Technology-based Interventions for Preventing and Treating Substance Use Among Youth

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KEYWORDS

• Youth • Substance use disorders • Prevention • Treatment • Technology

KEY POINTS

- Technology-based interventions are effective for preventing and treating substance use disorders.
- Technology is particularly suited to youth.
- Technology-based interventions are relevant at any stage in the development of a substance use disorder.
- Technology-based interventions provide solutions to extant problems of traditional interventions.

INTRODUCTION

Substance use and substance use disorders among youth pose unique developmental and clinical challenges for families, providers, and youth themselves. Close to 40% of high school seniors have used an illicit drug in the last year, and 20% of high school seniors have used an illicit drug other than cannabis in the last year.[1] Youth who use substances are at risk for sexually transmitted diseases,[2] impaired cognitive functioning,[3] major depressive episodes,[4] poor educational attainment,[5]

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involvement in the criminal justice system,[6] and having a substance use disorder later in life.[7,8]

Substance use disorder development takes time and is influenced by various risk factors and behaviors. Intervening during this development process plays a vital role in redirecting a young person's life trajectory. Intervention strategies along this trajectory include universal prevention, selective prevention, and treatment.[9,10] The goal of universal prevention is to prevent substance use initiation (ie, prevent youth from trying a drug for the first time). Selective prevention involves identifying high-risk youth and intervening to stop problematic substance using behaviors that may escalate into a diagnosable disorder. The goal of treatment is to intervene with individuals who meet diagnostic criteria for a substance use disorder.

Numerous implementation barriers hinder our ability to deliver evidence-based universal prevention, selective prevention, and treatment interventions for youth.[11–14] Clinician-delivered treatment is expensive with variable adherence to intervention fidelity. Unfortunately, less than one-third of substance abuse treatment facilities offer adolescent-specific programs,[15] and only 10% to 15% of youth who could benefit from treatment actually receive it.[14] Interventions that leverage computer, mobile, and Web technologies are appealing to youth,[16] require minimal cost,[13,17] deliver therapeutic content in a consistent and standardized manner,[17] minimize burden on staff,[18] and can be tailored to different individuals and treatment settings.[17,19] Technology is well suited as a means of providing universal prevention,[20] selective prevention,[21] and treatment[22] interventions that can fully or partially replace face-to-face interactions with prevention or therapeutic staff (thereby reducing costs and freeing staff to attend to more patients) or augment standard services under a clinician extender model that increases access and availability of evidenced-based practices outside clinical settings.[23]

The widespread use of technology among youth underscores the opportunity for delivering these interventions to this cohort. Approximately 80% of youth in the United States have a cell phone (many of these are smartphones)[24] and more than 90% have access to a computer and the Internet.[24] Abroad, Internet and smartphone access and use are increasing among younger age groups.[25] Given technology's prevalence and acceptance among youth and its ability to enhance cost effectiveness and fidelity to psychotherapeutic models, technology-based interventions fill critical gaps for preventing and treating substance use among youth.

This article provides an overview of the current research on the use of technology-based substance use prevention (universal and selected) and treatment interventions for youth. Directions for future research are also identified and discussed. Web site links to more information about specific interventions are provided in **Table 1**.

TECHNOLOGY-BASED UNIVERSAL PREVENTION

Technology-based universal prevention interventions generally target youth between ages 10 and 18 who self-report never having used alcohol or other substances. These interventions often consist of interactive, digital, activities designed to increase drug-related knowledge and alter attitudes and normative beliefs around substance use[26] to prevent or delay the onset of substance use. These interventions can be adapted from empirically supported interventions and delivered via computer.[27] Early studies have used CD-ROM technology to deliver interventions, but many studies have shifted to Internet and mobile technologies. The following section summarizes the patterns of findings from scientific evaluations of