A Review of Behavioral Therapies in Adolescents with Opioid Use Disorder

Justine W. Welsh, MD, Maggie J. Mataczynski, BA, Minh D. Nguyen, BA, and R. Kathryn McHugh, PhD

Abstract: A growing evidence base supports the use of medication to treat opioid use disorder (OUD) in adolescents, but little is known about behavioral therapies for adolescents with OUD. A systematic review using PRISMA methodology was conducted on behavioral therapy for adolescent OUD. Only three studies were identified. Combined evidence from two studies indicates initial efficacy of the Adolescent–Community Reinforcement Approach, motivational enhancement therapy, and cognitive-behavioral therapy for reducing opioid use. The only group therapy identified, which involved adolescents and their parents, demonstrated improvement in participants' knowledge of relapse-prevention strategies, drug-refusal skills, and overall psychosocial functioning. Additional studies that included behavioral therapy but that did not specifically test its efficacy are also highlighted to expand the understanding of the small literature base. This review highlights the sparse evidence base for these therapies in this population. In addition, we highlight promising areas for future research and include evidence from the adult literature that may inform that research. Studies on behavioral therapies that utilize randomized, controlled trials for this population are imperative.

Keywords: adolescent, behavioral therapy, counseling, opioid-related disorders, systematic review

In 2018, an estimated 699,000 adolescents aged 12–17 (2.8% of the adolescent population) misused opioids, and 108,000 (0.4%) met criteria for an opioid use disorder (OUD).[1] Unfortunately, adolescents have also been taking part, as it were, in the nation's dramatic increase in opioid-related overdoses. Hospitalizations secondary to opioid poisonings in individuals aged 15–19 more than doubled from 1997 to 2012.[2] In addition, mortality rates of adolescents from prescription and illicit opioids rose 252.6% from 1999 to 2016.[3] Despite Food and Drug Administration approval of buprenorphine for ages 16 and older,[4] coupled with recommendations for the use of medication for opioid use disorder (MOUD) by the American Academy of Pediatrics,[5] MOUD remains underutilized,[6] even in youth who have experienced an opioid overdose.[7] The Food and Drug Administration has also approved naloxone, the opioid overdose reversal medication, for use in all pediatric ages.[8] However, according to a study of 120 pharmacies, only half of the pharmacies correctly reported that there was no age restriction to obtain this medication, which may hinder youth access.[9] Although MOUD has extensively proven efficacy in adults, a recent review of the literature identified few studies examining efficacy and safety in adolescents, which may deter clinicians from utilizing these potentially life-saving medications.[10]

A further challenge in treating OUD in youth is poor treatment retention. Although treatment retention is significantly higher in adolescents who receive MOUD than in those who receive detox only (e.g., 72% retention at 28 days in adolescents receiving buprenorphine, compared to 39% receiving clonidine),[11] direct comparisons suggest that treatment retention is significantly worse than among adults. For example, one study found that 57% of youth were retained at 3 months, compared to 78% of adults, and that 17% of youth were retained at 12 months, compared to 45% of adults.[12] Another study of buprenorphine maintenance indicated only a 9% retention rate of adolescents and young adults (aged 15–25) at 12 months.[13]

Early intervention in this population is critical to reduce the risk of overdose and prevent future additional negative outcomes from opioid use. Behavioral interventions, such as cognitive-behavioral therapies and structured counseling approaches, have demonstrated efficacy for treating substance use disorders (SUDs) in adults[14,15] and adolescents.[16,17] Studies of behavioral therapy for OUD, however, have focused primarily on adult samples. Research on therapy approaches specific to the adolescent population with OUD remains

From the Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine (Dr. Welsh and Ms. Mataczynski); Division of Alcohol, Drugs and Addiction, McLean Hospital, Belmont, MA (Ms. Nguyen and Dr. McHugh); Harvard Medical School (Dr. McHugh).

Supported by National Institute on Drug Abuse grant nos. R21 DA046738 and R21 DA046937.

Original manuscript received 28 April 2020; revised manuscript received 24 June 2020, accepted for publication 20 July 2020.

Correspondence: Justine W. Welsh, MD, 12 Executive Park Drive NE, Suite 200, Atlanta, GA 30329. Email: justine.welsh@emory.edu

Supplemental digital contents are available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.harvardreviewofpsychiatry.org).

DOI: 10.1097/HRP.0000000000000272

limited. Given the limited use of MOUD and low rates of treatment retention in this population, the identification of evidence-based therapeutic interventions is imperative. This article seeks to identify and review the current evidence base for using behavioral therapy in adolescents with OUD.

This review provides a comprehensive assessment of the literature on behavioral therapy for OUD in adolescents. A description of evidence-based behavioral treatment approaches for adolescents with SUDs, not specific to OUD, is highlighted to provide context prior to describing the results of the literature review. Additional studies that included behavioral therapy, but that did not specifically test its efficacy, are also discussed to expand the understanding of this small literature base. We conclude with future directions and a discussion of how the literature on behavioral therapy in adults may inform further research in adolescents.

EVIDENCE-BASED BEHAVIORAL THERAPIES FOR ADOLESCENTS WITH SUBSTANCE USE DISORDERS

As context for our literature review, this section describes the evidence-based treatments for adolescents with SUDs that can be applied to OUD.

Adolescent Community Reinforcement Approach

The Adolescent Community Reinforcement Approach (A-CRA) is a behavioral treatment that emphasizes positive social activities, peer connections, and familial relationships in order to develop an abstinent lifestyle that is more rewarding than substance use.[18–21] Treatment also focuses on building problem-solving, relapse-prevention, and anger-management skills, while promoting community engagement.[18,19] The A-CRA model motivates caregivers to play an active role in the process by providing parent guidance around discouraging substance use, while utilizing positive communication skills.[18] CRA, the adult version of the treatment manual from which A-CRA is adapted, has demonstrated efficacy in treating multiple SUDs, including alcohol, cannabis, cocaine, and OUD.[22–25] Studies of CRA in adolescents with SUDs have also demonstrated efficacy, mostly for alcohol and cannabis use disorder. In a study comparing treatment as usual to CRA in youth aged 14–22, substance use significantly decreased in the CRA group.[26] In justice-involved youth, A-CRA combined with assertive continuing care (case management and continuing care) demonstrated a significant decrease in frequency of use in those reporting continued use, as well as a significant increase in the proportion of participants that reported no use.[27] Another study examining A-CRA in adolescents with or without co-occurring disorders demonstrated a significant increase in days abstinent and a decline in substance use problems at 12-month follow-up for those with co-occurring externalizing or internalizing disorders, compared to adolescents with an SUD alone. The number of days with emotional problems for those with externalizing or internalizing co-occurring disorders also significantly improved compared to those with an SUD alone.[28]

Motivational Enhancement Therapy

Motivational enhancement therapy (MET) is a brief, time-limited counseling approach to help adolescents resolve ambivalent feelings about reducing or discontinuing substance use. MET can encompass a combination of motivational interviewing techniques and other therapies. Unlike other therapies that systematically guide patients through recovery, MET emphasizes a patient's own intrinsic motivation to change. Commitment to change is then reinforced through subsequent encounters. Different techniques within motivational interviewing include rolling with resistance to avoid confrontation and also the use of reflections, affirmations, and summarizing.[29] These interviewing techniques are often combined with other types of treatment, including cognitive-behavioral therapy (CBT). While much of the literature to support MET has been gathered from adult populations, motivational techniques have also shown to be efficacious in adolescents. Treatment outcomes for adolescent cannabis users were compared between brief MET and a delayed-treatment control condition.[30] The experimental MET group demonstrated significant reductions in days of use, amount used, number of dependence criteria met, and percentage of those meeting *Diagnostic and Statistical Manual of Mental Disorders* (DSM)–IV criteria for dependence, compared to the control condition. A similar study comparing MET to a delayed control group demonstrated that 45% of the MET group had a "meaningful change" in use (defined as reduction in marijuana use by 50% or reporting no symptoms of dependence/abuse at three-month follow-up), compared to 33% in the control group.[31] Although results were not significant, the initial findings indicate promise for MET in reducing adolescent cannabis use. Data also support the use of brief motivational interviewing interventions in adolescents with nicotine use. Colby and colleagues[32] compared motivational interviewing to a brief advice condition in adolescent smokers. Results demonstrated a small to medium effect size for the motivational interviewing group on abstinence from cigarettes at follow-up. The motivational interviewing group also had a significant reduction in dependence symptoms and smoking days per week, as well as greater reported serious quit attempts. These motivational interventions comprise a growing evidence base for the efficacy of this behavioral treatment in adolescents with substance use.

Cognitive-Behavioral Therapy

CBT focuses on modifying thoughts and behaviors that are maintaining disorder symptoms.[20] CBT for SUDs educates patients about how to identify harmful patterns, target motivational and cognitive barriers, and improve overall life skills (e.g., problem solving, coping).[33] CBT approaches use functional analysis to identify triggers for use and to subsequently both (1) identify strategies for reducing exposure to triggers and (2) develop new skills to modify responses to triggers. While there are different types of CBT, core components of the modality work toward lessening reinforcers for substance

use through introducing contingencies to reward abstinence or other desired behaviors, impart reduction-of-use/abstinence skills, and encourage rewarding sober activities.[33]

Both CBT and A-CRA have been actively compared in previous studies. The Cannabis Youth Treatment Study is one of the largest adolescent SUD trials to review the efficacy and affordability of five different therapies.[24] In that study, 600 youth who used cannabis aged 12–18 were randomized to 5 sessions of MET/CBT, 12 sessions of MET/CBT, Family Support Network, A-CRA, or Multidisciplinary Family Therapy. Primary outcomes examined were days of abstinence and percentage of adolescents in recovery (no use or abuse/dependence problems, and living in the community). All five interventions demonstrated significant improvements in primary outcomes at 12 months, with no significant differences between groups. However, the most cost-effective treatment modalities were both variations of MET/CBT and A-CRA.

Group Therapy

Group therapy has a long-standing history in addiction treatment. Five of the major substance use group models include psychoeducational, skills-development, cognitive-behavioral, support, and interpersonal processes.[34] Support, affiliation, identification, and peer confrontation are common themes among these frameworks that can help individuals connect with one another through the recovery process. Group settings facilitate a commitment to abstinence through these rewarding therapeutic benefits and have similar efficacy to individual therapy. In a meta-analysis of 33 different group therapies in adults, individuals displayed significantly greater rates of abstinence when compared with no treatment, individual therapy, and other forms of treatment (i.e., progressive relaxation training, couple therapy, health education).[35] In adolescents, a small but growing evidence base supports the use of different group therapies in substance-using populations. A review of the evidence for different group therapies in adolescents aged 11–20 found that 10 of the 13 studies identified positive substance use outcomes.[36] The 10 studies that displayed positive outcomes used forms of MET, CBT, family and coping skills, interactional therapy, psychoeducation, student assistance program, group-based therapy, adolescent group therapy, supportive counseling, and the 12-step model. Although most of the treatments demonstrated positive substance-use outcomes, only two of them met criteria for Chambless and Hollon's "possible efficacy" of treatment[37]—which included but were not limited to randomized studies with control groups, use of manuals, and reliable and valid outcomes-assessment measures.[36]

METHODS

The protocol of this systematic review was prepared according to Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.[38] Two individual medical librarians reviewed study design prior to search execution. The MEDLINE-PubMed, Cochrane, and PsycInfo databases were searched through February 2020 for relevant published studies that provided information regarding behavioral treatments for adolescents with OUD. The search terms included opioid-related disorders, adolescent, counseling, and behavioral therapy. Controlled vocabularies in the Thesaurus of Psychological Index Terms and MeSH terms were used along with keywords in the title and abstract fields. The databases were searched for eligible studies conducted in or later than 1950, according to the following criteria: studies in the English language; human subjects 12–17 years old; diagnosed with OUD; and tested the efficacy or effectiveness of some type of behavioral therapy or counseling. Duplicate articles, duplicated data, and manuscripts without original data (e.g., comments, reviews, case reports, and technical descriptions) were considered ineligible (see Supplemental Text Box 1, http://links.lww.com/HRP/A130 for more details). See Table 1 for an outline of identified titles, abstracts, and full-length manuscripts. The Covidence online software was used to assist with screening and full-text review.

Two independent reviewers (MM and MN) screened the titles and abstracts to find eligible studies, which were selected for further reading if eligible aspects appeared in the title. Abstracts and keywords were vetted for suitability in the remaining studies. For any study in which eligibility could not be easily ascertained by review of the title, the full-text article was read in detail to determine final eligibility. Due to the variability across studies in sample-selection methods with respect to age, any studies that included the specified age range (12–17) were included in analyses (i.e., studies that also included young adults were not excluded). Additional studies identified during the search that did not examine efficacy of a behavioral therapy intervention are discussed following the main review findings.

RESULTS

Search Results

The initial search identified 346 titles and abstracts; 89 duplicates were removed, leaving 257 studies to be screened. Based on review of titles and abstracts, 50 met the initial criteria or needed to be fully read to comprehend the extent of its eligibility. Of the 50 full-text studies that were screened for eligibility, 47 were excluded. The reasons for exclusion were as follows: incorrect patient population (n = 21); the study design did not test efficacy of behavioral therapy (n = 23); not OUD-related (n = 2); and no full text access (n = 1). The results of the search are presented in Supplemental Figure 1, http://links.lww.com/HRP/A131.

Review of Identified Studies

Only three studies matched the full inclusion criteria (see Table 1). Notably, none of these studies utilized a randomized design, and the studies relied on self-report almost exclusively. Conclusions should therefore be considered preliminary. In Pugatch and colleagues observational group study,[39] adolescents

Table 1

PRISMA-Selected Studies

Study	Sample		Design				Results
	Sample	Sex M/F	Design and setting	Intervention conditions	Comparative conditions	Drug use confirmation	Treatment outcomes
Pugatch et al. (2014)[39]	Adolescents and young adults aged 16–22 years with opioid use disorder: n = 42 Parents/ guardians: n = 72	Adolescent group: 25/17 Parents/ guardians: 28/44	Thirteen 90-minute modules for adolescents and separate modules for parents	Psychoeducational group therapy, including MAT, drug testing, psychopharmacology, individual counseling, and parent guidance	N/A	Drug testing Adolescent and parent self-reports on drug use and impaired driving Adolescent needle use self-report	52% of adolescents reported weekly abstinence from all substances; 17% reported substance use 86% attended 3 or more sessions 57% completed treatment (>10 sessions) Adolescents (90%) and parents (80%) reported increase in adolescent's ability to refuse drugs Adolescents (90%) and parents (97%) reported increased knowledge of relapse-prevention skills Adolescents/parents (100%) self-reported improvement in adolescent's psychosocial-functioning domains 5% reported driving while impaired 91% denied injection use
Godley et al. (2017)[19]	Adolescents aged 12–17 years with any SUD: n = 4027 Opioid problem use group: n = 306 Marijuana and alcohol problem use group: n = 3721	OPU group: 178/128 MAPU group: 2870/851	Efficacy of A-CRA in OPU vs. MAPU groups Data analyzed from SAMHSA-funded outpatient community substance use treatment programs from 2007–12	A-CRA in OPU group	A-CRA in MAPU group	Self-reported drug use as well as abuse/dependence symptoms, emotional problems, incarceration, residential treatment, and drug use while living in a sober community	Initiation: MAPU, 79%; OPU, 82% Engagement: MAPU, 63%; OPU, 67% Retention: MAPU, 8.9 sessions; OPU, 8.9 sessions Treatment satisfaction: MAPU, 11.7/14; OPU, 12.5/14 At intake, compared to MAPU group, OPU group had greater use of all drugs (except marijuana): alcohol, opioid, and other drug use ($p < .001$); SUD symptoms ($p < .05$);

Table 1

Continued

Study	Sample		Design				Results
							emotional problems ($p < .001$); and incarceration days ($p < .05$) Compared to MAPU group, OPU group had significantly greater decrease in all drugs over time (except marijuana), including opioid use ($p < .001$ for all except alcohol [$p < .05$]) Compared to MAPU group, OPU group had significantly decreased emotional problems ratings over time ($p < .05$) MAPU group had significant reductions, over time, in days of alcohol and marijuana use ($p < . 001$) and SUD symptoms ($p < .001$)
Davis et al. (2019)[20]	Adolescents aged 12–17 years and young adults aged 18–29 years: n = 785 Adolescent subgroup: n = 252 Young adult subgroup: n = 533	Adolescent group: 154/98 Young adult group: 296/237	Effect on latency of return to first self-reported opioid use after treatment initiation Data was retrospectively analyzed from CSAT/SAMHA-funded outpatient community substance use treatment programs from 2002–13	A-CRA vs. MET/CBT or CBT alone	TAU	Self-reported days until first opioid use	Hazard ratios for latency to return to opioid use: A-CRA vs. TAU: 79% higher for A-CRA (HR = 1.79; 95% CI [1.35, 2.38]; $p < .01$) ACRA vs. MET/CBT or CBT alone: 122% higher for A-CRA (HR = 2.22; 95% CI [1.68, 2.92]; $p < .01$) MET/CBT or CBT alone vs. TAU: no difference (HR=0.81; 95% CI [0.61, 1.06]; $p = .09$) Median number of days to first opioid use for combined age groups: A-CRA, 59.6; MET/CBT or CBT, 58.3; TAU, 63.9 Hazard ratios for latency to return to opioid use in male adolescents: A-CRA vs. TAU: HR = 1.23; 95% CI [0.61, 2.48] TAU vs. MET/CBT or CBT alone: HR = 2.55; 95% CI [1.29, 5.04]

Table 1
Continued

Study	Sample	Design	Results
			A-CRA vs. MET/CBT or CBT alone: HR = 3.14; 95% CI [1.63, 6.04]
			Hazard ratios for latency to return to opioid use in female adolescents:
			A-CRA vs. TAU: HR = 1.58; 95% CI [0.69, 3.62]
			TAU vs. MET/CBT or CBT alone: HR = 0.82; 95% CI [0.37, 1.78]
			A-CRA vs. MET/CBT or CBT alone: HR = 1.29; 95% CI [0.68, 2.47]

A-CRA, Adolescent–Community Reinforcement Approach; CBT, cognitive-behavioral therapy; CSAT/SAMHSA, Center for Substance Abuse Treatment/Substance Abuse and Mental Health Services Administration; MAPU, marijuana or alcohol problem use; MAT, medication-assisted treatment; MET, motivational enhancement therapy; OPU, opioid problem use; SUD, substance use disorder; TAU, treatment as usual.

and young adults aged 16–22 received treatment in a buprenorphine maintenance program. For the second study, Godley and colleagues[19] examined data from an observational study of community-based SUD treatment settings through a large-scale dissemination grant supported by the Substance Abuse and Mental Health Services Administration.[40] Outcomes were collected using the Global Appraisal of Individual Needs. For the last study, Davis and colleagues[20] used the national Global Appraisal of Individual Needs data set collected from 137 sites, which is also associated with Substance Abuse and Mental Health Services Administration–funded outpatient programs, to study latency to first opioid use episode after treatment.

Pugatch and colleagues[39] reported on outcomes from the only group therapy identified in the search. This study was a small (n = 42), open-label study and thus did not include a control or comparison condition. The therapy comprised 13 ninety-minute group sessions that incorporated CBT, contingency management, motivational interviewing, and self-help strategies. Half of the sessions focused on the adolescents' awareness of addiction. The other sessions focused on recovery, with a final group to process termination. An abstinence- or harm reduction–based objective was highlighted during each of the 13 sessions over the 13-week time period. All sessions had a similar structure, beginning with a check-in and followed by two group activities. Adolescents were able to draw for a small monetary reward from a prize jar at the end of session and could have an additional draw if they remained abstinent since the previous session. A parent-directed curriculum mirrored the adolescent portion and placed emphasis on understanding family strengths and addressing addiction as a family disease. Adolescents and their parents were encouraged to discuss materials and communicate openly after each session. Approximately half of the sample completed ten or more sessions. The majority of participants identified an improvement in knowledge of relapse prevention (90% for adolescents, 97% for adults), drug-refusal skills of adolescents (90%), adult's perception of adolescent drug-refusal skills (almost 80%), and overall psychosocial functioning of adolescents (100% of adolescents and parents). More than half (52%) of the sample reported abstinence throughout the treatment. Of all of the weekly assessment points, 17% included reported substance use, and 5% included reports of driving while intoxicated. The vast majority of adolescents (91%) denied injection use. Data on the correspondence between drug tests (assumed to be urine, but not explicitly stated) and self-report were not reported, but the authors believed them to be highly correlated. Along with the drug tests, this study had several limitations that hamper the ability to draw clear conclusions about the efficacy of the treatment. In addition to the lack of a comparison group, the study did not include a follow-up period and did not collect baseline measures of substance use; it is therefore unclear whether there were reductions in substance or needle use or simply low base rates in this sample. Adolescents were also receiving other forms of treatment in an outpatient substance use program, making it hard to determine

whether the results were fully attributable to the group or were affected by the concurrent treatments. Finally, the subjects were predominantly white, with high socioeconomic status, and supported by parents. Despite these limitations, the results support the feasibility of this approach for treating adolescents with OUD. This research also highlights promising rates of treatment completion, parent engagement, and enhancement of knowledge and relapse-prevention skills.

Godley and colleagues[19] used data from adolescents and young adults who received A-CRA in the context of outpatient care at 78 SUD treatment settings from 2007 to 2012. Adolescents within these treatment settings with primary opioid problem use (OPU; n = 306) were compared to adolescents with primary marijuana or alcohol problem use (MAPU; n = 3721). The OPU group consisted of participants who reported symptoms of past-year opioid abuse (22%) or dependence (31%) as defined by DSM-IV-TR, or at least weekly use of opioids (49%). MAPU participants met criteria for past-year marijuana or alcohol abuse (30% and 18%, respectively) or dependence (33%; 8%) as defined by DSM-IV-TR, or reported at least weekly use of marijuana/alcohol (65%; 15%). None of the MAPU participants met criteria for the OPU group, though some of the OPU group participants met the threshold for inclusion in the MAPU group. The OPU group was more severe at baseline on a wide array of measures, such as substance use problem severity, number of substances used, and mental health problems. Despite the greater severity of the OPU group, no significant differences between groups were found in markers of treatment initiation, engagement, retention, or satisfaction. Both groups had significant reductions in substance use and substance use problems over the course of treatment and posttreatment follow-up. The OPU group had a significantly greater reduction in alcohol ($p < .05$; small effect size of –0.15), opioid ($p < .001$; large effect size of –1.41), other drug use ($p < .001$; moderate effect size of –0.45), and days of emotional problems ($p < .05$) when compared to the MAPU group. The MAPU group had a significant reduction in days of alcohol and marijuana use ($p < .001$) but not opioids or other drugs. For substance use problems, the MAPU group had significant reductions in SUD symptoms over time ($p < .001$). Overall, the OPU group responded with a similar degree of improvement to the MAPU group but did not improve to the MAPU group level, likely due to greater baseline severity in the OPU group. The lack of random assignment and comparison of A-CRA to a control group for youth with OPU limits the interpretation of findings. Nevertheless, results of this study supported the feasibility and acceptability of A-CRA for adolescents with significant opioid use or OUD.

Using data from the national GAIN data set from 2002–13, Davis and colleagues[20] tested the hypothesis that treatment as usual (e.g., 12-step facilitation, supportive counseling) would be associated with worse opioid-use outcomes (defined as time to first opioid use) than the active comparison conditions (A-CRA, MET/CBT, and CBT) among youth and young adults with OUD (n = 785). Latency to first opioid-use episode after treatment initiation was measured in three different treatment conditions comprising adolescents and young adults: A-CRA (n = 298), MET/CBT (n = 142), CBT alone (n = 107), and treatment as usual (n = 238). Participants were included if they were between the ages of 12 and 29, were entering treatment for OUD, and if it was known what type of treatment they had received in their facilities. Groups were defined by the type of therapy received, and all participants who received only motivational interviewing were screened out. In partial support of the hypotheses, MET/CBT or CBT alone and treatment as usual were associated with longer latency to opioid use than A-CRA. Specifically, the hazard rates for latency to opioid use in individuals who received A-CRA compared to the treatment-as-usual condition was 79% higher for A-CRA ($p < .01$) and 122% higher for A-CRA compared to MET/CBT or CBT alone ($p < .01$). There was no difference in latency between the MET/CBT or CBT alone group and the treatment-as-usual group (HR = 0.81, $p = .09$). Of note, although these differences were statistically significant, the magnitude of these effects was modest, with similar median days to opioid use in all conditions (range between 58.3 and 63.9 days). Adolescents had longer latency to opioid use relative to young adults; there was no age × treatment type interaction, suggesting that adolescents had better outcomes for all treatment types. There was some indication of interactions based on sex. Male adolescents were found to have a shorter latency to first opioid use after treatment initiation in the A-CRA or treatment-as-usual conditions than MET/CBT or CBT alone. Female adolescents demonstrated no difference in average latency to first opioid use after treatment initiation between treatment conditions. Treatment adherence and fidelity to the intervention models were not examined. A strength of this study was the use of propensity weights to approximate random assignment; however, the study sample was drawn from multiple independent treatment sites nested within several independent service grant initiatives, therefore increasing the potential for study confounds (e.g., differential follow-up attrition; fidelity to treatment and measurement protocols). Additionally, this study focused solely on latency to first use and did not include other clinically meaningful outcomes (e.g., days of opioid use, OUD symptoms).

Additional Studies That Included Behavioral Therapy

In the search results, several studies were identified that included behavioral therapy but that did not specifically test its efficacy. Some of the studies investigating efficacy of MOUD included a behavioral therapy component but did not identify specific effects of the therapy. Despite not meeting inclusion criteria for this review, these studies may provide helpful insight into a very small evidence base and are therefore briefly reviewed in this section.

One study examined adolescents with (n = 56) and without heroin (n = 93) use who received short-term residential treatment with an adolescent-tailored 12-step approach.[41] Both groups had significant declines in days not meeting responsibilities

because of drug use, days in detention, overall mental distress, number of arrests, and illegal activity. The heroin-use group had a significant reduction in heroin use on available days at 12 months (59.5% at baseline; 19.7% at follow-up).[41] Findings provide support that adolescents with heroin use can respond to treatment, although this group experienced a greater severity of symptoms relative to those without heroin use, which persisted over a 12-month follow-up period.

A buprenorphine taper study by Woody and colleagues[42] examined youth between the ages of 15 and 21 (n = 152) who were assigned to either a 12-week or 14-day buprenorphine/naloxone taper. Both conditions included once-weekly group and individual counseling. Counseling components highlighted creating positive relationships, taking medications properly, coping with stress, drug refusal and education, and attending age-appropriate self-help groups. Findings indicated that individuals who completed the 12 weeks of buprenorphine treatment had fewer opioid-positive urine screens and less injection-drug use, and received less outside addiction treatment, than the 14-day taper. Those in the 12-week group also attended a greater number of counseling sessions.[42] Another MOUD study examined adolescents under age 18 (n = 55) on methadone or buprenorphine in combination with individual counseling (CBT, motivational interviewing, social work resources, and additional family therapy in some cases).[43] There were 32 treatment completers (ages 15–18) at four months. At baseline, 98% of participants had an opioid-positive urine drug screen (n = 52), compared to 28% (n = 9) of those at treatment completion. In addition, participants experienced a significant improvement in mean scores on the depression, anxiety, and anger subscales of the Beck Youth Inventory Second Edition over the course of treatment.[43]

In another study, Marsch and colleagues[11] compared clonidine and buprenorphine over a 28-day detoxification period in adolescents (aged 13–18; n = 36) with opioid dependence in conjunction with contingency management and three-times-weekly A-CRA.[11] The buprenorphine group had significantly better treatment retention and more opioid-negative urine drug screens than the clonidine group. The authors speculated that the behavioral therapy and contingency management incentives, which focused on opioid abstinence, likely promoted treatment retention in both groups. In a separate study involving the same cohort (aged 13–18) as Marsch and colleagues' study,[11] the Youth Self-Report was used to assess emotional and behavioral problems; on 6 of the instrument's 13 scales, subjects showed significant improvement.[44] Findings indicated that youth who stayed in treatment had a reduction in internalizing and total problems. A later study conducted by Marsch and colleagues[45] tested attendance and urine drug screens of youth (aged 16–24; n = 53) who were given buprenorphine, intensive CBT 2–3 times weekly, contingency management, and vouchers. Only 11 of the participants were under the age of 18. Individuals randomized to the 56-day taper group had significantly more opioid-negative urine drug screens (35%) than the 28-day taper group (17%).[45]

Qualitative measures were collected from a sub-study of a larger clinical trial examining the efficacy of two tapers of buprenorphine/naloxone, combined with behavioral treatment.[46] Participants (n = 22) ranged from 13 to 24 years old at intake of the main study, but all were 18 years or older during the interviews of the sub-study. Outcomes of the interviews indicated that increasing the youth's social support systems through treatment encouraged treatment initiation and continuation. Findings also highlighted that staff engagement, especially at the initiation of treatment, was extremely important for the adolescents to begin care.[46]

DISCUSSION

Summary of Findings

Our literature search yielded only three studies, highlighting the dearth of literature on this important topic. These studies reflected only two separate data sets, neither of which employed randomized designs. Accordingly, any conclusions should be interpreted with caution. Nonetheless, these studies yielded promising findings about the efficacy of behavioral therapy for OUD. Treatment retention and outcomes were strong, with evidence for significant reduction in opioid use and related problems. Adolescents appeared to have better outcomes than young adults in the studies reviewed.

There was some indication that the sex of subjects was a relevant variable in the one study that compared treatment types (A-CRA, CBT with or without MET, treatment as usual) to latency of first opioid use. Replication of this finding will be important, however, given the large number of tests run in this analysis (and thus elevated risk of type 1 error). An analysis specifically of A-CRA showed that it was associated with significant reduction in opioid and other drug use, substance-related problems, and mental health symptoms in this population.

The group therapy outlined by Pugatch and colleagues[39] integrated both parent and adolescent group therapy formats. In addition, it used a hybrid model, incorporating a number of treatment modalities. The parental involvement factors, psychoeducation, and initial acceptability of this therapy could positively affect an adolescent's treatment course. These encouraging preliminary findings can direct future OUD-focused group therapies.

Although these studies provide some initial answers on the use of behavioral therapy in youth, they also highlight a substantial gap in the evidence base. Given the paucity of research on behavioral therapy in adolescents, the adult literature can be informative for considering next steps in this clinical and research agenda.

Lessons from Studies of Adults

Studies of behavioral therapies for OUD in adults have yielded mixed results. In particular, results for studies combining behavioral therapy with buprenorphine have been disappointing and often suggest little or no additive benefit,[47] whereas studies of people receiving methadone maintenance treatment have

been more promising.[48–50] Several lessons can be gleaned from the adult literature that may inform clinical research in adolescents.

First, treatment adherence and compliance have been a significant limitation in studies of behavioral therapy in OUD. For example, in a large clinical trial of buprenorphine with or without drug counseling, only 66% of participants met the minimum criteria for adequate attendance (>60% of sessions attended).[51] Similarly, in a trial testing CBT added to outpatient buprenorphine treatment, the average session attendance was only 6.7 out of 12 sessions.[52] Participants in these trials may have received sub-therapeutic doses of behavioral therapies. Efforts to enhance the adherence to behavioral therapy will facilitate a better test of its efficacy in youth.

Second, although behavioral therapy has often failed to show consistent additive benefit for opioid use outcomes, it has been linked with reduction in other substance use and psychosocial and functional outcomes.[48,53] Behavioral therapy may actually offer the greatest promise for targeting the domains of symptoms and functioning that are *not adequately addressed by MOUD*. In adolescents, these domains may critically include interpersonal and family functioning, involvement of family supports in treatment, and efforts to enhance medication adherence. Similarly, behavioral therapy may be used to address common co-occurring psychiatric conditions, which are highly prevalent in youth with SUDs.[54]

Third, contingency management and other reinforcement-based therapies appear to offer the most robust benefits in adults.[14] A focus on such behavioral approaches may be particularly indicated in adolescents. Almost a dozen trials have tested the Community Reinforcement Approach for SUDs, with all of them showing positive or equal outcomes.[21] Using the same data set as the adolescent opioid-specific study by Godley and colleagues,[19] Welsh and colleagues[23] examined young adult outcomes (n = 419). Similar rates of treatment retention, initiation, and engagement were found in the primary opioid-use group compared to individuals who presented to treatment for primary marijuana or alcohol use. The opioid-use group also demonstrated significant decreases in opioid, alcohol, marijuana, and other drug use over time.

Future Directions

There are many gaps in understanding the role of behavioral therapy for OUD in adolescents. The most fundamental question has yet to be answered: is behavioral therapy effective for adolescents with OUD? In addition, the state of the evidence base of MOUD is limited in this population,[10] and buprenorphine is Food and Drug Administration–approved for youth only starting at age 16.[55] Accordingly, the most important next steps to efficiently advance knowledge would be to conduct randomized trials that use additive designs to test the addition of behavioral therapy to MOUD. In such trials, randomization would occur at the level of behavioral therapy (i.e., all patients receive medication) to allow for causal conclusions about whether or what type of behavioral therapy is efficacious in this population.

Although several behavioral therapy options may be promising, as reviewed above, studies of behavioral therapy that include family involvement and contingency management or other reinforcement-based strategies may be particularly promising. For example, enhancement of A-CRA (which integrates family members) with a full contingency-management protocol would leverage multiple potential mechanisms of behavioral change and optimize the likelihood of success.

CONCLUSION

Despite the obvious need for effective behavioral treatment for adolescents with OUD, the literature is sparse. Although the initial results are promising, none of the three studies reviewed here involved a randomized clinical trial, and one of the three was an open-label study without a comparison group. Thus, we are limited in the ability to interpret treatment efficacy at this early stage. Nonetheless, the reviewed studies provide support for the feasibility and acceptability of several approaches, with available outcome evidence for each treatment suggesting the need for randomized clinical trials. Because so few studies have been conducted on behavioral therapies for adolescents with OUD, further research is urgently needed.

Declaration of interest: Dr. Welsh has received consulting fees from Analgesic Solutions and training fees from Chestnut Health Systems.

The authors would like to acknowledge Dr. Mark D. Godley for his assistance in editing this manuscript.

REFERENCES

1. Substance Abuse and Mental Health Services Administration. 2018 National Survey on Drug Use and Health (NSDUH) releases: key substance use and mental health indicators in the United States. 2019. https://www.samhsa.gov/data/nsduh/reports-detailed-tables-2018-NSDUH
2. Gaither JR, Leventhal JM, Ryan SA, Camenga DR. National trends in hospitalizations for opioid poisonings among children and adolescents, 1997 to 2012. JAMA Pediatr 2016;170:1195–201.
3. Gaither JR, Shabanova V, Leventhal JM. US national trends in pediatric deaths from prescription and illicit opioids, 1999–2016. JAMA Netw Open 2018;1:e186558.
4. Subutex: prescribing information. 2011. https://www.accessdata.fda.gov/drugsatfda_docs/label/2011/020732s006s007lbl.pdf
5. Committee on Substance Use and Prevention. Medication-assisted treatment of adolescents with opioid use disorders. Pediatrics 2016;138:e20161893.
6. Hadland SE, Wharam JF, Schuster MA, Zhang F, Samet JH, Larochelle MR. Trends in receipt of buprenorphine and naltrexone for opioid use disorder among adolescents and young adults, 2001–2014. JAMA Pediatr 2017;171:747–55.
7. Bagley SM, Larochelle MR, Xuan Z, et al. Characteristics and receipt of medication treatment among young adults who experience a nonfatal opioid-related overdose. Ann Emerg Med 2020;75:29–38.
8. NARCAN (naloxone hydrochloride) nasal spray: prescribing information. 2015. https://www.accessdata.fda.gov/drugsatfda_docs/label/2015/208411lbl.pdf

9. Jimenez DE, Singer MR, Adesman A. Availability of naloxone in pharmacies and knowledge of pharmacy staff regarding dispensing naloxone to younger adolescents. J Adolesc Health 2019;65:698–701.
10. Camenga DR, Colon-Rivera HA, Muvvala SB. Medications for maintenance treatment of opioid use disorder in adolescents: a narrative review and assessment of clinical benefits and potential risks. J Stud Alcohol Drugs 2019;80:393–402.
11. Marsch LA, Bickel WK, Badger GJ, et al. Comparison of pharmacological treatments for opioid-dependent adolescents: a randomized controlled trial. Arch Gen Psychiatry 2005;62:1157–64.
12. Schuman-Olivier Z, Weiss RD, Hoeppner BB, Borodovsky J, Albanese MJ. Emerging adult age status predicts poor buprenorphine treatment retention. J Subst Abuse Treat 2014;47:202–12.
13. Matson SC, Hobson G, Abdel-Rasoul M, Bonny AE. A retrospective study of retention of opioid-dependent adolescents and young adults in an outpatient buprenorphine/naloxone clinic. J Addict Med 2014;8:176–82.
14. Dutra L, Stathopoulou G, Basden SL, Leyro TM, Powers MB, Otto MW. A meta-analytic review of psychosocial interventions for substance use disorders. Am J Psychiatry 2008;165:179–87.
15. Magill M, Ray L, Kiluk B, et al. A meta-analysis of cognitive-behavioral therapy for alcohol or other drug use disorders: treatment efficacy by contrast condition. J Consult Clin Psychol 2019;87:1093–105.
16. Becker SJ, Curry JF. Outpatient interventions for adolescent substance abuse: a quality of evidence review. J Consult Clin Psychol 2008;76:531–43.
17. Hogue A, Henderson CE, Becker SJ, Knight DK. Evidence base on outpatient behavioral treatments for adolescent substance use, 2014–2017: outcomes, treatment delivery, and promising horizons. J Clin Child Adolesc Psychol 2018;47:499–526.
18. Godley SH, Meyers RJ, Smith JE, et al. The Adolescent Community Reinforcement Approach for adolescent cannabis users. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2001.
19. Godley MD, Passetti LL, Subramaniam GA, Funk RR, Smith JE, Meyers RJ. Adolescent Community Reinforcement Approach implementation and treatment outcomes for youth with opioid problem use. Drug Alcohol Depend 2017;174:9–16.
20. Davis JP, Prindle JJ, Eddie D, Pedersen ER, Dumas TM, Christie NC. Addressing the opioid epidemic with behavioral interventions for adolescents and young adults: a quasi-experimental design. J Consult Clin Psychol 2019;87:941–51.
21. Meyers RJ, Roozen HG, Smith JE. The Community Reinforcement Approach. Alcohol Res Health 2011;33:380–8.
22. Roozen HG, Boulogne JJ, van Tulder MW, van den Brink W, De Jong CAJ, Kerkhof AJFM. A systematic review of the effectiveness of the Community Reinforcement Approach in alcohol, cocaine and opioid addiction. Drug Alcohol Depend 2004;74:1–13.
23. Welsh JW, Passetti LL, Funk RR, Smith JE, Meyers RJ, Godley MD. Treatment retention and outcomes with the Adolescent Community Reinforcement Approach in emerging adults with opioid use. J Psychoactive Drugs 2019;51:431–40.
24. Dennis ML, Godley SH, Diamond G, et al. The Cannabis Youth Treatment (CYT) study: main findings from two randomized trials. J Subst Abuse Treat 2004;27:197–213.
25. Abbott PJ. A review of the Community Reinforcement Approach in the treatment of opioid dependence. J Psychoactive Drugs 2009;41:379–85.
26. Slesnick N, Prestopnik JL, Meyers RJ, Glassman M. Treatment outcome for street-living, homeless youth. Addict Behav 2007;32:1237–51.
27. Henderson CE, Wevodau AL, Henderson SE, et al. An independent replication of the Adolescent-Community Reinforcement Approach with justice-involved youth. Am J Addict 2016;25:233–40.
28. Godley SH, Hunter BD, Fernández-Artamendi S, Smith JE, Meyers RJ, Godley MD. A comparison of treatment outcomes for Adolescent Community Reinforcement Approach participants with and without co-occurring problems. J Subst Abuse Treat 2014;46:463–71.
29. Miller WR, Zweben A, DiClemente CC, Rychtarik RG. Motivational enhancement therapy manual: a clinical research guide for therapists treating individuals with alcohol abuse and dependence, vol. 2. Washington, DC: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism, 1999.
30. Martin G, Copeland J. The Adolescent Cannabis Check-Up: randomized trial of a brief intervention for young cannabis users. J Subst Abuse Treat 2008;34:407–14.
31. Walker DD, Roffman RA, Stephens RS, Wakana K, Berghuis J, Kim W. Motivational enhancement therapy for adolescent marijuana users: a preliminary randomized controlled trial. J Consult Clin Psychol 2006;74:628–32.
32. Colby SM, Monti PM, Barnett NP, et al. Brief motivational interviewing in a hospital setting for adolescent smoking: a preliminary study. J Consult Clin Psychol 1998;66:574–8.
33. McHugh RK, Hearon BA, Otto MW. Cognitive-behavioral therapy for substance use disorders. Psychiatr Clin North Am 2010;33:511–25.
34. Center for Substance Abuse Treatment. Substance abuse treatment: group therapy. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2005.
35. Lo Coco G, Melchiori F, Oieni V, et al. Group treatment for substance use disorder in adults: a systematic review and meta-analysis of randomized-controlled trials. J Subst Abuse Treat 2019;99:104–16.
36. Engle B, Macgowan MJ. A critical review of adolescent substance abuse group treatments. J Evid Based Soc Work 2009;6:217–43.
37. Chambless DL, Hollon SD. Defining empirically supported therapies. J Consult Clin Psychol 1998;66:7–18.
38. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med 2009;6:e1000097.
39. Pugatch M, Knight JR, McGuiness P, Sherritt L, Levy S. A group therapy program for opioid-dependent adolescents and their parents. Substance Abus 2014;35:435–41.
40. Godley SH, Garner BR, Smith JE, Meyers RJ, Godley MD. A large-scale dissemination and implementation model for evidence-based treatment and continuing care. Clin Psychol (New York) 2011;18:67–83.
41. Clemmey P, Payne L, Fishman M. Clinical characteristics and treatment outcomes of adolescent heroin users. J Psychoactive Drugs 2004;36:85–94.
42. Woody GE, Poole SA, Subramaniam G, et al. Extended vs short-term buprenorphine-naloxone for treatment of opioid-addicted youth. JAMA 2008;300:2003–11.
43. Smyth BP, Ducray K, Cullen W. Changes in psychological well-being among heroin-dependent adolescents during psychologically supported opiate substitution treatment. Early Interv Psychiatry 2018;12:417–25.
44. Moore SK, Marsch LA, Badger GJ, Solhkhah R, Hofstein Y. Improvement in psychopathology among opioid-dependent adolescents during behavioral-pharmacological treatment. J Addict Med 2011;5:264–71.
45. Marsch LA, Moore SK, Borodovsky JT, et al. A randomized controlled trial of buprenorphine taper duration among opioid-dependent adolescents and young adults. Addiction 2016;111:1406–15.

46. Moore SK, Guarino H, Marsch LA. "This is not who I want to be:" experiences of opioid-dependent youth before, and during, combined buprenorphine and behavioral treatment. Subst Use Misuse 2014;49:303–14.
47. Carroll KM, Weiss RD. The role of behavioral interventions in buprenorphine maintenance treatment: a review. Am J Psychiatry 2017;174:738–47.
48. Carroll KM, Kiluk BD, Nich C, et al. Computer-assisted delivery of cognitive-behavioral therapy: efficacy and durability of CBT4CBT among cocaine-dependent individuals maintained on methadone. Am J Psychiatry 2014;171:436–44.
49. Marsch LA, Guarino H, Acosta M, et al. Web-based behavioral treatment for substance use disorders as a partial replacement of standard methadone maintenance treatment. J Subst Abuse Treat 2014;46:43–51.
50. Schottenfeld RS, Chawarski MC, Pakes JR, Pantalon MV, Carroll KM, Kosten TR. Methadone versus buprenorphine with contingency management or performance feedback for cocaine and opioid dependence. Am J Psychiatry 2005;162:340–9.
51. Weiss RD, Griffin ML, Potter JS, et al. Who benefits from additional drug counseling among prescription opioid-dependent patients receiving buprenorphine–naloxone and standard medical management? Drug Alcohol Depend 2014;140:118–22.
52. Fiellin DA, Barry DT, Sullivan LE, et al. A randomized trial of cognitive behavioral therapy in primary care-based buprenorphine. Am J Med 2013;126:74.e11–74.e17.
53. Petry NM, Alessi SM, Hanson T, Sierra S. Randomized trial of contingent prizes versus vouchers in cocaine-using methadone patients. J Consult Clin Psychol 2007;75:983–91.
54. Conway KP, Swendsen J, Husky MM, He J-P, Merikangas KR. Association of lifetime mental disorders and subsequent alcohol and illicit drug use: results from the National Comorbidity Survey-Adolescent Supplement. J Am Acad Child Adolesc Psychiatry 2016;55:280–8.
55. Suboxone (buprenorphine and naloxone): prescribing information. n.d. http://www.suboxone.com/content/pdfs/prescribing-information.pdf