



Cost and cost-effectiveness of computerized vs. in-person motivational interventions in the criminal justice system



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ABSTRACT

Introduction: Although substance use is common among probationers in the United States, treatment initiation remains an ongoing problem. Among the explanations for low treatment initiation are that probationers are insufficiently motivated to seek treatment, and that probation staff have insufficient training and resources to use evidence-based strategies such as motivational interviewing. A web-based intervention based on motivational enhancement principles may address some of the challenges of initiating treatment but has not been tested to date in probation settings. The current study evaluated the cost-effectiveness of a computerized intervention, Motivational Assessment Program to Initiate Treatment (MAPIT), relative to face-to-face Motivational Interviewing (MI) and supervision as usual (SAU), delivered at the outset of probation.

Methods: The intervention took place in probation departments in two U.S. cities. The baseline sample comprised 316 participants (MAPIT = 104, MI = 103, and SAU = 109), 90% (n = 285) of whom completed the 6-month follow-up. Costs were estimated from study records and time logs kept by interventionists. The effectiveness outcome was self-reported initiation into any treatment (formal or informal) within 2 and 6 months of the baseline interview. The cost-effectiveness analysis involved assessing dominance and computing incremental cost-effectiveness ratios and cost-effectiveness acceptability curves. Implementation costs were used in the base case of the cost-effectiveness analysis, which excludes both a hypothetical license fee to recoup development costs and startup costs. An intent-to-treat approach was taken.

Results: MAPIT cost \$79.37 per participant, which was ~\$55 lower than the MI cost of \$134.27 per participant. Appointment reminders comprised a large proportion of the cost of the MAPIT and MI intervention arms. In the base case, relative to SAU, MAPIT cost \$6.70 per percentage point increase in the probability of initiating treatment. If a decision-maker is willing to pay \$15 or more to improve the probability of initiating treatment by 1%, estimates suggest she can be 70% confident that MAPIT is good value relative to SAU at the 2-month follow-up and 90% confident that MAPIT is good value at the 6-month follow-up.

Conclusions: Web-based MAPIT may be good value compared to in-person delivered alternatives. This conclusion is qualified because the results are not robust to narrowing the outcome to initiating formal treatment only. Further work should explore ways to improve access to efficacious treatment in probation settings.

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1. Introduction

In the United States, nearly 5 million adults are on probation or parole (Kaeble, Maruschak, & Bonczar, 2015), a disproportionate

Abbreviations: MAPIT, Motivational Assessment Program to Initiate Treatment; MI, motivational interviewing; SAU, supervision as usual.

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number of whom have a substance use disorder. A nationally representative sample of male probationers aged 18 to 49 found that 45% needed substance use treatment in 2012, yet only 24% received it (SAMHSA, 2014).

Given both the high prevalence of substance use among probationers and the adverse consequences of substance use—including revocation, rearrest, and incarceration—connecting substance-involved probationers with treatment is critical. However, given limited funding for probation, it is important to justify fiscally the resources spent on reducing recidivism. Linking probationers to treatment is one key factor in reducing recidivism (Drake, 2011; Drake & Aos, 2012; Taxman, 2008),

especially because 8% of probationers are incarcerated for a new offense or through revocation of the terms of probation (Kaeble et al., 2015).

Screening, Brief Intervention, and Referral to Treatment (SBIRT) is one approach to linking clients to treatment. Many SBIRT models include brief counseling of 1 to 4 sessions, and most draw on motivational interviewing (MI) principles that are designed to increase motivation and readiness for change. Such an approach has been shown to reduce unhealthy alcohol use among the general population in primary care settings (Moyer, 2013). There is also evidence that MI can increase treatment initiation and compliance among probationers (McMurran, 2009). However, it may be more difficult to deliver an MI-based intervention than delivering general, unspecified counseling (Hall, Staiger, Simpson, Best, & Lubman, 2016). Moreover, it can be especially difficult for probation officers to implement an MI-based intervention, given large caseloads and limited training in behavioral health (Chadwick, Dawolf, & Serin, 2015; Taxman, Perdoni, & Caudy, 2013; Walters, Vader, Nguyen, Harris, & Eells, 2010).

Technology-based interventions have emerged as a potential solution to addressing substance use in settings where specialized skills are otherwise absent. Several studies document 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). However, there is relatively little research on technology-based approaches to addressing substance use issues in justice settings (Walters et al., 2014).

The current study is a cost-effectiveness analysis (CEA) of a multisite randomized controlled trial to test the effectiveness of three approaches to encourage substance-involved probationers to initiate treatment: Motivational Assessment Program to Initiate Treatment (MAPIT), a two-session motivational computer intervention; motivational interviewing (MI), a two-session counselor-delivered intervention; and supervision as usual (SAU). The main study found that, compared to SAU, both MAPIT and MI were associated with increases in treatment initiation at the 2-month follow-up, and the increase for MAPIT was statistically significant ($OR = 2.4, p = .037$), whereas the increase for MI was not ($OR = 2.15, p = .07$). At 6 months, MAPIT was associated with an increase in treatment initiation relative to SAU, but the increase fell short of standard levels of statistical significance ($OR = 1.84, p = .058$). No independent effect of site was found (Lerch, Walters, Tang, & Taxman, 2017).

Few studies have assessed the cost-effectiveness of programs for substance-involved probationers, and no study to our knowledge has assessed the cost-effectiveness of a computer-based intervention in this population. However, studies demonstrate that providing traditional forms of services and treatment to substance-involved offenders are cost-effective and cost-beneficial, particularly when the treatment is in the community. For example, in-prison substance use treatment combined with community-based aftercare treatment is particularly cost-effective (Griffith, Hiller, Knight, & Simpson, 1999; McCollister et al., 2003; McCollister & French, 2003; McCollister, French, Prendergast, Hall, & Sacks, 2004), and criminal justice diversion programs for substance-involved offenders have been shown to be cost-beneficial (Zarkin, Dunlap, Belenko, & Dynia, 2005) and cost-effective (Cowell, Broner, & Dupont, 2004). Also, the general treatment literature finds that web-based and telemedicine initiatives in health care delivery tend to be effective, low-cost, and potentially cost-effective (Barnett, Murphy, Colby, & Monti, 2007; Scott et al., 2007). The current study is the first to examine the cost-effectiveness of a web-based motivational intervention in a probation setting.

2. Material and methods

2.1. Overview

The main study, including sample, study procedures, and outcomes, are described elsewhere (Lerch et al., 2017; Taxman, Walters, Sloas,

Lerch, & Rodriguez, 2015). The current study applies cost-effectiveness analyses (CEAs) to better understand the resources needed to implement the interventions and the degree to which outcomes improve with the increased cost of interventions compared to SAU. Results rely on the joint distribution of outcomes and cost, and they are expressed as the additional cost of achieving a one-unit improvement in outcome under one intervention compared to the next best alternative (Drummond, Sculpher, Claxton, Stoddart, & Torrance, 2015). CEA can also be used to determine which of several interventions is good value at a given level of the hypothetical willingness of a decision-maker to pay for a certain outcome (Glick, Doshi, Sonnad, & Polsky, 2015; Murphy et al., 2017).

Conducting a CEA requires decisions about the analytic perspective, the study period, and the appropriate outcome. Like other economic analyses, the perspective guides which costs to include in the study and the appropriate measure of effectiveness. The current study uses the probation system as the analytic perspective because that system makes decisions about the interventions and would incur the costs associated with implementation. Other costs, such as the value of participant time, are excluded from the analysis because these costs are not incurred by the probation system. Additionally, the analysis excludes those costs that are solely incurred for research purposes. All costs are presented in 2016 U.S. dollars. The outcome of interest is any treatment initiation measured at 2 and 6 months after baseline assessment.

The current study assesses development costs, startup costs, and implementation costs. Development is to create an intervention, and development costs may be recouped by requiring a fee for using the intervention. Startup gets an intervention running, and startup costs are incurred before the study period begins, do not depend on the number of probationers in the study, and typically are not included in cost-effectiveness estimates (Neumann, Sanders, Russell, Siegel, & Ganiats, 2016). Implementation costs are incurred after probationers are enrolled into the study, increase with the number of participants recruited, and are included in cost-effectiveness estimates.

2.2. Sample and procedures

Participation in the study was voluntary and included substance-involved people who had recently started probation in Baltimore City, Maryland, or Dallas, Texas. Individuals were provided information on the study during the probation intake process. Those who expressed an interest were screened to determine whether they met the eligibility requirements of any drug use or heavy alcohol use during the past 90 days. Those who were eligible provided consent to participate in the study, were given a baseline assessment, and were randomized to one of the three treatment arms: MI, MAPIT, or SAU. More details on the study procedures are published elsewhere (Taxman et al., 2015).

The baseline sample consisted of 316 participants (MAPIT = 104, MI = 103, and SAU = 109)—90% ($n = 285$) who completed the 6-month follow-up. The MAPIT and MI groups were randomized to receive two intervention sessions lasting roughly 45 min each. The first session typically took place the same day the person was randomized. The second session took place approximately 4 weeks later. 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 two MAPIT sessions were self-paced; a research assistant was available to address any technical issues that arose. The development and content of MAPIT is described more fully elsewhere (Walters et al., 2014).¹ MI sessions

¹ Samples of the program can be viewed at <http://youtu.be/9yV6bTn1tVE>, <http://youtu.be/XEZ5o48WwTg>, <http://youtu.be/u2SHWG0QXe8>, and <http://youtu.be/wMShVdPpcsw>.

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