Journal of Substance Abuse Treatment 47 (2014) 339–346

Contents lists available at ScienceDirect

Journal of Substance Abuse Treatment

Do improvements in substance use and mental health symptoms during treatment translate to long-term outcomes in the opposite domain?

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ARTICLE INFO

Article history:
Received 7 November 2013
Received in revised form 26 June 2014
Accepted 30 June 2014

Keywords:
Adolescent treatment
Mental health
Causal effects
Response to treatment

ABSTRACT

Providers who treat adolescents with co-occurring substance use and mental health issues may prioritize treatment of one set of symptoms believing that improvements in one domain will result in improvements of the other. However, limited empirical data for adolescents provide evidence of such "spillover effects." Using data from 2900 youth in an outpatient treatment, we examined whether during-treatment changes in substance use or mental health symptoms predicted 12-month outcomes in the analogous and opposite domains. There was very little evidence of spillover effects, only that youth with no internal distress at 0 and 3 months reported lower levels of substance use problems at 12-months relative to youth with internal distress that stayed the same from 0 to 3 months. These findings suggest that providers treat both sets of substance use and mental health symptoms in an integrated manner given that these symptoms commonly co-occur among youth with either set.

1. Introduction

Between one-quarter to one-half of the 150,000 adolescent treatment admissions to substance abuse treatment facilities in the United States each year are for youth with co-occurring substance use and mental health issues (Chan, Dennis, & Funk, 2008; Diamond et al., 2006; Grella, Hser, Joshi, & Rounds-Bryant, 2001; Jaycox, Morral, & Juvonen, 2003; Robbins et al., 2002; Substance Abuse and Mental Health Services Administration, & Center for Behavioral Health Statistics, Quality, 2012). However, there is a dearth of evidence-based interventions that simultaneously treat both young peoples' substance use behaviors and mental health symptoms (Hawkins, 2009). Absent of such treatments, those charged with treating adolescents with comorbid conditions are thus encouraged to offer "integrated care" (Brannigan, Schackman, Falco, & Millman, 2004; Hawkins, 2009; National Institute on Drug Abuse, 2009). The dominant strategy for offering integrated care is based on a quadrant model of severity of both mental health and substance use symptoms (i.e., patients' care is determined by whether they have high or low severity on both mental health and substance use symptoms) (National Association of State Mental Health Program Directors & National Association of State Alcohol and Drug Abuse Directors, 1998); however, this model may have limited clinical utility broadly (Pincus, Watkins, Vilamovska, & Keyser, 2006), and there is a debate as to whether the model is developmentally appropriate for adolescents (Hawkins, 2009; Stewart et al., 2011).

Although intuitively appealing, there are noted challenges associated with delivering integrated care. Barriers result from an "organizationally fragmented health care system" in which substance use, mental health, and general health services are "de-linked" from each other and even further siloed by confidentiality policies that limit communication between systems (Sterling, Weisner, Hinman, & Parthasarathy, 2010). This suggests that concurrent treatment of both substance use and mental health symptoms must be directed and managed by the client (or in the case of adolescent clients, families or guardians). Treatment takes place in different settings by different professionals who may have different treatment philosophies and who may face organizational barriers that prohibit collaboration (Burnam & Watkins, 2006; Kavanagh et al., 2000).

Another barrier to offering integrated care, and the focus of the current study, is that some providers may opt to treat only one set of symptoms assuming that the improvements in one domain will yield either concurrent or consequent improvements in the other. For the purposes of the current analysis, we term such effects—whether hypothesized or realized—as "spillover effects." In fact, such notions may not necessarily be a 'barrier' because there is some evidence of spillover effects, though these have been observed primarily in adult samples. For example, one prospective study of adults admitted to residential and methadone treatment revealed that exposure to substance use treatment alone led to

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http://dx.doi.org/10.1016/j.jsat.2014.06.012
0740-5472/

rapid and sustained reductions in psychiatric symptoms (Gossop, Marsden, & Stewart, 2006). Similar evidence suggests also that the converse is true, namely that treating psychiatric symptoms alone in adults leads to improvements in substance use symptoms (Baker et al., 2007; Grella, Joshi, & Hser, 2004; Grella et al., 2001; Magura, Rosenblum, & Betzler, 2009).

Although evidence of spillover effects has been observed in adult samples, to our knowledge there is limited empirical evidence of spillover effects among adolescents. For example, there is some evidence that effective mental health treatments may prevent the development of subsequent substance use disorders (Curry et al., 2012; Kendall, Safford, Flannery-Schroeder, & Webb, 2004); however, only limited empirical evidence supports the beneficial effects of effective substance use treatment on long-term psychological well-being (Edelen, Slaughter, McCaffrey, Becker, & Morral, 2010). More generally, mental health symptoms have been hypothesized to modify the effect of substance use treatment, though a recent meta-analysis of outpatient adolescent treatment finds no empirical evidence of such effect modification (Tanner-Smith, Wilson, & Lipsey, 2013); similarly, findings are mixed whether substance use severity at intake modifies the effect of mental health treatment (e.g., Goldstein et al., 2009; Hirschtritt et al., 2012; McKowen, Tompson, Brown, & Asarnow, 2013).

This does not suggest, however, that researchers and treatment providers alike do not presume such effects exist. Evaluations of substance abuse treatments for adolescents are often conducted with an implicit assumption that improvements in substance using behaviors among adolescents in treatment will result in reduced psychiatric symptoms (Kelly, Urbanoski, Hoeppner, & Slaymaker, 2012). This is demonstrated in part by the number of substance use treatment evaluations that examine mental health outcomes in addition to substance use outcomes without specifying why psychiatric symptoms are hypothesized to improve (e.g., Dennis et al., 2004; Godley et al., 2010; Ramchand, Griffin, Suttorp, Harris, & Morral, 2011). In light of such practices, research is needed to better understand how treatments that effect symptoms in one domain may effect symptoms in the other.

One way to study spillover effects is to test whether changes that occur during treatment in one domain (e.g., substance use) predict long-term, post-treatment outcomes in the other (e.g., mental health). Kelly et al. (2012) term this strategy 'response to treatment' and advocate more generally for evaluating adolescent substance abuse treatment programs by examining the relationships between during treatment changes with post-treatment outcomes. In that study, described as the first attempt to study 'response to treatment' in adolescents, the researchers examined whether changes in adolescent residential clients' psychological distress, motivation to abstain and abstinence self-efficacy, coping skills, and commitment to NA/AA between intake and discharge predicted 3-month abstinence. They found only evidence that changes in abstinence self-efficacy during treatment predicted abstinence 3-months post-discharge (Kelly et al., 2012).

In the present study, we adopt a similar strategy to test for spillover effects among adolescents. Specifically, we test the hypothesis that changes in one domain of outcomes will result in improvement in the other by examining (i) whether short-term reductions in substance use behaviors and problems that occur in the first 3-months of treatment translate to improved 12-month substance use and emotional well-being outcomes and (ii) whether improvements in emotional well-being in the first 3-months of treatment translate to improved 12-month emotional well-being and substance use outcomes. We do so with a large sample of youth receiving a brief intervention delivered in community-based settings; however, we are not evaluating the treatment, per se. Rather, we are evaluating whether symptom changes that occur during the period in which youth are receiving treatment predict long-term outcomes. We define changes that occur during the period in which youth are receiving treatment as "response to treatment," though note that such changes may not necessarily be a causal response. Findings from the current study will provide further evidence on whether there are potential associations between initial responses to treatment on both substance use and emotional well-being outcomes, informing both how to improve the care afforded to youth with comorbid conditions as well as how to evaluate this care.

2. Materials and methods

2.1. Sample/Data

In 2003, the Center for Substance Abuse Treatment (CSAT) launched the Effective Adolescent Treatment (EAT) initiative that provided support for 37 community-based programs across the U.S. to adopt a brief, evidence-supported therapy (motivational enhancement treatment/cognitive behavioral therapy-5 or MET/CBT-5) to treat adolescent cannabis use. MET/CBT-5 is a 5-session treatment offered over the course of 6–7 weeks, consisting of two individual motivational enhancement therapy sessions and three group cognitive behavioral therapy sessions (Diamond et al., 2002; Sampl & Kadden, 2001). The selected community-based programs were provided 3 years of support, including training and supervision in the MET/CBT-5 protocol, and were required to collect client data at baseline and at 3, 6 and 12-months using a standardized instrument (Hunter et al., 2012).

In aggregate, 3609 youth were interviewed at both baseline and at the 3-month follow-up. Of these, 2900 were eligible to have a 12-month interview (i.e., they were enrolled during a time for which the treatment facility still had funding to conduct a 12-month interview with the client). Approximately three-quarters of those eligible (N = 2130, 73.4%) were interviewed at 12-months. Analyses showed that those who responded to the assessment at 12-months looked representative of the 3,609 youth with both baseline and 3-month data on age, race, gender and baseline values of the outcomes considered here.

2.2. Measures

All client-level data were collected via self-report using the Global Appraisal of Individual Needs (GAIN) (Dennis, 1999). The GAIN has eight sections assessing background and demographic characteristics (asked at baseline only), substance use, physical health, risk behaviors, mental health, environment, legal, and educational/vocational problem areas. We employed the same two measures of substance use used in the original trial of MET/CBT-5, (Dennis et al., 2004) and two measures of mental health symptoms.

The Substance Problem Scale (SPS) is a 16-item scale comprised of seven items which are criteria for substance dependence, four items which are criteria for substance abuse, two items related to substance-associated health and psychological problems, and three items related to lower severity symptoms (e.g., hiding use, people complaining about use, and weekly use), with higher scores indicating more problems (range: 0 to 16). Internal reliability is excellent ($\alpha = 0.92$) (Dennis, Chan, & Funk, 2006), and evidence suggests a unidimensional construct, which primarily reflects addiction severity and its impact on daily life (Stucky, Edelen, & Ramchand, 2014).

The Substance Frequency Scale (SFS) is an 8-item scale that assesses the average proportion of days where alcohol and other drugs were used in the past 90, with higher scores indicating increased frequency of use in terms of days of use, days being high most of the day, and days actually causing problems (scale is standardized and ranges from 0 to 1). Internal reliability was good ($\alpha = 0.80$) for the substance use frequency scale (Ramchand et al., 2011).

The Internal Mental Distress Scale (IMDS) is a 43-item scale that comprises a count of past-year symptoms at baseline and past 90-day