



Harm Reduction for Youth in Treatment for Substance Use Disorders: One Size Does Not Fit All

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Abstract

Purpose of Review Current interventions for adolescent substance use disorders demonstrate moderate efficacy and poor rates of long-term abstinence. As such, assessment of alternate, non-abstinence-oriented interventions is of value. We aim to examine the potential for non-abstinence goals in a harm reduction treatment framework for adolescent substance use disorders.

Recent Findings Harm reduction can include reduction of substance use and reduction of negative consequences related to substance use behaviors. Developmental factors unique to adolescence alter the trajectory of substance use, and should be addressed when tailoring interventions to this population. This may include setting a series of youth-identified proximal harm reduction goals (e.g., reducing quantity or frequency of consumption over time) to encourage continued engagement in treatment and progress to a terminal outcome such as abstinence. Harm reduction goals may lead to tension between providers and systems for youth involved in the juvenile justice system and those with comorbid psychiatric illness, and thus may require collaborative, multi-disciplinary approaches to treatment.

Summary Further research should aim to characterize outcome measures and determine measures of goal achievement within a harm reduction framework. At this time, harm reduction for adolescents should be considered mainly as a proximal outcome for poor responders to traditional interventions.

Keywords Harm reduction · Substance use disorders · Youth treatment · Biopsychosocial development

Introduction

Establishing and implementing effective treatments that result in durable outcomes for youth with substance use disorders (SUDs) has been a challenge. Most youth who obtain treatment in outpatient settings have similar outcomes: poor rates of retention and abstinence, and high rates of post-treatment

relapse [1,2, 3]. These findings are unsurprising given that traditional experimental designs have commonly compared fixed, time-limited interventions to community treatment, which is more malleable, and accommodating to psychosocial and familial disruptions. Research-based treatment approaches have not adequately considered the heterogeneity of young people's personal characteristics such as impulsivity and sensation-seeking [4], co-occurring disorders and clinical severity [5], baseline motivation to change, self-efficacy, coping skills, and goal setting [6], differential response to treatment during intervention [7], and/or the impact of treatment referral sources such as the juvenile justice system, which refers more than 50% of youth who are in SUD treatment [8,9]. Indeed, reports dating to the early 1990s suggest that prior legal problems, severity of drug use, and severity of co-occurring disorders predict poor retention in treatment for youth [10,11].

Traditional goals of SUD treatment have always been abstinence, followed by relapse prevention for those who have met this challenging outcome. However, only one-third of adolescents achieve abstinence during initial treatment [2].

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For example, the Cannabis Youth Treatment (CYT) study found that 5 weeks of combined motivational enhancement and cognitive behavioral therapies (i.e., MET/CBT-5) resulted in abstinence for approximately one-third of participants [12]. Moreover, for those able to achieve abstinence, this occurred by the sixth treatment week for 94% of adolescents [13]. This suggests that adjunctive, enhanced, or novel interventions should be implemented following 5 weeks of primary treatment to increase effectiveness of SUD treatment for those who have not yet achieved abstinence, and to increase rates of abstinence among youth engaged in treatment. Since achieving abstinence remains an elusive goal for a significant number of youth in SUD treatment, other therapeutic approaches to improve outcomes for poor treatment responders require consideration. Assessment of innovative empirical approaches for attaining abstinence, including adaptive treatment designs reported in the adult SUD treatment literature [14], may improve outcomes in youth [2].

One approach is to examine non-abstinence-oriented outcomes in the context of the harm reduction (HR) framework [15,16•], and to determine its benefits and shortcomings for adolescent SUD. The model of HR (also known as harm minimization) for SUD treatment emerged in the 1980s [15,16•]. Traditionally, HR has targeted reduction in negative consequences related to substance use behaviors (substance-related harm; policies or programs) such as transmission of infectious diseases through needle exchange and opiate substitution [17,18]. Early adopters of HR programs include the UK, Canada, Australia, the Netherlands, and Switzerland, with other Western countries such as the USA lagging behind. Harm reduction as a treatment goal has become progressively adopted for adult substance using populations with promising results [19,20]. However, there remains a significant gap in the literature on structure, efficacy, and cost-effort burden of HR approaches in youth [21]. Given the high cost-effort burden of current psychotherapeutic interventions for adolescents and the modest efficacy of, and high relapse rates following intervention this is an area of considerable importance.

The overarching objective of this manuscript is to explore a modified HR approach along developmentally informed lines, and examine the potential utility, acceptability, and implementation of a youth-focused-modified HR treatment approach that may improve treatment outcomes for those unable or unwilling to achieve abstinence.

We posit *a priori* that the definition of HR for youth should include reduction of substance use, in addition to the traditional goals of HR focused on reduction of negative sequelae related to substance use behaviors. Specifically, we will (1) consider developmental and substance use trajectories in youth that may affect treatment matching (HR vs. abstinence), (2) evaluate the appropriateness of HR as an interim or finite goal setting outcome, (3) consider the role of HR in treatment of special adolescent sub-populations (i.e., those referred from

the juvenile justice system and dually diagnosed adolescents), and (4) identify specific priorities for further research.

Adolescent Development, Treatment Matching, and Outcome

Developmental differences between adults and adolescents result in different patterns and consequences of SUD [22–24], and internal motivation for behavior change [25,26]. Adolescence is a period of marked neurodevelopmental, behavioral, cognitive, and psychological change, where sense of self, identity, and role are established, and acceptance by peers is valued [27]. In addition to identity development, differentiation from caregivers and peer influence, adolescents are vulnerable to develop SUDs due to differential neurodevelopment [28]. Brain regions governing reward, impulsivity, and sensation-seeking are relatively more developed during mid-adolescence than higher order cognitive regions regulating behavioral inhibition, decision-making, and planning, which continue to mature into the early-mid 20's [29]. Substance use during adolescence may further reinforce impulsive and risky behaviors, including substance use itself, which provides immediate rewards and may contribute to lasting brain structural changes and changes in behaviors, cognition, and mental health even in occasional users [28]. Finally, adolescents differ from their adult counterparts in substance use trajectories in that (a) many different heterogeneous trajectories may exist, with differential clinical outcomes and consequences resulting from psychosocial contributors to progress along any given trajectory [30,31]; (b) they have a shorter substance use history meaning that they are less likely to have experienced negative health consequences, and fewer psychosocial consequences; (c) they are more likely to be referred to treatment by parents, school, or the juvenile justice system [32,33], thus likely less internally motivated to change substance use behaviors [9]; (d) they are more likely to engage in heavy, episodic, or binge use and polysubstance use [34–36]; and (e) they have co-occurring mood, anxiety, or conduct disorders [5]. These developmental factors should be taken into account when identifying appropriate interventions for youth with SUDs. Although adolescents are the primary stakeholders in treatment, given their age and stage of development, autonomy and decision-making, youth are oftentimes forfeited to other systems of care (i.e., family, school, social, medical) that influence and shape development. Harm reduction-oriented interventions have the potential to reinforce insightful decision-making, while addressing adolescent goal setting and commitment. Clinicians may be able to support healthy maturational processes in adolescents in the context of

exercising their autonomy, while strengthening deficient areas such as social competence, coping skills, and emotion regulation, which are commonly seen in substance users.

Goal Setting

Goal setting as a predictor of SUD treatment outcome has not been well studied. According to Goal-Setting Theory [37], specific goal setting is associated with higher performance due to reduced ambiguity in process and outcome. An adult study investigating the role of goal setting in cannabis treatment outcomes found that initial goal setting is associated with abstinence or moderate use as the desired outcomes [38]. A study on youth SUD outcomes and goal setting found that goal setting and motivation that precedes goal setting predicted lower cannabis use in treated adolescents [39]. Further, adolescents with lower frequency of cannabis use appeared to be more likely to set abstinence-related goals [39].

Kaminer and colleagues studied “goal commitment to change” as a potential mediator and a mechanism of behavior change for adolescents in treatment for SUD using the Adolescent Substance Abuse Goal Commitment (ASAGC) questionnaire [40]. This questionnaire is a reliable and valid measure developed to assess adolescents’ commitment to either abstinence or HR (including consumption reduction as a treatment goal) [40]. Adolescents who reported no alcohol use had significantly higher scores on the commitment to abstinence scale than adolescents who reported alcohol use, regardless of comorbid substance use. Substance use was not associated with commitment to HR. Commitment to abstinence consistently predicted number of drinking days, number of heavy drinking days, and the maximum number of drinks post-treatment, while commitment to HR did not predict any drinking outcomes [41]. These results suggest that greater commitment to abstinence is associated with reduced use of alcohol following treatment completion. Similarly, King et al. [42] found that motivation to fully abstain from cannabis use was independently associated with attenuated progress along the adolescent’s substance use trajectory.

Adolescents’ substance use and engagement in treatment appear to be influenced significantly by extrinsic factors such as parental monitoring and peer group influences in regard to use [43], and parental or legal pressures in regard to treatment [9]. Although self-set goals, versus externally set goals, were predictors of better performance, the ambivalence with which adolescents approach SUD treatment, and the ambiguity of SUD interventions to adolescents, lead to compromised internal motivation for behavior change. Lower internal motivation for change presents a challenge to achieving an ambitious outcome such as abstinence [39].

Harm reduction may allow adolescents to identify and set in motion internally motivated goals for themselves in a

step-wise fashion, with achievement of any one goal reinforcing continued engagement in treatment. It may also address the ambivalence that many experience about cessation of substance use, and the sense of failure experienced with relapse. This is important as research shows that low readiness to change and motivation contribute to attrition, and that external coercion from juvenile justice, family members, and/or school are negatively associated with motivation and treatment retention [44].

Minor Relapse

In examining the extant adolescent literature, determining a substance use threshold that reflects significant decreases in harm and use-related consequences, and the parameters of use (i.e., frequency, dosage, intoxication, severity of SUD disorder, type of substance, dual use, and mode of delivery), which are most closely related with outcomes, may be helpful in establishing recommendations for treatment matching. Further, examining extant studies of relapse may inform prediction of the utility of, and treatment outcome in, HR. As relapse is an indicator of the inability to maintain positive treatment gains, examining the literature for use associated with minor relapses (i.e., limited period of substance use; usually one-two discrete events) following a period of abstinence, and relapse (i.e., return to consistent substance use) may provide clues as to those who would benefit from a HR treatment approach.

Winters and colleagues [45] posit that “minor relapse” represents progress towards an outcome, presumably sustained abstinence. Furthermore, they argue that an abstinence-only, categorical approach to treatment outcome analysis is sub-optimal as it overlooks the value of motivational and behavioral change pre- to post-treatment [45]. There are suggestions of “temporary abstinence” as a treatment goal in the literature [46,47]; however, these descriptions have not included defined parameters (e.g., quantity of use, duration of use), nor explanations for its potential merits or harms as a goal.

Maisto and colleagues [48] examined four different definitions of relapse and their relationships to substance-related outcome measures in adolescent alcohol users. The authors found that any drinking following 4 days of abstinence, the least stringent relapse criteria, significantly predicted diagnosis of a SUD at 12 months follow-up. The remaining three definitions, all of which, in part, were comprised of one or more days of binge drinking following 4 days of abstinence, were related to consumption outcomes (drinking days/month, drinks/drinking day) [48]. This suggests that engaging in substance use in any form may be associated with negative substance-related psychosocial consequences, whereas binge drinking may be indicative of persistent, heavy substance use. However, it has also been shown that those who engage in

substance use at reduced levels following treatment no longer meet diagnostic criteria for SUD or only experience minor relapses prior to obtaining eventual abstinence (slow abstainers) [49]. These slow abstainers demonstrate improved psychosocial and academic functioning over time, and reach levels of psychosocial and academic functioning equal to that of their post-treatment abstinent peers [49].

In examining quantity- and frequency-based definitions of relapse, isolated substance use for ≤ 3 consecutive days has also been termed a minor relapse [50], with fewer associated consequences than a major relapse, which involves multiple episodes of use or return to consistent use. High-volume substance use (i.e., alcohol, ≥ 5 standard 0.6 oz drinks/occasion) in adolescents is associated with substance-related problems [5]. Regardless of primary substance of use, alcohol is usually the substance on which adolescents relapse to substance use or polysubstance use [51], and nicotine/tobacco use seems to endure in polysubstance users during treatment, despite potential reductions in use of other substances [49]. However, those who relapse on alcohol or nicotine/tobacco demonstrate delayed return to heavy substance use, whereas those who relapse on amphetamines or their primary substance of use progress more rapidly to frequent and/or heavy use [51]. The adolescent literature to date on the effect of a minor relapse on substance use outcomes, and the threshold of use (quantity, duration, frequency and consequences) which constitutes a minor lapse, remains mixed. However, the literature does appear to support the association between reduction of use of the primary substance of use and delayed re-initiation at reduced levels of use among adolescents. As such, a harm reduction approach predicated on level of consumption may serve as a useful proximal outcome for slow abstainers.

Special Populations

Adolescents who are at high risk for substance use due to psychosocial difficulties, low academic achievement, psychiatric comorbidity, family dysfunction, history of abuse or neglect, and other negative life factors, are also at high risk for SUD treatment poor-response or rapid relapse [26]. Without intervention to attenuate the impact of harm related to these multi-dimensional issues, substance use may escalate [26]. As such, the two largest sub-populations of youth with high prevalence of SUD are those who require psychiatric and/or legal interventions.

Juvenile Justice System

While both juvenile justice and public health systems aim to reduce societal costs of substance use, there remains great tension between the juvenile justice system and public health priorities that may be heightened in a harm reduction model.

Juvenile justice's primary goal is substance use cessation to reduce risk of engaging in future illegal activity (including the use of substances). However, a public health model promotes reduction of use to decrease mortality and morbidity (due to motor vehicle accidents, risky behaviors including risky sexual behaviors and accidents, suicidality) and related individual, financial, and social health burden. This further leads to tensions in regard to allocation of resources including health care providers, case managers, and others involved in psychosocial services, despite evidence that increasing wrap-around services results in improved functioning and lower recidivism rates [52].

Research demonstrates that adolescents in the juvenile justice system who continue to use are more likely to continue engaging in criminal offenses [53]. However, this relationship is likely impacted by factors common to both criminality and substance use such as poor educational outcomes and psychosocial circumstances, school delinquency, and psychiatric comorbidity, which should be addressed during substance use treatment. Detained adolescents who are substance users have high rates of multiple sexual risk behaviors, violence, and medical and mental health consequences [53]. As such, collaboration between juvenile justice and harm reduction providers provides an opportunity to not only reduce substance use, but also to address the multitude of psychiatric and psychosocial factors that influence functioning. Collaborative HR approaches with a focus on prevention, and minimization of substance use and criminal activity may result in improved treatment outcomes for these youth.

Psychiatric Comorbidity

The majority of youth with a SUD have a comorbid psychiatric illness and related problems [5,54,55]. The opposite is also true, that is, adolescents with psychiatric disorders have high rates of comorbid SUDs [56]. Those with comorbidity are usually at higher risk of negative psychosocial and health consequences, higher dropout, and poorer response to treatment compared to mono-diagnosis youth [5]. Continued substance use and/or progression to heavy or polysubstance use has been shown to parallel a neurobiological shift from positively reinforced reward-seeking mechanisms, to negatively reinforced compulsive behaviors, negative affective states, reduced motivation and readiness to change, and heightened stress response [57]. This, in combination with the common liability index [58] and pre-existing behaviors and personality traits that may pre-dispose to SUDs, may result in exacerbation of primary or secondary psychiatric symptoms, and affects clinicians' ability to determine effectiveness of pharmacotherapies. Dually diagnosed patients' mental health symptoms, psychosocial issues, and previous interactions with systems of care may impact their ability to actively engage, or their providers' ability to trust their engagement in HR

treatment (e.g., anhedonia and decreased motivation, multiple severe psychiatric symptoms, consuming psychosocial issues, lack of social supports). Further, treatment for dually diagnosed youth is usually complicated by separate systems of care for psychiatric and SUDs with little collaboration between systems. Integrated care with strong wrap-around services in the community is needed for these youth [5].

SUD treatment outcomes may be affected by type of comorbid psychiatric illness [59]. In examining specific classes of disorders, those adolescents with SUDs and comorbid internalizing (mood and anxiety) disorders are more likely to remain in treatment once engaged [60], and decrease their use after treatment onset [61]. Due to baseline negative affective states, adolescents with mood and anxiety disorders may be more vulnerable to the neuropsychological effects of chronic use. However, they may be more amenable to a series of short-term proximal HR goals along a trajectory to abstinence as they are less likely to be able to commit to long-term, future-oriented abstinence goals. In contrast, those with externalizing disorders have been shown to have negative associations with treatment, poorer retention rates [60], increase their use after treatment onset [61], and are more likely to have a greater number, or severity of substance-related consequences [62], and thus may not be able to establish the patient-clinician trust necessary to engage in a HR treatment approach. Further, these adolescents are more likely to be involved with the juvenile justice system [63]. As such, they may be embedded in a system whose message is one of abstinence only [52].

Research Priorities

Research priorities in the field of HR for adolescent substance use treatment include determination of outcome measures and proximal/interim or finite goals of treatment. Currently, clinical research common outcome measures include parameters such as frequency, quantity, and harmful consequences of use. Proximal outcomes include retention and engagement in treatment, following the assumption that those who complete the planned treatment are more likely to achieve abstinence. Further, measurements of goal achievement require further examination as traditional measures of treatment compliance (i.e. breathalyzer, urine toxicology) are not appropriate for non-abstinence goals. Clinical research should also aim to improve motivational techniques for increasing readiness to change, engagement in treatment, and realistic goal setting. In addition, a nosological refinement of the term HR specifically for youth is necessary to reflect the need to add “consumption reduction”, for example, Reduction of Consumption and Harm (RCH). Several investigators have been using the term Protective Behavioral Strategies (PBS) in adults as a proximal

factor expected to (a) relate to both frequency of drug use and related negative consequences, and (b) account for the effects of several known risk/protective factors of problematic drug use [64,65]. Lastly, the ethics of HR in adolescents in the context of parental oversight and juvenile justice system involvement, and how settings in which HR can be implemented, require further research attention.

Discussion

Harm reduction as a treatment goal, while not a model widely accepted for adolescents with SUDs, has become increasingly adopted for adult substance using populations with promising results [66]. However, this may not translate to adolescents as a “cut and paste” model as youth have shorter substance use trajectories, more constraints around use of substances and treatment of SUDs (i.e., legal, parental, academic, confidentiality), different patterns, and social contexts of use due to developmental stage and aforementioned constraints [6]. Further, given relative neurodevelopmental immaturity, adolescents’ insight and competency for making treatment decisions regarding substance use behaviors may not be appropriate. Nevertheless, setting more achievable goals, underscored by pragmatism, and driven by stage of change, is applicable to both adult and adolescent populations.

There is a clear consensus that changes associated with adolescent biopsychosocial development and ecological influences have an impact on treatment process and outcome [67]. Furthermore, they contribute to engagement in treatment and provide a personal meaning to the individual’s potential set of treatment goals. For example, adolescents’ inherent neurobiological vulnerability may partially explain why adolescents who will achieve abstinence do so by 5–6 weeks of treatment, earlier than the 12 weeks treatment programs generally afford. This also supports the development of short-term, flexible, proximal goals for those adolescents who are unable to achieve abstinence.

Conclusion

Continued efforts to examine potential markers and predictors of outcomes that are identifiable at baseline (e.g., personality characteristics) could help in differentiating potential responders to abstinence-focused interventions. This distinction would lead to developing adaptive treatment algorithms addressing patients’ individualized needs. However, work remains to be done to develop and validate a clinically useful operational definition of harm reduction (e.g., quantity/frequency thresholds) for youth, given possible effects of substance use on the developing brain [28]. We opine that harm reduction is only a temporary desirable proximal outcome

goal for youth who are poor responders to an abstinence-focused treatment plan due in part to the behavioral and neurocognitive limitations associated with their developmental stage, and potential psychiatric comorbidity. With increasing neurocognitive maturation, the challenge would be to decrease the dissonance between what the adolescent patient needs based on a functional analysis by the treatment team and what he/she may want as an outcome goal.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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