Effectiveness of a computerized motivational intervention on treatment initiation and substance use: Results from a randomized trial

Jennifer Lerch [a,*], Scott T. Walters [b], Liansheng Tang [c], Faye S. Taxman [a]

[a] George Mason University, Department of Criminology, Law and Society and Center for Advancing Correctional Excellence!, 4087 University Drive, Ste. 4100, Fairfax, VA 22030, USA
[b] University of North Texas Health Science Center, School of Public Health, 3500 Camp Bowie Blvd., EAD 709, Fort Worth, TX 76107, USA
[c] George Mason University, Department of Statistics, 1710 Nguyen Engineering Building, Fairfax, VA 22030, USA

A B S T R A C T

As many as 80% of the nearly five million adults under community supervision (i.e., probation, parole) are substance involved; however, treatment utilization is low. Using a multi-site randomized controlled trial, we tested the efficacy of in-person motivational interviewing (MI), a motivational computer intervention (MAPIT), or standard probation intake (SAU) to encourage treatment initiation among 316 substance-involved probationers in Dallas, Texas and Baltimore City, Maryland. Ninety-three percent ($n = 295$) of participants completed the 2-month follow-up and 90% ($n = 285$) completed the 6-month follow-up. At 2-months, individuals in the MAPIT condition were more likely to report treatment initiation compared to the SAU condition (OR = 2.40, 95% CI = 1.06, 5.47) via intent-to-treat analysis, especially among those completing both sessions (RE = 0.50, 95% CI = 0.05, 0.95) via instrumental variable analysis. At 6-months, MAPIT approached significance for treatment initiation in both analyses. MI did not achieve significance in any model. We did not find any differential impact on substance use. The success of MAPIT suggests that an integrated health-justice computerized intervention as part of a Screening, Brief Intervention, and Referral to Treatment (SBIRT) can be used to address public safety and health issues.

© 2017 Elsevier Inc. All rights reserved.

1. Introduction

In 2015, nearly 25 million adults in the United States reported illicit drug use in the past month, and nearly 65 million adults reported binge alcohol use in the past month. Treatment initiation was low among substance users in need of treatment, with only 14% of those needing treatment receiving treatment services (Center for Behavioral Health Statistics and Quality, 2016). Screening, Brief Intervention, and Referral to Treatment (SBIRT) has emerged as a favored framework to identify and refer at-risk individuals to treatment. The White House, Substance Abuse Mental Health Services Administration (SAMHSA), and World Health Organization (WHO) promote SBIRT as an evidence-based intervention in settings such as emergency rooms, medical offices, schools, and specialty treatment programs (Humeniuk, Henry-Edwards, Ali, Poznyak, & Monteiro, 2010; The White House, Office of the Press Secretary, 2012; U.S. Department of Health and Human Services (HHS), Office of the Surgeon General, 2016). When implemented as a brief intervention (5–10 min), SBIRT has been shown to reduce risky alcohol use in adult primary care (Moyer, 2013), but does not garner the same results for illicit drug use (Hingson & Compton, 2014; Roy-Byrne et al., 2014; Saitz, 2014). A recent review of 13 randomized trials found that SBIRT does not improve alcohol treatment initiation rates (Glass et al., 2015); however, no such studies exist on treatment initiation for drug use. More research needs to explore whether SBIRT influences treatment initiation, which is often considered a precursor to changes in drug use.

Related research on brief counseling (2–4 sessions) provides robust support for the effectiveness of adaptations of motivational interviewing (MI) at reducing both alcohol and drug use, as well as increasing treatment initiation. MI has been widely validated as a stand-alone treatment, as a precursor to more extensive treatment, or as a clinical style for delivering other components, such as tailored feedback (Hettema, Steele, & Miller, 2005). There is also emerging evidence that MI can improve treatment compliance for individuals in the criminal justice system (McMurran, 2009). Challenges to the dissemination of MI (and SBIRT in general) include the difficulty of sustaining quality practice over time (Hall, Staiger, Simpson, Best, & Lubman, 2016). One solution is to use technology-based interventions that do not rely on provider availability or skill level. In fact, there is a substantial literature on the effectiveness of technology-based interventions at reducing substance use and related risk behaviors in primary care and specialty treatment settings (Marsch, Carroll, & Kiluk, 2014).

* Corresponding author.
  E-mail addresses: jlerch@gmu.edu (J. Lerch), Scott.Walters@unthsc.edu (S.T. Walters), ltang1@gmu.edu (L. Tang), ftaxman@gmu.edu (F.S. Taxman).

Of the nearly 5 million adults under community supervision (i.e., probation and parole) in the United States (Kaeble, Maruschak, & Bonczar, 2015), as many as 60 to 80% are substance-involved (Feucht & Gfroerer, 2011). Nearly 3.5 million individuals under community supervision are estimated to be in need of substance abuse treatment (Taxman, Perdoni, & Harrison, 2007), but only 17% access treatment services (Karberg & James, 2005). Improved rates of treatment initiation could significantly reduce failures on community supervision, which fuel the use of jail or prison incarceration as responses to continued drug use (Phelps, 2013). Technology-based interventions may be particularly well suited to justice settings where the workforce has limited training in behavioral health (Bonta et al., 2011; Chadwick, Dawolf, & Serin, 2015) and there are relatively few treatment resources available (Taxman, Perdoni, & Caudy, 2013). One study of a prison-based substance abuse computer education program found that inmates had comparable attendance at a computerized intervention and similar gains in coping skills as traditional counseling groups (Chaple et al., 2014).

This study reports on a randomized controlled trial comparing the efficacy of an in-person MI intervention, a motivational computer intervention, or standard probation intake to encourage treatment initiation and reduce substance use among substance-involved probationers in Dallas, Texas and Baltimore City, Maryland.

2. Material and methods

2.1. Design and procedures

We randomized substance-using probationers in Dallas, Texas and Baltimore City, Maryland to one of three conditions: a 2-session motivational computer intervention (MAPIT), a 2-session in-person MI intervention (MI), or supervision as usual (SAU). Participants in all three conditions followed the standard probation process at their respective sites. Study participants were English-speaking adults (≥18 years old) who had been recently placed on probation. Participants reported at least one instance of heavy alcohol (≥5 drinks per day for men; ≥4 drinks per day for women) or any illicit drug use during the past 90 days. After consenting, participants completed a baseline assessment and were randomized to one of the study conditions. If assigned to MAPIT or MI, participants completed the first intervention session after the baseline assessment, and the second session approximately 4 weeks later. The first session targeted motivation to complete probation, initiate treatment, and obtain HIV testing. The second session emphasized goal setting, coping strategies, and social support. Participants completed follow-up assessments at 2- and 6-months post-randomization. The study protocol was reviewed and approved by the human subjects institutional review boards at George Mason University and University of North Texas Health Science Center. More detail on the study design and procedures are reported elsewhere (Taxman, Walters, Sloas, Lerch, & Rodriguez, 2015).

In terms of intervention theory, MAPIT drew from the extended parallel process model in how it framed risk messages (Witte & Allen, 2000) and Social Cognitive Theory in terms of how it presented comparative information and suggestions (Bandura, 1986). MAPIT also incorporated a number of MI-based strategies, such as open questions, affirmations, and summary statements; personalized feedback; and selective reinforcement of client responses that were consistent with change. MAPIT used theory-based algorithms and a text-to-speech engine to deliver personalized reflections, feedback, and suggestions. At the participant's request, the program could send emails or mobile texts to remind participants of their goals. The development and content of MAPIT is described more fully elsewhere (Walters et al., 2014); samples of the program can be viewed at: http://youtu.be/9yV6bTn1tVE; http://youtu.be/XEZ5o48WwTg; http://youtu.be/u2SHWG0QXe8; http://youtu.be/wMShVdPpcsw. We structured the MI intervention similarly to MAPIT, using a tailored feedback report and activities that addressed motivation to engage in treatment and successfully complete probation. We used training and fidelity procedures similar to other large clinical trials (Project MATCH Research Group, 1993). The development and content of the MI condition is described more fully elsewhere (Spohr, Taxman, Rodriguez, & Walters, 2016; Walters, Ressler, Douglas, & Taxman, 2011).

2.2. Measures

2.2.1. Dependent measures

We created dichotomous outcomes measuring whether any substance use and/or treatment initiation occurred at follow-up. We assessed these measures via a self-report Timeline Follow-back (TLFB), a calendar-based recall system that has been widely validated in substance treatment trials (Sobell & Sobell, 1996). The primary outcome of treatment initiation was measured as two or more days of any treatment involvement (i.e., self-help, group sessions, individual sessions, in-patient, detoxification, intensive outpatient, medication, residential, religious services, or other services) at 2- and 6-month follow-up, when the participant had not been in treatment in the 30 days before randomization. This definition of treatment resembles those used in prior research (McLellan et al., 1994; Green, Polen, Dickinson, Lynch, & Bennett, 2002; Garnick, Lee, Horgan, Acevedo, and the Washington Circle Public Sector Workgroup, 2009). This definition reduces the potential inclusion of one-time only treatment attendance, such as a required substance abuse assessment visit, and ensures a reliable estimate of actual initiation. Successful recovery can be achieved through both formal (e.g., residential) and informal (e.g., self-help) modalities (Laudet, Savage, & Mahmood, 2002; De Leon, 2004; Humphreys et al., 2004; Gossop, Stewart, & Marsden, 2015), and thus we included informal treatment modalities (e.g., self-help) to broaden our ability to identify participants who were seeking recovery outside of traditional mechanisms (De Leon, 2004). Of those who initiated treatment at the 2-month follow-up, one participant used only self-help groups (2.1%), while five participants (10.4%) used self-help with some other form of treatment as well. Of those who initiated treatment at the 6-month follow-up, one participant used only self-help groups (1.2%), while eighteen participants (20.9%) used self-help with another form of treatment. The secondary outcome of substance use was determined by any instance of heavy alcohol use (≥5 drinks per day for men; ≥4 drinks per day for women), marijuana use, or hard drug use (e.g., cocaine, opiates) at 2- and 6-month follow-up.

2.2.2. Covariate measures

We examined several baseline characteristics as potential covariates. Demographic characteristics included age, race, gender, and housing stability. Composite scores from the Addiction Severity Index-Lite (ASI) (McGahan, Griffith, Parente, & McLellan, 1986) included employment/education (2-month follow-up (2 MFU) $\alpha = 0.75$; 6-month follow-up (6 MFU) $\alpha = 0.75$), alcohol (2 MFU $\alpha = 0.77$; 6 MFU $\alpha = 0.77$), drug (2 MFU $\alpha = 0.76$; 6 MFU $\alpha = 0.76$), medical (2 MFU $\alpha = 0.91$; 6 MFU $\alpha = 0.91$), and family/social (2 MFU $\alpha = 0.66$; 6 MFU $\alpha = 0.64$). We also examined measures of recidivism risk, positive screening for a mental health disorder, lifetime prior treatment, age of first substance use, and whether the participant had a court ordered requirement for substance abuse testing or treatment. Finally, we examined readiness for treatment (2 MFU $\alpha = 0.94$; 6 MFU $\alpha = 0.94$) from the Criminal Justice Client Evaluation of Self and Treatment Intake (Institute of Behavioral Research, Texas Christian University, 2005). When examining correlations between baseline characteristics covariates, we found that problem recognition and desire for help subscales were highly correlated ($r = 0.85$, $p < 0.001$). A factor analysis revealed that these two subscales loaded as a single item representing motivational readiness.