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The Recovery Line: A pilot trial of automated, telephone-based treatment for continued drug use in methadone maintenance

Brent A. Moore, Ph.D. [a,c,*], Tera Fazzino, M.A. [c], Declan T. Barry, Ph.D. [a,c], David A. Fiellin, M.D. [b], Christopher J. Cutter, Ph.D. [b,c], Richard S. Schottenfeld, M.D. [a], Samuel A. Ball, Ph.D. [a,c]

[a] Department of Psychiatry, Yale University School of Medicine, New Haven, CT, 06510, USA
[b] Department of Internal Medicine, Yale University School of Medicine, New Haven, CT, 06510, USA
[c] APT Foundation, New Haven, CT, 06519, USA

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ABSTRACT

The current pilot study evaluated feasibility, acceptability, and initial efficacy of a therapeutic Interactive Voice Response (IVR) system ("the Recovery Line") for patients receiving methadone maintenance who continue to use illicit drugs. Patients were randomized ($N = 36$) to 4 weeks of treatment-as-usual (TAU) or Recovery Line plus TAU. Ratings of the Recovery Line were high and remained stable throughout the study. However, despite instructions and reminders, patients used substantially less than the recommended daily use (<10 days of 28). Patients were more likely to report abstinence from opioids and cocaine on days they used the Recovery Line ($p = .01$) than those they did not. Conditions did not differ significantly on patient satisfaction, urine screen outcomes, or coping efficacy. As with other computer-based treatments, findings suggest the Recovery Line is acceptable and feasible. However, additional methods to increase patient utilization of automated systems and larger clinical trials are needed.

Automated, computer-based interventions have shown promise in treating substance use disorders (Bewick et al., 2008; Bickel, Christensen, & Marsch, 2011; Carey, Scott-Sheldon, Elliott, Bolles, & Carey, 2009; Carroll et al., 2008; Moore, Fazzino, Garnet, Cutter, & Barry, 2011; Portnoy, Scott-Sheldon, Johnson, & Carey, 2008; Rooke, Thorsteinsson, Karpin, Copeland, & Allsop, 2010). Such systems extend the effectiveness of patient self-management by providing motivational enhancement, assessment and feedback, accurate and detailed education, and specific skills training. These systems differ from electronic or "E-therapy" in which therapists provide counseling remotely (Web-chat, text, e-mail, or phone). Fully automated systems offer a number of potential advantages, including low cost, consistent delivery, and greater accessibility and availability of treatment, and increased flexibility of scheduling and convenience (Budman, 2000; Marsch, 2011; Moore et al., 2011). Studies of computer-based treatments have found high user acceptance and utilization (Bickel, Marsch, Buchhalter, & Badger, 2008; Carroll et al., 2008; Cavanagh & Shapiro, 2004; Kypri, Saunders, & Gallagher, 2003), and automated systems may even be preferable to one-on-one therapy among clients who dislike therapy or have concerns about confidentiality.

Automated computer-based systems can be mobile and delivered via cell phones or other devices, providing immediate therapeutic intervention from any place at any time. Individuals can use the system to practice skills in their own environment and can repeat this training frequently at their own pace (Budman, 2000; Dyches, Alemagno, Llorens, & Butts, 1999). Easily accessible, real-time interventions may be helpful for less motivated or more difficult-to-treat populations, since these interventions require less effort to attend appointments and retrospectively recall specific behavior for therapeutic discussion (Shiffman, 2009). Some mobile interventions utilize sophisticated technologies such as smart phones and include applications and mobile Web sites, while others use traditional phone technology for delivery using Interactive Voice Response (IVR) systems. With IVR systems patients use keypad responses or voice commands to choose menu options, respond to prompts, and answer assessments. Many studies of IVR technology have been limited to patient reminders, brief assessments, and evaluations of self-monitoring (Kaminer, Litt, Burke, & Burleson, 2006; Kranzler, Abu-Hasaballah, Tennen, Feinn, & Young, 2004; Litt, Kadden, & Kabela-Cormier, 2009; Mundt, Bohn, King, & Hartley, 2002; Mundt, Perrine, Searles, & Walter, 1995; Searles, Perrine, Mundt, & Helzer, 1995; Simpson, Kivlahan, Bush, & McFall, 2005), but more recently Therapeutic IVR (TIVR) technology has increased in flexibility and sophistication, and incorporates more complex treatment components including self-monitoring, goal setting and coping skills

* Corresponding author. Division of Substance Abuse, Department of Psychiatry, Yale University School of Medicine, 495 Congress Ave. Second Floor, New Haven, CT 06519. Tel.: +1 203 285 2700; fax: +1 203 781 4681.
E-mail address: brent.moore@yale.edu (B.A. Moore).

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ehearsal (Naylor, Helzer, Naud, & Keefe, 2002). Therapeutic IVR can effectively augment treatment for a range of psychiatric and behavioral health problems such as obsessive–compulsive disorder, depression, chronic pain, and medication adherence (Baer & Greist, 1997; Bender et al., 2010; Greist et al., 2002; Naylor, Helzer, & Rathmell, 2008; Naylor, Naud, Keefe, & Helzer, 2010; Osgood-Hynes et al., 1998). In addition, TIVR systems show potential promise to augment brief interventions for substance users, including non-treatment seekers in primary care settings (Dyches et al., 1999; Rose, MacLean et al., 2010; Rose, Skelly et al., 2010). However, although brief IVR systems have been shown to be acceptable and feasible to a range of patients, to our knowledge only two studies evaluated a TIVR with treatment seeking patients with problematic drug or alcohol use (Mosavel, 2005; Rose, Skelly, Badger, Naylor, & Helzer, 2012). Mosavel found that patients' system use was heavily skewed with most patients having limited use and a few using extensively. Rose et al. evaluated TIVR following group CBT for alcohol use disorders and found high acceptability and ease of use as well as improved abstinence, self-efficacy, and coping skills efficacy compared to baseline values. However, both studies did not include a comparison condition.

Over the past 10 years, treatment admissions for opioid dependence have increased by 50%, in large part due to abuse of prescription pain relievers (Substance Abuse and Mental Health Services Administration Office of Applied Studies, 2010). Many programs, including those involved in the current study, have noted a substantial increase in patient volume with decreased reimbursement levels and therefore decreased staffing and higher caseloads (SAMHSA, 2010). The dramatic increase in dependence has led to treatment need that exceeds the current system. Thus, there is a clear need to expand the reach and variety of therapeutic interventions available, especially to those in methadone maintenance who typically receive limited face-to-face counseling. Technological interventions provide a means to extend the scarce treatment resources available, however, their feasibility, acceptability and efficacy must be demonstrated. TIVR represents an approach that has the potential to be more accessible, flexible, and cost effective than counseling and other potential technological interventions. The current pilot study was designed to evaluate feasibility, acceptability, and initial efficacy of a TIVR system ("The Recovery Line") for opioid dependent patients receiving methadone maintenance who were continuing to use illicit drugs while enrolled in treatment.

1. Materials and methods

1.1. Participants

Patients were recruited from November 2010 through July 2011 at the APT Foundation in New Haven, CT through clinic posters and flyers, brochures provided to counselors, and word-of-mouth. Seventy-five patients enrolled in methadone maintenance treatment who reported use of illicit drugs in the past 30 days expressed initial interest and participated in a brief screening. Exclusion criteria were (1) current suicide or homicide risk; (2) a *DSM-IV* current psychotic or bipolar disorder; (3) involvement in another treatment study; (4) inability to read or understand English; and (5) a life-threatening or unstable medical problem. Seventeen (23%) were ineligible (16 for active psychiatric disorder, 1 for medical problems) and 12 (16%) who were potentially eligible refused treatment (1) or failed to return for consent (11). Forty-six patients signed informed consent and were further evaluated for eligibility. Five patients were excluded for current psychotic or bipolar disorder, one for an unstable medical problem, one was in another study, one withdrew, and two failed to complete the baseline assessment, yielding a final treatment comparison sample of 36.

1.2. Design and procedures

Eligible participants ($N = 36$) were randomly assigned to 4 weeks of either treatment-as-usual (TAU, $n = 18$) or the Recovery Line plus treatment-as-usual (RL + TAU, $n = 18$). Participants completed weekly assessments and a comprehensive end-of-treatment assessment. Urine samples for toxicology analysis were also collected during weekly assessments. Participants received $20 per week as an incentive for completing weekly assessments and providing a urine sample. The study was approved by the Human Investigation Committee of Yale University School of Medicine and the study was conducted in accordance with the Helsinki Declaration of 1975.

1.3. Measures

Patients assigned to the Recovery Line completed a brief interview each week to evaluate characteristics of the system patients liked and disliked, and any technical difficulties with the system. The interview was developed for this study and included three five-point Likert scale items evaluating patient interest, perceived efficacy, and ease of use of the Recovery Line from "not at all" to "extremely" (e.g., "How interesting does the Recovery Line sound to you?, How helpful was the Recovery Line? How easy to use was the Recovery Line?). An additional single item five-point Likert scale evaluated patient satisfaction with their continuing methadone treatment for patients in both conditions.

The Structured Clinical Interview for *DSM-IV* (SCID) was used to assess psychotic and mood disorders for exclusion criteria (First, Spitzer, Gibbon, & Williams, 1997). Retention was evaluated as the number of weeks participants remained in the study. Urine samples for toxicology analyses were performed using a one-step immunochromatographic test (Redwood Toxicology Laboratory, Santa Rosa, CA) that included morphine/opiates (>300 ng/ml cuttoff), oxycodone (>100 ng/ml cuttoff), cocaine (>300 ng/ml cuttoff), benzodiazepine (>300 ng/ml cuttoff), methamphetamine (>500 ng/ml cuttoff), and THC (>50 ng/ml cuttoff). Missing urines were coded as positive for opioids. The proportion of urines negative for all drugs tested, for opioids (opiates and oxycodone), and for cocaine were computed. Self-reported drug use was assessed using Time Line Follow Back methodology (Sobel & Sobel, 1992). Coping skill effectiveness was evaluated with the Effectiveness of Coping Behaviors Inventory (ECBI) (Litman, Stapleton, Oppenheim, Peleg, & Jackson, 1984). Scores on the ECBI have been found to predict post-treatment abstinence for alcohol dependent inpatients (Litman et al., 1984), and to improve for patients receiving a TIVR intervention for alcohol use disorders (Litman et al., 1984; Rose et al., 2012).

1.4. Treatments

1.4.1. Treatment-as-usual (TAU)

The proposed system was meant to serve as an enhancement of current services being delivered, which included the requirement to attend one individual session per month and encouragement to attend open access groups (with 10 or more typically available Monday–Friday) covering a range of topics, including introduction to methadone, weekend planning, overdose planning, and spirituality. These are the services provided in the standard care comparison condition.

1.4.2. The Recovery Line plus treatment-as-usual (RL + TAU)

The RL + TAU condition involved a TIVR orientation session, 4 weeks of 24-hour access to the system, a patient notebook with summary Recovery Line information, and a weekly reminder from staff to use the system. A technical assistance line for system problems was available from 8:30 to 4:30, Monday–Friday and was staffed by the study research assistant.