordingly, DD patients respond as positively to treatment factors such as support, clarity, and spirituality as

SUD patients do. This hopeful finding suggests that if DD patients were as well integrated into SUD treatment as SUD patients, they likely would obtain as much immediate benefit from it.

7.3. One-year and 5-year substance use and psychiatric outcomes

DD and SUD patients obtained comparable 1- and 5-year alcohol consumption and substance use problem outcomes. These results extend prior findings obtained in SUD treatment (Brooks & Penn, 2003; Moos et al., 1999) and in integrated treatment (Drake et al., 2008; Tiet & Mausbach, 2007) by showing that DD patients' SUD problems improve as much as those of SUD patients and that this improvement endures over a 5-year time span. Accordingly, SUD treatment programs may be able to compensate for characteristics of DD patients (e.g., psychiatric symptoms) that make it more difficult for them to reduce their substance use.

Alternatively, psychiatric symptoms may not necessarily provide a barrier to the reduction of substance use. In this regard, there appears to be relatively little evidence for the supersensitivity hypothesis, that is, the idea that individuals with severe psychiatric disorders experience more severe substance use and more negative consequences associated with substance use than individuals with only SUDs do (Gonzalez, Bradizza, Vincent, Satsiewicz, & Paas, 2007).

Whereas DD and SUD patient had similar substance use outcomes, DD patients reported more psychiatric symptoms at both 1- and 5-year follow-ups. Several other studies have obtained similar results (e.g., Moos et al., 1999; Moos, Schaefer, Andrassy, & Moos, 2001). In this respect, 13.3% of the DD patients experienced an exacerbation of psychiatric symptoms during treatment. These findings may be attributable to the lack of specialized services in SUD treatment programs focused on psychiatric symptoms, such as the effective provision of psychotropic medications (Timko, Ilgen, & Moos, 2007). These problems may be heightened by the lack of continuing outpatient care, which has been associated with poorer outcomes (Moos et al., 2001; Ouimette, Moos, & Finney, 2003; Timko et al., 2007). It will be important for future research to investigate the associations of continuing outpatient care and longer term outcomes, such as those included in this study.

Our findings leave open the question of whether DD patients' psychiatric symptoms would improve more in integrated treatments that focus on reducing both substance use and psychiatric symptoms (Drake et al., 2008) or whether sequential treatments would be more effective. In any case, DD patients' psychiatric symptoms do not appear to hinder them in successfully reducing their substance-related problems over the long term.

7.4. Predictors of 1- and 5-year outcomes

Patients who perceived treatment more positively experienced better 1-year substance use and psychiatric outcomes. Notably, greater satisfaction with treatment was associated with fewer substance use problems and psychiatric symptoms at both 1- and 5-year follow-ups. These results extend prior findings linking treatment satisfaction to short-term SUD outcomes (Carlson & Gabriel, 2001; Chan et al., 1997; Donovan et al., 2002; Zhang et al., 2008) and indicate that a positive experience in treatment can have long-term beneficial consequences for both DD and SUD patients.

Patients who had better proximal outcomes at discharge also tended to have better 1- and 5-year substance use and psychiatric outcomes. Consistent with prior research (e.g., Carbonari & DiClemente, 2000; Chung et al., 2001; Forys et al., 2007; Vielva & Iraurgi, 2001), the strongest predictors of these outcomes at both time points were more self-efficacy and less reliance on avoidance coping. In conjunction with the lack of differential associations

between indices of treatment integration, proximal outcomes at discharge, and long-term outcomes among DD and SUD patients, the findings show that increases in self-efficacy and reductions in avoidance coping during SUD treatment may initiate a process that benefits DD patients as much as it does SUD patients.

7.5. Limitations

There are several notable limitations to this study. First, our measures were obtained via self-report, which is subject to a variety of biases, such as social desirability. However, studies in the substance abuse area have supported the validity of self-report measures (Babor, Steinberg, Anton, & Del Boca, 2000; Del Boca & Noll, 2000). In addition, for the most part, any such biases should affect DD and SUD patients' self-reports similarly, with perhaps one exception. Compared with SUD patients, DD patients may experience more cognitive and memory biases (Kurtz, Moberg, Ragland, Gur, & Gur, 2005), which may hamper their ability to accurately report their outcomes at discharge from treatment and their longer term alcohol consumption and psychiatric symptoms.

Second, all patients in our study were male veterans, which limits the generalizability of our findings. Given the gender differences in substance use (Moos, Finney, & Cronkite, 1990) and psychiatric disorders (Nolen-Hoeksema & Girgus, 1994), our results may not be applicable to women. Furthermore, it is unknown whether our results would generalize to nonveteran programs or patient populations. The VA is publicly funded, operates the largest SUD treatment system in the United States, and in general, provides SUD and psychiatric services that are of similar quality and effectiveness to those in the private section (Rosenheck, Desai, Steinwachs, & Lehman, 2000). However, the VA patient population has poorer health status compared with the general patient population (Agha, Lofgren, Van Ruiswyk, & Layde, 2000). It is possible that less-impaired DD patients in non-VA standard SUD programs would fare as well on proximal outcomes at discharge and long-term psychiatric outcomes as their SUD counterparts.

Lastly, we did not compare DD patients in integrated treatments to those in standard SUD treatment. Thus, although our results show that DD patients' psychiatric symptoms do not improve as much as those of SUD patients in standard SUD treatment, we do not know whether DD patients would do better in integrated or sequential treatment. On a related point, we focused on DD patients as an overall group and did not address the heterogeneity among patients with different Axis I disorders (Tiet & Mausbach, 2007). More information is needed about whether residential SUD treatment might provide more benefits for individuals with some Axis I disorders, such as major depressive or bipolar disorders, than for individuals with other Axis I disorders, such as schizophrenia.

7.6. Conclusions and implications

Broadly speaking, in the context of residential SUD treatment, DD and SUD patients experienced comparable SUD outcomes, but DD patients experienced markedly poorer psychiatric symptom outcomes. Given that many DD patients are treated in SUD programs that may not adequately serve these patients' psychiatric needs (Timko & Moos, 2002; Timko & Sempel, 2004), these programs either need to add resources directed toward treating psychiatric problems, such as more emphasis on daily living skills and mutual support groups oriented toward DD patients, or DD patients need to be treated in sequential or integrated programs (Drake et al., 2008). It should be noted, however, that standard SUD programs may offer more components of integrated treatment than standard psychiatric programs do (Timko et al., 2005).

As important, our findings indicate that SUD programs should allocate more resources to enhance DD patients' positive reactions to treatment and include treatment components to change specific proximal outcomes, such as self-efficacy and coping skills, which benefit both DD and SUD patients. These treatment components should be provided as an integral part of SUD treatment and address DD patients' psychiatric needs, for example, by focusing on self-efficacy and skills directed toward coping with psychiatric symptoms and related deficits in interpersonal functioning. In this vein, Ouimette et al. (2003) found that patients with substance use and PTSD who received PTSD-focused treatment in the first 3 months following discharge from SUD treatment were more likely to be remitted at a 5-year follow-up.

Finally, one way to enhance patients' integration into treatment and proximal outcomes at discharge is to improve the staff work environment. In this regard, Moos and Moos (1998) found that staff members in more supportive and goal-directed work environments tended to create more supportive and goal-directed treatment environments. Patients in these treatment environments participated more intensively in treatment, were more satisfied with the program, and improved more during treatment on such proximal outcomes as self-efficacy and coping skills. With respect to further research, information about the probable mechanisms of change in SUD treatment (Bogenschutz, 2007; Moos, 2007) can guide researchers in their quest to identify the most effective ingredients of SUD treatment for both DD and SUD patients.

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Table 1

DD and non-DD (SUD) patients' demographic characteristics

Demographic characteristics	DD patients (n = 691)	SUD patients (n = 1,805)	F or χ^2 (df)
Mean age in years (<i>SD</i> /range)	43.8 (8.6/22–70)	43.6 (10.3/21–77)	0.2 (2,495)
Race/Ethnicity (%)			52.3 (5) **
White	64	49	
African American	33	47	
Latino/a	3	3	
Native American	1	2	
Married (%)	21	21	0.0 (1)
Years of education (<i>SD</i> /range)	12.9 (1.8/8–17)	12.6 (1.8/8–17)	13.9 (2,494) **
Employed at intake (%)	19	24	7.3 (1) **
Arrested in prior 12 months (%)	33	36	1.9 (1)
Drug dependence diagnosis (%)	43	48	3.7 (1)

**
 $p < .01$.

Table 2

DD and non-DD (SUD) patients' status on intake values of proximal and substance use and psychiatric distal outcomes

Dependent variable	DD, <i>M (SD)</i>	SUD, <i>M (SD)</i>	<i>F (df)</i>
Proximal outcomes			
Benefits of quitting (0–24)	18.2 (4.9)	19.6 (4.5)	36.9 (2,496)**
Self-efficacy (0–5)	2.6 (1.2)	3.2 (1.3)	21.9 (2,496)**
Substance-specific coping (0–60)	29.7 (11.9)	29.7 (12.3)	0.9 (2,495)
Approach coping (0–36)	9.6 (4.1)	10.4 (3.9)	13.0 (2,486)**
Avoidance coping (0–36)	9.2 (3.6)	8.0 (3.6)	63.4 (2,487)**
Distal outcomes			
Alcohol consumption (ounces of ethanol)	21.8 (16.0)	20.5 (14.9)	2.8 (2,496)
Substance use problems (0–60)	18.6 (12.3)	17.2 (10.8)	16.4 (2,435)**
Psychiatric symptoms (0–88)	43.3 (18.4)	31.3 (18.3)	224.4 (2,496)**

**
 $p < .01$.

Table 3

DD and non-DD (SUD) patients' status on perceptions of treatment and proximal outcomes at discharge

Dependent variable	DD, <i>M (SD)</i>	SUD, <i>M (SD)</i>	<i>F (df)</i>
Perceptions of treatment			
Support (0–10)	7.3 (2.3)	7.5 (2.1)	3.9 (2,317)*
Clarity (0–10)	7.0 (2.2)	7.2 (1.9)	4.1 (2,317)*
Spirituality (0–10)	5.7 (2.8)	6.0 (2.7)	0.2 (2,316)
Satisfaction (0–33)	25.2 (6.3)	26.7 (5.4)	27.9 (2,316)**
Treatment intensity (no. of individual sessions)	4.5 (4.8)	4.5 (5.7)	0.1 (2,315)
Proximal outcomes			
Benefits of quitting (0–24)	18.6 (4.8)	20.1 (4.2)	22.4 (2,313)**
Self-efficacy (0–5)	3.6 (1.1)	3.9 (1.0)	25.3 (2,312)**
Substance-specific coping (0–60)	44.4 (9.5)	45.6 (9.5)	3.7 (2,314)
Approach coping (0–36)	13.9 (3.1)	14.5 (2.8)	10.8 (2,293)**
Avoidance coping (0–36)	6.6 (3.5)	5.9 (3.3)	5.8 (2,293)*

* $p < .05$.** $p < .01$.

Table 4

DD and non-DD (SUD) patients' 1- and 5-year substance use and psychiatric outcomes

Distal outcomes	DD, <i>M (SD)</i>	SUD, <i>M (SD)</i>	<i>F (df)</i>
1-Year outcomes			
Alcohol consumption (ounces of ethanol)	8.9 (13.2)	8.5 (12.4)	0.1 (2,494)
Substance use problems (0–60)	10.3 (11.7)	9.0 (11.3)	2.8 (2,400)
Psychiatric symptoms (0–88)	36.7 (21.2)	24.1 (18.9)	60.6 (2,496) **
5-Year outcomes			
Alcohol consumption (ounces of ethanol)	7.7 (12.0)	7.1 (11.3)	0.4 (1,866)
Substance use problems (0–60)	8.1 (10.6)	8.2 (11.3)	1.01 (1,750)
Psychiatric symptoms (0–88)	37.4 (21.4)	23.8 (19.7)	62.8 (1,870) **

**
 $p < .01$.

Table 5
Indices of patients' perceptions of treatment as predictors of proximal outcomes at discharge

Variables	Proximal outcomes				
	Benefits of quitting	Self efficacy	Substance-specific coping	Approach coping	Avoidance coping
Covariate r^2	.16 **	.16 **	.11 **	.08 **	.11 **
Patient status (0 = SUD, 1 = DD)	-.09 **	-.10 **	-.04	-.07 **	.05 *
Perceptions of Treatment					
Support	.12 **	.14 **	.17 **	.18 **	-.07 **
Clarity	.10 **	.13 **	.13 **	.12 **	-.09 **
Spirituality	.10 **	.13 **	.19 **	.16 **	-.05 *
Satisfaction	.24 **	.22 **	.23 **	.26 **	-.09 **
Final r^2	.22 **	.22 **	.18 **	.16 **	.13 **

Note. In each regression, control variables (race/ethnicity, education, and employment, intake value of the dependent variable, and program treatment orientation) were entered in Step 1; patient status and perceptions of treatment were entered in Step 2. Entries in the table are standardized beta coefficients; entries in bold identify independent predictors. Sample sizes for regressions ranged from 2,289 to 2,311 due to missing data.

* $p < .05$.

** $p < .01$.

Table 6

Indices of patients' perceptions of treatment and proximal outcomes at discharge as predictors of 1- and 5-year substance use and psychiatric outcomes

Variables	1-Year outcomes			5-Year outcomes		
	Alcohol consumption	Substance use problems	Psychiatric symptoms	Alcohol consumption	Substance use problems	Psychiatric symptoms
Covariate r^2	.12 **	.12 **	.27 **	.06 **	.11 **	.21 **
Patient status (0 = SUD, 1 = DD)	-.10	.03	.13 **	.03	-.02	.16 **
Perceptions of treatment						
Support	-.03	-.05 *	-.05 **	-.02	-.05	-.05 *
Clarity	-.03	-.04 *	-.04 *	-.02	-.02	-.02
Spirituality	-.06 **	-.04	-.04 **	-.04	-.03	-.05 *
Satisfaction	-.06 **	-.06 **	-.07 **	-.04	-.10 **	-.07 **
Proximal outcomes						
Benefits of quitting	-.07 **	-.06 **	-.11 **	-.05	-.04	-.10 **
Self-efficacy	-.14 **	-.13 **	-.16 **	-.10 **	-.12 **	-.12 **
Substance-specific coping	-.04	-.04	-.04	-.04	-.06 *	-.02
Approach coping	-.02	-.06 **	-.07 **	-.06 **	-.07 *	-.11 **
Avoidance coping	.08 **	-.09 **	.14 **	-.03	.03	-.12 **
Final r^2	.15 **	.15 **	.33 **	.08 **	.14 **	.27 **

Note. In each regression, control variables (race/ethnicity, education, and employment, intake values of the dependent variable and the discharge outcome, and program treatment orientation) were entered in Step 1; patient status, perceptions of treatment, and discharge outcomes were entered in Step 2. Entries in the table are standardized beta coefficients; entries in bold identify independent predictors. Sample sizes for regressions ranged from 1,714 to 2,285 due to missing data.

* $p < .05$.

** $p < .01$.