Over the past decade, great strides have been made in the treatment of alcohol and other drug (AOD) disorders in adolescents. Before that period, most of the treatments administered for AOD disorders were those used to treat adults, and little or no modifications were made on the basis of developmental considerations for adolescents. Treatment replication was almost nonexistent, because treatments lacked specific protocols or structured delivery. In an attempt to evaluate the effectiveness of adolescent drug treatment, Catalano et al. concluded that some treatment is better than no treatment. Recent advances in AOD disorder treatment include treatment modalities designed specifically to treat adolescents, some of which were modified from adult treatments. The awareness that “adolescents are not adults” and that there are developmental differences that may affect treatment, adherence, and outcomes has advanced the field of adolescent alcohol treatment. Treatments have been developed specifically to target AOD disorders in adolescents. This article reviews treatment outcome studies for adolescents with AOD disorders.

INCLUSION CRITERIA

Overwhelmingly, treatments for AOD disorders in adolescents have involved psychosocial modalities, the bulk of which have not been tested in a controlled, comparative fashion. To identify treatment outcome studies that were conducted in a controlled fashion, comparing ≥1 modality, a computerized literature search was conducted through journal databases, including Medline, PsychInfo, and Current Contents. In addition, the reference lists of the published articles were reviewed. Studies included in this review were those that (1) focused on AOD use disorders in adolescents, (2) evaluated ≥1 treatment modality in a comparative manner, (3) were published between 1990 and 2005, and (4) used random assignment to treatment conditions. This approach was used to highlight evidence-based treatments, to promote the transportability and transferability of successful treatments to clinicians, researchers, and the community. The following psychosocial treatments for AOD disorders in adolescents are reviewed: family-based interventions, motivational enhancement therapy (motivational interviewing), behavioral therapy, cognitive-behavioral therapy, and pharmacotherapy. Although pharmacological treatments for AOD disorders in adolescents are very limited, the few placebo-controlled studies are discussed.

FAMILY-BASED INTERVENTIONS AND MULTISYSTEMIC THERAPY

Family-based interventions for the treatment of AOD disorders in adolescents represent the most thoroughly investigated, comparative, psychosocial treatment modality. The approaches are grounded in family systems theory, which posits that individuals’ behavior is integrally related to their primary relational context, the family. In addition, social and community contexts influence the dynamics of adolescents’ thoughts and perceptions of various situations, which may lead to certain behaviors. AOD use is assessed and treated in the context of an adolescent’s functioning.
within the family, patterns of communication, and relationships to extended family and social systems. The existing literature on comparative family therapy studies of treatment of AOD disorders is described below (Table 1).

Lewis et al⁵ randomly assigned 84 adolescents (age range: 12–20 years) to either family therapy (described as the Purdue Brief Family Therapy Program) or a family education intervention (Training in Parenting Skills), in which parents received parenting skills training. The mean age of the subjects was 16 years, and subjects were predominately male (male: 68 subjects; female: 16 subjects). The Purdue Brief Family Therapy Program model combines structural, strategic, functional, and behavioral family therapies. It seeks to reduce adolescent AOD use by decreasing family resistance to drug treatment, redefining drug use as a family problem, reestablishing appropriate parental influences, assessing interpersonal functions of drug use, interrupting dysfunctional family behaviors, implementing change strategies, and providing assertion training skills to assist both the adolescent and his or her siblings in resisting peer pressure to engage in drug use. The Training in Parenting Skills program educates family members about the types of addictive drugs, their effects, and ways of overcoming addiction to drugs. Drugs of abuse were classified as soft drugs (ie, tobacco, alcohol, and marijuana) or hard drugs (ie, any other illegal drugs). Treatment was administered over a 12-week period, and AOD use was measured according to frequency of use and an index of drug severity. Individual questionnaires and videotaped interactions between parents and adolescents were used to assess family dynamics. Adolescents randomly assigned to family therapy were significantly more likely to have lower posttreatment drug severity index values (37.5% vs 54.6%) and greater overall improvement from baseline to the end of treatment.

Studies by Henggeler et al⁴ focused on the use of multisystemic therapy (MST) for the treatment of adolescents involved in the juvenile justice system. Within the adolescent sample (n = 200), 26 subjects had AOD-related offenses such as public intoxication or AOD possession or sale. Adolescents were randomly assigned to MST or individual counseling. MST focused on changing the youths’ behavior in their natural environment, and the first step was to identify each adolescent’s strengths and weaknesses. A plan was created on the basis of the individual’s strengths and weaknesses, and the strengths were used to facilitate change. MST was time-intensive, and therapy sessions were usually held in the home setting. MST also provided parents with resources necessary for independent management of difficult situations as they arose throughout the treatment period. Individual counseling used a psychodynamic, client-centered, behavioral approach. Therapy sessions targeted personal, family, and academic issues with the individual offender as the center, rather than the multiple systems to which the individual was linked. The mean age of the adolescents was 14.4 years, and treatment duration for each subject, as determined by the treatment provider, varied. The mean times for MST and individual counseling were 24 hours and 28 hours, respectively. The rate of repeated, AOD-related arrests, rather than the quantity or frequency of AOD use, was the primary outcome variable. Adolescents who received MST had significantly lower arrest rates than did those who received individual counseling (4% vs 16%). Specific substance use assessment tools and reduction of AOD use as a primary outcome variable were not mentioned in that study. It seemed that reduction in AOD-related arrests was assumed to be a proxy indicator of reduction in AOD use.

Henggeler et al⁶ extended MST to explore its effect on juvenile offenses and AOD use. MST was compared with the Department of Youth Services usual services (court orders monitored by probation officers). In this study, AOD use was a primary outcome variable and drugs were delineated as soft drugs (alcohol and marijuana) or hard drugs (cocaine, hallucinogens, amphetamines, barbiturates, and heroin). Both interventions were delivered over a 4-month period, and the usual-treatment group had monthly meetings with a probation officer to evaluate school attendance and curfew compliance. Frequency of AOD use over the past 3 months was a primary outcome variable. Adolescents in the MST group had significantly lower alcohol and marijuana use than did those in the usual-treatment group. The base rate of use of hard drugs was so low that statistical analysis of treatment effects was precluded.

In another group of 118 juvenile offenders, Henggeler et al⁷ randomly assigned adolescents to MST or usual community services. The usual community services consisted of outpatient substance abuse services and weekly meetings that followed a 12-step program. The age range of subjects was 12 to 17 years (mean age: 15.7 years). Substance use was assessed by using the Personal Experience Inventory⁸ and was monitored over time with urine toxicological screens. Participants randomly assigned to MST were exposed to an average of 130 days of treatment, with ~40 hours of direct contact and 6 hours of indirect contact. Participants randomly assigned to usual community services received treatment for an average of 5 months and received few substance abuse or mental health services. Subjects in the MST group used significantly less alcohol, marijuana, and other drugs at the end of treatment. In addition, subjects in the MST group experienced 50% fewer out-of-home placements at 6 months after treatment. Eighty subjects were located at the 4-year follow-up evaluation,⁹ which revealed that MST had significant long-term effects on the reduction of aggressive criminal behaviors (0.15 vs 0.57 convictions per year) and marijuana abstinence (55% vs 28%).

In a study evaluating 3 treatments for AOD use in adolescents, Joanning et al⁹ randomly assigned adolescents to family systems therapy, adolescent group therapy, or family drug education. Family systems therapy combined structural and strategic family therapy. The adolescent group therapy was similar to outpatient group therapy offered by hospitals and targeted social skills, cognitive development, and role playing. The family drug education group consisted of multiple families.
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<td>Lithium vs placebo</td>
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were not discussed. Subjects (n = 134) were 11 to 20 years of age and received 7 to 15 family systems therapy sessions delivered weekly for 12 weeks, adolescent group therapy delivered weekly for 12 sessions, and family drug education delivered biweekly for 6 sessions. Drugs endorsed by the participants included marijuana, alcohol, barbiturates, amphetamines, and hallucinogens. Unfortunately, the quantity and frequency of AOD use were not measured; instead, substance use was assessed through random drug screens, legal involvement, drug involvement surveys, and family assessment interviews. Although the groups did not differ in family functioning, the family systems therapy group had significantly more abstainers (54%) than did the adolescent group therapy group (28%) or the family drug education group (16%).

In a study combining integrated family therapy with CBT, 43 adolescents 12 to 18 years of age (mean age: 16.07 ± 1.12 years) were randomly assigned to receive integrated family therapy with CBT or a drug harm psychoeducation curriculum during a 16-week treatment period.9 The integrated family therapy with CBT used problem-focused family therapy and promoted drug abstinence by fostering adaptive family communication, age-appropriate roles, and effective parenting skills. Behavioral contracts were used, and the CBT component introduced the adolescents to rational-emotive and problem-solving principles. The drug harm psychoeducation used drug information from the National Institute on Drug Abuse, which included harmful effects of AODs and negative consequences associated with drug use. Treatment duration was 16 weeks, with 1-, 3-, and 6-month follow-up evaluations. Alcohol and illicit drugs of all types were targeted for use reduction. Assessment instruments were validated specifically for use with adolescents. AOD use frequency, urinalysis results, and self-report interviews were used as outcome variables. During the 6-month posttreatment follow-up period, the drug harm psychoeducation group had an average alcohol use rate of 6.06 days/month, compared with 2.03 days/month for the integrated family therapy with CBT group. The drug harm psychoeducation group also had a higher marijuana use rate at the 6-month follow-up evaluation (13.83 vs 5.67 days/month).

Waldron et al10 examined the treatment outcomes of 114 substance-abusing adolescents (age range: 13–17 years; mean age: 15.4 ± 1.01 years) randomly assigned to 1 of 4 treatment interventions, that is, functional family therapy, individual CBT, combination functional family therapy and CBT (joint intervention), or psychoeducation. The functional family therapy and CBT groups received 12 hours of therapy (1 session per week), the psychoeducation group received 12 hours of therapy (eight 90-minute sessions, with 2 hours reserved for crisis situations), and the joint intervention group received 24 hours of therapy (two 1-hour sessions per week). Treatment duration was 12 weeks, with scheduled follow-up evaluations at 4 and 7 months. With marijuana as the primary drug of choice in the sample, the primary substance use outcome measures included proportion of days on which marijuana was used and proportion of youths achieving minimal use. Urine drug screen results, as well as quantity and frequency of substance use reported with timeline follow-back assessment, were also used as outcome measures. Collateral reports were obtained from parents and siblings. During the pretreatment period, the joint intervention and psychoeducation groups had the greatest proportions of days with marijuana use (joint intervention group: 56.73%; psychoeducation group: 66.21%), as well as the most significant reductions in proportions of days with marijuana use at the 7-month posttreatment evaluation (joint intervention group: 36.44%; psychoeducation group: 41.88%). There were no significant changes over time in proportions of days with alcohol use or tobacco use.

In a study conducted by Liddle et al,11 marijuana- and alcohol-abusing adolescents (n = 182) between the ages of 13 and 18 years were randomly assigned to receive weekly multidimensional family therapy, adolescent group therapy, or multifamily educational intervention for a 14- to 16-week period. Collateral reports, self-reports, and urine analysis results were used as outcome measures. At the end of the treatment period, subjects in the multidimensional family therapy group showed the most improvement overall, with 42% of participants reporting drug use reduction (adolescent group therapy: 25%; multifamily educational intervention: 32%). During the 1-year follow-up period, all 3 groups were below the initial treatment entry criteria for drug use (multidimensional family therapy: 45%; adolescent group therapy: 32%; multifamily educational intervention: 25%).

**MOTIVATIONAL ENHANCEMENT THERAPY**

Motivational enhancement therapy (also referred to as MI) is a brief intervention used to enhance an individual’s motivation to make changes regarding substance use and life situations that may trigger or perpetuate substance use. Addiction and high-risk behaviors are primary targets of motivational enhancement therapy.12 This form of brief intervention is theoretically appealing because adolescents with AOD disorders often are non–treatment-seeking and need to be motivated to engage in treatment.13 The primary tenets of MI include using an empathic nonjudgmental stance, performing reflective listening, developing discrepancy, rolling with resistance and avoiding arguments, and supporting self-efficacy for change.

Marlatt et al14 randomly assigned high school seniors (female: 188 subjects; male: 160 subjects) to an individualized, brief, MI intervention during their freshman year in college or to a no-treatment condition. Subjects were screened during high school, and no subjects >19 years of age were included. The mean age or age range of subjects was not cited. Subjects received 1 MI session during the winter term of their freshman year in college. Outcome measures included drinking rates, alcohol-related problems, and alcohol dependence. Self-reports of quantity, frequency, and peak alcohol consumption
were collected, and collateral reports were used to corroborate reports. The MI group demonstrated significant decreases in drinking and reductions in alcohol-related consequences. The significant reductions in drinking were demonstrated in both short-term and long-term drinking outcomes. At the 6-month follow-up assessment, subjects in the MI group drank significantly less frequently and drank smaller quantities over time, and their peak quantity was smaller. These positive outcomes persisted at the 2-year follow-up assessment, again with significantly lower frequency, quantity, and peak alcohol consumption for the MI group, compared with the control group.

McCambridge and Strang15 randomly assigned 200 adolescents (age range: 16–20 years; mean age not indicated) to 1 session of MI versus a nonintervention, education-as-usual, control condition. Baseline assessments included peer interviews, self-reports of drug use, and testing of hair samples for biochemical validation of drug use. The outcome variables were changes in drug use (nicotine, alcohol, cannabis, and other drug use), changes in drug-specific perceptions, and changes in behavioral outcomes. At baseline, 11 subjects in the intervention group and 17 subjects in the control group were identified as nondrinkers. The 3-month follow-up evaluation revealed that 13 nondrinkers (1 from the MI group and 12 from the control group) had initiated drinking. Overall, the MI group showed significant reductions in nicotine, alcohol, and marijuana use.

BEHAVIORAL THERAPY

Behavioral therapy targets substance use in the context of the individual’s environment. Approaches in behavioral therapy are based on classic and operant conditioning. This intervention involves identification of the behaviors that promote substance use and behavioral disruption through teaching of skills to avoid relapse. Essential elements in behavioral therapy are functional analysis, skills training, and relapse prevention. Functional analysis explores the triggers for substance use and the stimuli that promote maintenance of use. After problematic areas are identified, individual-specific skills to prevent relapse are taught. Other areas of focus include stress management, drug refusal skills, assertiveness training, social skills, and self-regulation.

Azrin et al16 randomly assigned 26 treatment-seeking adolescents with substance use disorders to either behavioral therapy or supportive counseling. The age range of the subjects was 13 to 18 years (mean age: 16 years). The behavioral therapy group received written assignments and review of in-session assignments, rehearsals, therapist modeling, and self-recording. Principle-specific procedures included stimulus control, in which subjects identified the amount of time spent in “risky” versus “safe” situations and the goal was to increase the time spent in safe situations; urge control, which attempted to interrupt internal stimuli that were precursors to drug use; and social control/contracting, in which parents assisted in providing youths with activities on the “safe list.” The supportive counseling group focused on expressions of feelings, self-generated insight into reasons for substance use, and discussion of drug-related experiences without directives from the counselor. The duration of treatment was 6 months, and participants attended a mean of 15 sessions. Outcome variables included type and frequency of drug use, school attendance, employment, institutionalization, and arrests. Urine drug screens were used to corroborate self-reports. Adolescents in the behavioral therapy group reported less-frequent substance use and had fewer positive drug screens than did those in the supportive counseling group. Adolescents in the behavioral therapy group also had improved school attendance and performance and better conduct ratings than did those in the supportive counseling group.

A 9-month follow-up study of 74 subjects (age range: 13–43 years) with substance use disorders who received behavioral therapy versus supportive therapy revealed that the behavioral therapy group had significantly greater reductions in drug use at the end of treatment and the follow-up period.17 Furthermore, the behavioral therapy group showed more days worked, less alcohol use, and more days in school than did the supportive therapy group. Behavioral therapy use in the treatment of adolescent substance use has been expanded in the context of the family. Family behavioral therapy has been shown to be as effective as individual cognitive problem-solving in treating adolescents with conduct disorder and substance dependence.18 Although there are few trials comparing behavioral therapy with other modalities for treating adolescent substance use disorders, the trials conducted to date are very promising.

COGNITIVE-BEHAVIORAL THERAPY

CBT extends behavioral therapy by integrating the impact of cognitive elements in addressing substance use. CBT is based on social learning theories and emphasizes functional analyses by addressing drug use in the context of its antecedents and consequences. The mainstays of CBT are the recognition of high-risk situations and the acquisition of skills aimed at addressing those high-risk situations.

Kaminer et al21 randomly assigned 32 adolescents with dual diagnoses (age range: 13–18 years) to 12-week treatment with CBT versus interactional group therapy in an outpatient setting. CBT included didactic presentations, modeling, role playing, and homework exercises. The primary outcome variables were urine drug screen results, scores on the Teen Addiction Severity Index,20 and self-reports of quantity and frequency of drug use. It was hypothesized that adolescents with disruptive disorders such as conduct disorder, oppositional-defiant disorder, or attention-deficit/hyperactivity disorder would fare better with CBT, whereas those with internalizing disorders such as depression or anxiety disorders would receive greater benefit from interactional therapy. Although there was no treatment-matching effect, adolescents in the CBT group showed significant reductions in severity of substance use with the Teen Addiction Severity Index. In contrast, treatment differences were not seen with urine drug screening.

Kaminer et al21 completed a larger, randomized, con-
controlled trial comparing CBT with psychoeducational therapy in treating adolescents with substance use disorders. Adolescents ($n = 88$) predominately had dual diagnoses and were randomly assigned to 8 weeks of either CBT or psychoeducational group therapy, for 75 to 90 minutes/week. The age of the subjects ranged from 13 to 18 years (mean: 15.4 ± 1.3 years). Urine drug toxicological results and the Teen Addiction Severity Index were used as substance use outcome measures. The authors hypothesized that both groups would experience improvement from pretreatment evaluations to 3- and 9-month follow-up evaluations but adolescents assigned to the CBT group would have better retention rates in treatment and at follow-up evaluations. Although the CBT group showed greater improvement at the 3-month follow-up evaluation, the relapse rates were similar at the 9-month follow-up evaluation, which was attributed to the increasing rate of relapse for the CBT group over time. Older adolescents and male subjects in the CBT group had significantly lower rates of positive urine drug screen results than did those in the psychoeducational therapy group at the 3-month follow-up evaluation. Overall, alcohol use decreased significantly from baseline to 3 months, favoring the psychoeducational therapy group, whereas the reduction in use of other substances favored CBT. Both conditions revealed improvements in self-reported substance use measures from baseline to 3- and 9-month follow-up periods.

PHARMACOTHERAPY
Pharmacological treatment of adolescent alcohol use disorders has lagged much farther behind than psychosocial treatments. Pharmacotherapy has been readily incorporated into the treatment of AOD use disorders in adults. The US Food and Drug Administration has approved medications, such as disulfiram, naltrexone, and acamprosate, for the treatment of alcohol dependence in adults.

Although clinicians are not reluctant to use pharmacotherapy to treat adolescents with psychiatric disorders, medications are rarely used to target alcohol use disorders directly. When medications are used in this population, they are often used to counteract adverse effects of alcohol withdrawal or to treat cooccurring psychiatric disorders. The extant literature reveals only 2 double-blind, placebo-controlled trials targeting adolescents with AOD use disorders.

Geller et al22 randomly assigned 25 adolescents with bipolar disorder and secondary substance use disorder to a 6-week trial of lithium versus placebo treatment. All subjects received weekly interpersonal therapy and, during the treatment period, subjects were seen twice weekly (once at a scheduled time and another time at random). The adolescents were 12 to 18 years of age, with an average age of 16.3 ± 1.2 years. Outcome variables were drug use measured with urine drug screens and clinical improvement measured with the Clinical Global Assessment Scale. There were significantly fewer positive drug screens in the lithium-treated group. The lithium-treated group had higher Clinical Global Assessment Scale scores, although mood outcomes did not differ between the groups.

Deas et al23 sought to evaluate the efficacy, safety, and tolerability of sertraline in treating adolescents with alcohol dependence with cooccurring depression. Ten outpatient treatment-seeking adolescents were randomly assigned to 12 weeks of either sertraline or placebo treatment. In addition, all subjects received 12 weeks of group CBT. Subjects were 16.8 ± 0.52 years of age. Outcome variables were quantity and frequency of alcohol use (drinks per drinking day and proportion of days drinking) and changes in depression scores measured with the Hamilton depression scale. Overall, there were significant reductions in depression scores and alcohol use, although there were no group differences. The lack of differences between the groups may be accounted for by the use of CBT, a treatment already proven to be effective for AOD dependence. Subjects were able to tolerate sertraline without significant adverse effects. A larger sample size might have reflected a separation between medication and therapy.

CONCLUSIONS
Much progress has been made in the development and implementation of treatments designed specifically for adolescents with AOD use disorders. The aforementioned comparative studies used assessment tools validated for use in adolescent populations. Most studies assessed and targeted multiple substances of abuse, which reflects the fact that adolescents tend to use multiple substances. Alcohol and marijuana are the most common substances of abuse among adolescents and frequently represent cooccurring substance use disorders. Few studies addressed development and how it might affect treatments or outcomes. As noted throughout the review, age was often referenced as a range and the ranges were broader in some studies than in others. When such broad age ranges are included in the studies, developmental issues are not easily addressed. References to ages in the studies presented in this article reflect the way ages were presented in the articles reviewed. MST and CBT studies considered cognitive development within the treatment context for individual clients. Unfortunately, conclusive statements regarding the impact of cognitive development could not be made, given the variance among clients. Substance use assessment methods and outcome measures also varied among the studies. Treatment modalities and durations of treatment were delineated explicitly, and the potential for replication seemed adequate in most cases. It is important to note that most studies compared 1 intervention with another and did not use a no-treatment condition. Although no-treatment conditions have been used in adult treatment-seeking populations, clinicians and researchers are overwhelmingly in agreement that it is unethical to expose an adolescent with a substance use disorder to a no-treatment condition. Future studies may be enhanced by the use of state-of-the-art assessment instruments designed specifically to assess AOD use in adolescents. In addition, integrating issues related
to the adolescent’s development and its overall impact may prove valuable.

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Evidence-Based Treatments for Alcohol Use Disorders in Adolescents

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