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Expanding the reach of alcohol and other drug services: Prevalence and correlates of US adult engagement with online technology to address substance problems

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HIGHLIGHTS

- 11% with a former substance problem report recovery-related use of online technology (ROOT)
- Controlling for demographics, clinical severity indicators were ROOT correlates
- Controlling for demographics and ROOT correlates, ROOT was associated with "internet addiction".

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ABSTRACT

Online technologies are well integrated into the day-to-day lives of individuals with alcohol and other drug (i.e., substance use) problems. Interventions that leverage online technologies have been shown to enhance outcomes for these individuals. To date, however, little is known about how those with substance use problems naturally engage with such platforms. In addition, the scientific literatures on health behavior change facilitated by technology and harms driven by technology engagement have developed largely independent of one another. In this secondary analysis of the National Recovery Study (NRS), a geo-demographically representative survey of US adults who resolved a substance use problem, we examined a) the weighted prevalence estimate of individuals who engaged with online technologies to "cut down on substance use, abstain from substances, or strengthen one's recovery" (i.e., recovery-related use of online technology, or ROOT), b) clinical/recovery correlates of ROOT, controlling for geo-demographic covariates, and c) the unique association between ROOT and self-reported history of internet addiction. Results showed one in ten (11%) NRS participants reported ROOT. Significant correlates included greater current psychological distress, younger age of first substance use, as well as history of anti-craving/anti-relapse medication, recovery support services, and drug court participation. Odds of lifetime internet addiction were 4.1 times greater for those with ROOT (vs. no ROOT). These data build on technology-based intervention studies, highlighting the reach of online technologies used specifically to address substance use, and therefore, the potential for large, positive impact on US adults with substance problems.

1. Introduction

Online technologies, including websites and smartphone applications ("apps"), are well integrated into the day-to-day lives of most individuals living in the United States (US). Among US adults, 88% use the internet, 77% use a smartphone, and 69% use social network sites, like Facebook, Instagram, and Twitter (Smith, 2017). Increasingly during the past decade, researchers have begun leveraging these online technologies to help address alcohol and other drug (i.e., substance use) problems (Fowler, Holt, & Joshi, 2016; Marsch, 2012). (While substance use problems may transcend diagnostic nomenclature, for simplicity, we generally refer to them as substance use disorder, or SUD.) For the 10% of US adults with SUD who seek services (Park-Lee, Lipari, Hedden, Kroutil, & Porter, 2017), accessible and low-cost resources are needed to help boost outcomes. For the 90% who do not seek services (Park-Lee et al., 2017), innovative strategies are needed to engage them with recovery-supportive tools, interventions, and communities.

Online, recovery-supportive technologies may enhance the field's ability to reach individuals who do not feel they need formal treatment

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(Park-Lee et al., 2017), have difficulty accessing treatment due to geographical or other life constraints, feel inhibited by fear or shame (Keyes et al., 2010), or may be willing to address their SUD provided only a small effort is required. Of note, a service's overall public health impact on the societal burden of SUD (Stahre, Roeber, Kanny, Brewer, & Zhang, 2014; Centers for Disease Control and Prevention (CDC), 2018; Rehm et al., 2009; National Drug Intelligence Center, 2011) is a function of both its effectiveness *and* reach (Glasgow, Klesges, Dzewaltowski, Estabrooks, & Vogt, 2006; Glasgow, Mckay, Piette, & Reynolds, 2001). Thus, given that they are ubiquitous and typically incur little or no cost to the end-user, online technology-based services may help address critical gaps in U.S. systems of SUD care.

1.1. Use of technology in SUD treatment

Prior studies in this area have examined technology use more generally (i.e., not specific to addressing substance use) among treatment-seekers. Specifically, studies conducted in both outpatient and inpatient treatment programs have shown 85–93% of patients own a mobile phone (Dahne & Lejuez, 2015; McClure, Acquavita, Harding, & Stitzer, 2013), 47–72% own a smartphone (Ashford, Lynch, & Curtis, 2018; Dahne & Lejuez, 2015; Milward, Day, Wadsworth, Strang, & Lynskey, 2015), 44% regularly use the internet (McClure et al., 2013), 66% use their phones to access the internet, and 64% download smartphone apps (Dahne & Lejuez, 2015). Three-fourths have a social network site account and two-thirds participate on at least one social network site weekly (Ashford et al., 2018)

Such engagement bodes well for the ultimate, broader application of technology-based intervention (TBI; Marsch, 2012) to SUD treatment. TBIs – which include online technology as well as mobile text message (e.g., (Gonzales, Ang, Murphy, Glik, & Anglin, 2014)) and (offline) computer-based technologies (e.g., (Carroll et al., 2008)) – harness digital innovation to increase the reach, fidelity, and efficiency of existing, evidence-based services in both clinical and non-clinical settings (Onken & Shoham, 2015). In clinical settings, TBIs typically employ psychoeducation and skill building. In non-clinical settings, brief interventions (e.g., personalized normative feedback) are common. Reviews suggest TBIs are generally better than inactive comparison conditions (e.g., self-help reading materials; Fowler et al., 2016; Litvin, Abrantes, & Brown, 2013). They may do as well as clinician-led approaches both for individuals with SUD (Fowler et al., 2016; Litvin et al., 2013), and co-occurring substance use and mental health problems (Sugarman, Campbell, Iles, & Greenfield, 2017). In clinical settings, TBIs that are added to, or substituted for parts of, usual treatment may yield the best outcomes (Carroll et al., 2008; Gustafson et al., 2014; Marsch et al., 2014). While brief interventions among college students are overrepresented in this literature, a review of TBI mechanisms suggests they mobilize change via similar psychological processes as face-to-face interventions, such as modified peer drinking norms, and increased coping skill quality (Dallery, Jarvis, Marsch, & Xie, 2015). Far less is known about how social network sites fare in TBI research, though they, too, have been leveraged to deliver existing evidence-based interventions (Ridout & Campbell, 2014). Importantly, two-thirds of an outpatient SUD sample indicated social network sites would be a good place to receive information to aid initiation or maintenance of substance problem resolution (Ashford et al., 2018)

In order to build on surveys assessing general technology engagement among SUD treatment seekers, and rigorous TBI research, the field may benefit from real-world, naturalistic examinations of online technology engagement specifically to address substance problems (hereafter referred to as recovery-related use of online technology, or ROOT). These data would inform both the baseline reach of ROOT (i.e., absent major policies to aid dissemination), and a scientific agenda for future research in the area.

1.2. The current study

This study presents secondary analyses of the first nationwide investigation of ROOT from the National Recovery Study (NRS), a geo-demographically representative sample of US adults who resolved a substance use problem (Kelly, Bergman, Hoeppner, Vilsaint, & White, 2017; Kelly, Greene, & Bergman, 2017; Kelly, Greene, & Bergman, 2018). This analysis of ROOT in the NRS had the following specific aims:

1) To examine the overall prevalence of ROOT including engagement with a) online mutual-help organization (MHO) meetings, as well as use of b) recovery-specific social network sites, c) general-interest social network sites, and d) other online technologies (e.g., "non-social" smartphone apps) to aid initiation or maintenance of substance use problem resolution; and

2) To examine clinical/recovery correlates of ROOT, controlling for geo-demographic characteristics.

We hypothesized that younger age, greater levels of education, and higher levels of income would each be significantly associated with ROOT – in line with prior SUD treatment samples (Ashford et al., 2018; Dahne & Lejuez, 2015; McClure et al., 2013). From the health beliefs model (Finney & Moos, 1995; Rosenstock, 1990), individuals with greater substance use severity may have greater problem recognition, and thus a greater propensity to try a wider range of strategies to resolve their problem. As such, we hypothesized that variables indicative of clinical severity including service utilization (anti-craving/anti-relapse medication, outpatient or inpatient specialty treatment, and recovery support services), younger age of first use, and more substances used in one's lifetime would also be associated with ROOT. Given the paucity of scientific research to date on ROOT, we also explored several other potential ROOT correlates, such as primary substance and criminal justice history.

In addition, individuals with a history of substance use problems may also have heightened neurobiological vulnerability to reinforcement derived from online technology including both positive, social reinforcement (i.e., receiving "likes" on a post) and negative reinforcement (i.e., avoiding unpleasant feelings) (Volkow, Koob, & Mclellan, 2016). It is widely accepted that evaluating a new intervention or resource involves an examination of risks to help contextualize benefits. Despite increased research on "internet addiction", including problematic smartphone and social network site use (Andreassen, Torsheim, Brunborg, & Pallesen, 2012; Elhai, Dvorak, Levine, & Hall, 2017; Kuss, Griffiths, Karila, & Billieux, 2014), research on SUD-related health behavior change facilitated by technology, has developed largely independent of this scientific literature on technology-associated risks. In order to begin highlighting any risks of technology engagement for individuals with SUD, ultimately resulting in a risk-benefit analysis of ROOT, we also explored whether ROOT was associated with a subjective history of “internet addiction”.

2. Method

2.1. Procedure

The NRS assessed US adults (18+ years) who responded "yes" to the screening question “Did you used to have a problem with drugs or alcohol, but no longer do?”. While NRS methods have been detailed elsewhere (Kelly, Bergman, et al., 2017), in brief, NRS data were derived from international survey company GfK's “KnowledgePanel” (GfK, 2013), which uses address-based sampling to randomly select individuals from 97% of all US households based on the US Postal Service's Delivery Sequence File. Only a sub-set of the KnowledgePanel received invitations to screen into the survey (i.e., individuals generally receive no more than one study opportunity per week), and, of those, only a subset responded to the NRS screening question.

Since this KnowledgePanel subsample (25,229 of the 39,809 invited