



Contemporary Drug Abuse Treatment

**A Review of
the Evidence Base**



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Introduction

The present review is a thematic summary of the research evidence base for the effectiveness and main influential factors of contemporary drug abuse treatment. The review is designed to be a companion resource to the section on effective treatment and rehabilitation services in the publication "Drug abuse treatment and rehabilitation: a practical planning and implementation guide" and to the document entitled "Investing in drug abuse treatment: a discussion paper for policy makers".

Most of the evidence for the impact of treatment comes from randomized controlled trials and uncontrolled observational evaluations of treatments and treatment systems. Both types of study assess the severity of problems for a sample of patients at intake to a treatment programme and then measure changes in those problems at one or more points during and after treatment. Experimental studies involve random assignment of groups of patients to specific interventions and comparison conditions. Where they are feasible, experimental designs offer the most convincing evidence on treatment efficacy. Observational evaluations are often large-scale activities that examine how effectively one or more types of treatment programme are delivered and how patients are assigned to them, but they include no manipulation of treatment conditions. Such studies are useful when there are general questions about the effectiveness of a treatment system; they can indicate if outcome expectations are achieved and how benefits of treatment vary across programmes and with the amount or type of treatment that patients receive.

A comprehensive survey of the relevant literature is beyond the remit of the present concise review and the cited studies are representative of a well-studied area or are notable for investigating a specific issue. The scope of the review is international. Most of the evidence for the effectiveness of treatment has been published by research groups working in the United States of America, in Europe and in several countries in the region of Asia and the Pacific, notably Australia. The summarized evidence

presented here reflects that geographical reality, but cannot be said to be a comprehensive summary of the evidence from across the globe. Moreover, the reader will need to judge the extent to which the summarized findings can be applied to his or her own specific culture and treatment service-delivery context. No attempt is made to contrast directly the results of studies conducted on specific treatment modalities across different nations. There are often substantial differences in the nature of patients treated and the structure and operation of the treatment systems that make such comparisons uninformative. It is, however, worth noting that the findings for the impact of the main forms of structured treatment are remarkably similar across national and cultural divides. The review has been limited to work published in peer-reviewed, scientific journals in English. All of the research cited has used methodologically sound observational, naturalistic or controlled, experimental designs. A literature search was performed using Embase, Pubmed, Medline, PsychInfo and Cochrane databases from 1980 to May 2002.

Structure of the review

The review consists of three sections. Parts 1 and 2 present research evidence for the effectiveness of the detoxification-stabilization phase and the rehabilitation-relapse prevention phase, respectively. Those phases contain treatments that have distinct goals, objectives and methods and are delivered in residential and community settings. Part 3 presents a discussion on a set of patient-related and treatment-related factors that are linked to treatment outcome. Patient-related factors include the severity of substance abuse, psychiatric symptoms, treatment readiness and motivation, employment and family and social support. Treatment-related factors include the setting of treatment, treatment completion and retention, pharmacotherapies, counselling, counsellor and therapist effects, participation in self-help groups and issues concerning matching patients to treatment.

1. The detoxification-stabilization phase of treatment

Patients and treatment methods

The detoxification and stabilization phase of treatment is designed for people who experience withdrawal symptoms following prolonged abuse of drugs. Detoxification may be defined as a process of medical care and pharmacotherapy that seeks to help the patient achieve abstinence and physiologically normal levels of functioning with the minimum of physical and emotional discomfort [1]. Pharmacotherapy involves the administration of a suitable agonist medication, in progressively diminishing amounts, to minimize withdrawal discomfort from opioid, barbiturate and benzodiazepine dependence, where a characteristic rebound physiological and emotional withdrawal syndrome is experienced usually around 8-12 hours following the last dose of the drug. Users of amphetamine and cocaine may also experience substantial emotional and physiological symptoms and will require a period of stabilizing treatment.

Indicators of effectiveness

The main goals of this phase include the safe management of medical complications, the attainment of abstinence and the motivation of a patient's cognitive and behavioural change strategies that are to be the focus of further rehabilitation efforts. On its own, detoxification is unlikely to be effective in helping patients achieve lasting recovery; this phase is better seen as a preparation for continued treatment aimed at maintaining abstinence and promoting rehabilitation [2, 3].

Pharmacotherapies

The evidence suggests that detoxification from illicit heroin and other opioids can be facilitated using dose-tapered opioid agonists (mainly methadone), the partial antagonist buprenorphine and two non-opioid drugs, clonidine and lofexidine (both α 2-adrenergic agonists).

However, evaluating the relative merits of those medications is hampered by differences in the operation of treatment programmes and various measurement issues to do with clinical assessments of withdrawal symptom severity. Allowing for this caveat, Gowing and colleagues conducted a Cochrane review of 218 international detoxification studies and calculated mean completion rates for inpatients and outpatients setting opioid detoxification of 75 per cent and 35 per cent, respectively, when using methadone and 72 per cent and 53 per cent, respectively, when using an α 2-adrenergic agonist [4]. Several randomized controlled trials have contrasted between buprenorphine and clonidine. Results suggest that buprenorphine is better at reducing the severity of withdrawal symptoms and leads to fewer adverse effects [5].

Procedures for accelerating the time required for opioid detoxification using opioid antagonists have been available for several decades [6]. The rapid opioid detoxification (RD) precipitates withdrawal with naloxone or naltrexone, while ultrarapid opioid detoxification (URD) administers naloxone or naltrexone under anaesthesia or deep sedation. Both techniques induce a severe but short withdrawal syndrome and have been developed and studied in several countries [7-10]. In a comprehensive review of 12 RD and 9 URD studies, O'Connor and Kosten note that substantial methodological variation hampers interpretation of the literature, which is also characterized by small sample sizes and generally short follow-up periods [11]. The general conclusion from these studies is that while URD has some medical risks, those techniques do not confer substantial advantage over existing detoxification methods, nor are they more successful in inducting and retaining abstinent patients in relapse prevention pharmacotherapy using naltrexone.

Length of stay

Stabilization of acute withdrawal problems is typically completed within 3-5 days, but this may need to be

extended for patients with conjoint medical or psychiatric problems or physiological dependence upon benzodiazepines and other sedatives [12, 13]. For methadone, the Gowing group's review suggests that, when detoxification extends for more than 21 days, the mean rate of treatment completion is 31 per cent. This compares with 58 per cent for treatment completed in 21 days or less. The authors note that this may reflect treatment-setting effects to some extent, as 89 per cent of the studies that have a longer duration of detoxification were conducted in a community setting.

Treatment setting

There has been much debate and study of the relative effectiveness of detoxification treatment in hospital inpatient or other residential settings or in outpatient or community-based settings [14, 15]. Residential settings are generally associated with better completion rates, but in most countries the prevailing practice is to stabilize all but the most severely affected patients in outpa-

tient settings. For example, for patients with cocaine dependence, the literature is replete with accounts of early dropouts during the first 14-21 days of outpatient treatment, with attrition rates ranging from 27 per cent to 47 per cent in the first few weeks of care [16-18]. Detoxification is generally viewed as particularly appropriate for patients who present with acute medical and psychiatric problems (in particular those with a history of seizure and depression) and also those who have concurrent acute alcohol dependence. Studies of shorter-term outpatient reduction programmes have generally reported poor outcomes with high patient dropout and few achieving abstinence [19]. However, those patients who have less acute problems and medical complications and have a stable, supportive home situation may well be able to complete detoxification in the community [20]. Few studies have examined the appropriate setting for the stabilization of physiological and psychiatric signs and symptoms associated with psychostimulant use; however, a residential medical setting is generally required if the patient has acute psychiatric symptoms and emotional distress.

2. The rehabilitation-relapse prevention phase of treatment

Patients and treatment methods

Rehabilitation is appropriate for patients who are no longer suffering from the acute physiological or emotional effects of recent substance abuse. Goals of this phase of treatment are to prevent a return to active substance abuse, to assist the patient in developing control over urges to abuse drugs and to assist the patient in regaining or attaining improved personal health and social functioning.

Treatment elements and methods

Professional opinions vary widely regarding the underlying reasons for the loss of control over alcohol and/or drug use typically seen in treated patients. A number of explanatory mechanisms have been suggested, including genetic predispositions, acquired metabolic abnormalities, learned, negative behavioural patterns, deeply ingrained feelings of low self-worth, self-medication of underlying psychiatric or physical medical problems and lack of family and community support for positive function. There is an equally wide range of treatment strategies and treatments that can be used to correct or ameliorate those underlying problems and to provide continuing support for the targeted patient changes. Strategies have included such diverse elements as medications for psychiatric disorders; medications to relieve drug craving; substitution pharmacotherapies to attract and rehabilitate patients; group and individual counselling and therapy sessions to provide insight, guidance and support for behavioural changes; and participation in peer help groups (e.g. Narcotics Anonymous) to provide continued support for abstinence.

Duration

Short-term residential rehabilitation programmes are typically delivered over 30-90 days; residential

therapeutic community programmes usually range from three months to one year; outpatient, abstinence-oriented counselling programmes range from 30 to 120 days; and methadone maintenance programmes can have an indefinite time period. Many of the more intensive forms of outpatient treatment (e.g. intensive outpatient and day hospital) begin with full- or half-day sessions five or more times per week for approximately one month. As the rehabilitation progresses, the intensity of the treatment is reduced to shorter sessions of one to two hours delivered twice a week and then tapering to once a week. The final stage of outpatient treatment is typically called “continuing care” or “aftercare”, with biweekly to monthly group support meetings (in association with parallel activities in self-help groups) continuing for as long as two years.

Defining outcome domains

The effectiveness of this phase of treatment can be judged against three outcome domains that are relevant both to the rehabilitative goals of the patient and to the public health and safety goals of society: (a) elimination or reduction of alcohol and drug use; (b) improved health and functioning; and (c) reduction in public health and public safety threats. The threats to public health and safety from substance abusing individuals come from behaviours that spread infectious diseases (including blood exchange arising from unprotected penetrative sex and sharing needles and other injection-related equipment) and engaging in crime to fund or sustain drug abuse. Regardless of the specific setting, modality, philosophy or methods of rehabilitation, all forms of rehabilitation-oriented treatment for addiction have the following four goals: (a) to maintain physiological and emotional improvements initiated during detoxification-stabilization; (b) to enhance and sustain reductions in alcohol and drug use (most rehabilitation programmes suggest a goal of complete abstinence); (c) to teach, model and support behaviours that lead to

improved personal health, improved social function and reduced threats to public health and public safety; and (d) to teach and motivate behavioural and lifestyle changes that are incompatible with substance abuse.

Main effects of residential treatment

There is a sizeable and long-standing body of international research evidence for the positive impact of residential programmes in the three outcome domains [21-24]. By way of a typical example, results from the largest major evaluation of residential rehabilitation programmes in the United States showed the

following reductions in the proportion of patients using illicit substances at least once a week during the year prior to admission and during the year following departure from treatment: the proportion of patients using cocaine decreased from 66 to 22 per cent; the proportion using cannabis, from 28 to 13 per cent; and the proportion using heroin, from 17 to 6 per cent [25]. Clients who complete treatment also achieve better employment and are substantially less likely to be involved in crime [26]. However, dropout from residential rehabilitation does seem to be a common problem, and studies typically report attrition levels of 25 per cent of patients within two weeks and 40 per cent by three months [27].

3. Effective components in the rehabilitation-relapse prevention phase of treatment

Patient-related factors

Severity of substance use

A variety of studies of treatments in different national contexts have shown that the chronicity and severity of patients' substance use patterns have been reliably associated with poorer retention in treatment and more rapid relapse to substance use following treatment [28-30].

Severity of psychiatric problems

International epidemiological population surveys and clinical studies have shown that people with substance abuse and dependence disorders are prone to have anxiety, affective and anti-social and other personality disorders [31-34]. Outcome studies of dependent opioid- and cocaine-abusing patients suggest that, for most patients, psychiatric symptoms improve early on in treatment and that, on average, there are sustained reductions in symptom levels over medium- and long-term follow-up [35]. However, a consistent finding across many studies and contexts is that severe psychiatric symptoms and disorders at intake to treatment are a reliable predictor of dropout and poorer follow-up outcomes [36-41].

Treatment readiness and motivation

Patients who report being ready and motivated to receive treatment tend to engage more successfully with the therapeutic programme and stay in treatment for longer periods of time [42]. Interestingly, patients who have been mandated to enter substance abuse treatment have shown outcomes that are quite similar to those who are self-referred and supposedly more "internally motivated" [43, 44].

Employment

Many people with drug abuse problems have enduring difficulties with obtaining and retaining paid employment. Unemployed patients are more likely to drop out of treatment prematurely and to relapse to substance abuse [45-47]. Although the ability of a treatment programme to secure a job for a client may be limited, community services will usually seek to help a client to improve employment opportunities and securing or maintaining a job is recognized as an important goal [48]. Employment has been found to predict retention in treatment and good outcome [49]. For example, in a sample of primarily employed, multiple substance abusers entering private inpatient or outpatient programmes, McLellan and colleagues showed that employment problems were one of the most significant predictors of post-treatment substance abuse and other aspects of poor health and social functioning [50].

Family and social supports

Social supports have been widely studied in the drug abuse and dependence field. Social support has been conceptualized variously as the availability of relationships that are not conflict-producing and supportive of abstinence; and the active participation in peer-supported treatments such as Narcotics Anonymous [51, 52]. Stressful life events (such as the loss of a job, bereavement or the ending of a personal relationship) may exert a more powerful effect in determining individual outcomes than treatment itself [53]. It follows that treatment goals may not be reached at all or may attenuate rapidly following treatment if the patient's environmental resources are limited. Effective treatments for substance abuse look beyond the programme to assist the patient in becoming included in society and improving family relationships and personal resources [54].

Treatment-related factors

Setting of treatment

Many studies have investigated differences in effectiveness between various forms of hospital inpatient and outpatient/day rehabilitation treatments. Much of the literature concerns alcohol dependence and has reported positive main effects for treatment and generally few interactions with setting [55]. Experimental studies of inpatient or outpatient treatment for cocaine dependence have resulted in the same conclusion [17, 41]. For example, Alterman and colleagues [41] compared the effectiveness of four weeks of intensive, highly structured day hospital treatment (27 hours weekly) with inpatient treatment (48 hours weekly) for cocaine dependence. The subjects were primarily inner city, male African Americans treated at a United States Veterans Administration Medical Center. The inpatient-treatment completion rate of 89 per cent was significantly higher than the day-hospital completion rate of 54 per cent. However, at seven months after treatment, self-reported outcomes indicated considerable improvements for both groups in drug and alcohol use, family/social, legal, employment and psychiatric problems. The comparability of the two treatment settings was also evident in 12-month outcomes [54]. The general conclusions from this work are that, for most treatment systems, it is likely that patients who have sufficient personal and social resources and who present with no serious medical complications should be assessed for outpatient/day treatment. Given the typically high demand for residential care, it seems logical to prioritize that setting for those with acute and chronic problems who have social stressors and/or environments that are likely to interfere with treatment engagement and recovery.

Treatment completion and retention

There is a substantial amount of literature to support the assumption that patients who complete treatment will have better outcomes than those who leave prematurely. Generally, longer stays in outpatient maintenance and residential rehabilitation programmes are related to better follow-up outcomes [46, 56]. Benefits increase with time in the programme and retention is a fairly reliable proxy measure of success for most types of treatment. Given that most people who are studied in drug abuse treatment programmes have chronic and diverse problems, it is to be expected that the longer they remain in treatment, the greater the likelihood that significant lifestyle improvements will be achieved and consolidated. A consistent finding from the

United States' national outcome studies is that patients who stay for at least three months in residential programmes have superior post-departure outcomes than patients with shorter stays [57]. In a landmark study, aggregate data from a sample of patients entering therapeutic community programmes showed that remaining in treatment for one year or more is significantly related to improvements at 12-month post-discharge follow-up [46]. This finding has been replicated in the United Kingdom of Great Britain and Northern Ireland, where the greatest levels of abstinence for opioid abuse at one-year follow-up were associated with 28 days of inpatient and shorter-stay residential participation (effectively a measure of programme completion) and 90 days in the longer-term residential programmes [58]. Also, patients who stay for at least one year in outpatient methadone treatment have substantially better outcomes than those who leave before that point [29, 42]. There is less clear-cut evidence for the retention and duration effects of community abstinence-oriented counselling services. To date, no link has been found between treatment duration and outcome for such services [42]. This may be due to diversity in organizational practices and patient differences.

The time spent in treatment does not directly mediate good outcome. Staying in treatment enables the patient to acquire new skills and to make progress in the programme. For example, Toumbourou and colleagues reported outcomes for a sample of Australian patients who had been treated in a therapeutic community [59]. The time spent in treatment was related positively to improved outcomes, but the extent or level of therapeutic progress attained emerged as a stronger predictor of outcome than simply the time spent in treatment. Overall, the issue of how long patients are able to spend in treatment is a key fiscal issue for most treatment systems. The implications of this work are that treatment service personnel and the wider care coordination infrastructure should ensure that patients are retained in treatment for at least the minimum threshold for success, and where possible, treatment duration should be determined by patient need. There are also important implications for targeting people who leave treatment at an earlier point, since those individuals are characterized by substantially poorer outcomes.

Pharmacotherapies

Several main forms of pharmacotherapy for opioid dependence have been developed and widely evaluated for their role in the rehabilitation-relapse prevention phase [60].

Agonist medications

Methadone

Originally developed in the mid-1960s in New York, daily dosing with methadone prevents withdrawal symptoms for approximately 24 hours. After initial trials, the treatment was extended to other localities across the United States and has been evaluated in considerable depth by American research groups in single- and multi-site evaluations across three decades and more recently by evaluators in many other countries. Those efforts have established a considerable international treatment base for oral methadone maintenance treatment and an impressive research evidence base for its effectiveness [56, 61]. For example, a recent national cohort study in the United Kingdom has reported sustained reductions in heroin abuse among patients who entered methadone maintenance treatment after six months and one- and two-year follow-ups [24, 38, 62]. A robust finding is that the dose of methadone has a positive linear relationship with retention in treatment and a negative linear relationship with heroin abuse. For example, Ling and his colleagues showed that 100 milligram (mg)/day was superior to 50 mg as indicated by staff ratings of global improvement and by a drug use improvement index based on urine testing [63]. In a study of moderate (40-50 mg) and high (80-100 mg) dose methadone, Strain and his colleagues found a significantly lower rate of opiate positive urine specimens among patients receiving the high dose of methadone (53 per cent versus 62 per cent) [64]. Several studies have shown that people on higher doses (around 50 mg/day and above) are more likely to be retained in treatment and less likely to continue to abuse heroin [56, 65]. For example, one study that assigned patients randomly to higher or lower dose methadone maintenance found that the proportion of toxicology tests that were positive for opioids was 45 per cent for the higher-dose group compared with 72 per cent for the lower-dose group [66]. In a similar study Strain's group found a high-dose regimen to be associated with significantly lower rates of opioid-positive urine samples, although there was no significant difference in rates of retention [67].

As an overall summary of the impact of methadone treatment, Marsch conducted a statistical meta-analysis of 11 studies that reported illicit opioid use, 8 studies that reported on human immunodeficiency virus (HIV) risk behaviours and 24 studies reporting on changes in criminal involvement [61]. Her review showed that there is a consistent statistically significant relationship between maintenance treatment and the reduction of illicit opioid use, HIV risk behaviours and drug and property crimes. Kreek has concluded that methadone maintenance with adequate doses of medication and access to counselling

and medical and psychiatric care leads to voluntary one-year retention of 60-80 per cent with reduction of daily illicit opioid use from 100 per cent on entry to treatment to less than 20 per cent within one year [68].

Levoalphacetylmethadol

Levoalphacetylmethadol (LAAM) is a longer acting form of methadone. Dosing in the range of 70-100 mg is capable of suppressing withdrawal symptoms for 48-72 hours and permits administration three times a week [69]. Rawson and his colleagues summarized findings from 27 trials of oral LAAM involving more than 4,000 patients and concluded that LAAM achieved comparable outcomes to methadone [70]. A meta-analysis of randomized controlled trials concluded that, while LAAM and methadone maintenance were of equivalent effectiveness in terms of capacity to reduce illicit drug use, there were small but statistically significant differences favouring methadone maintenance in treatment retention rates and rates of discontinuation of treatment because of side effects [71]. LAAM may, however, be permanently withdrawn in Europe following 10 cases of life-threatening cardiovascular complications. The United States authorities have examined the issue but have not taken the same action as the European authorities to date. Recently Clark and colleagues have reported the results of a Cochrane review of 15 randomized controlled trials and 3 controlled prospective studies to compare LAAM with methadone maintenance [72]. They concluded that LAAM appeared to be more effective at reducing heroin abuse than methadone. However, there are insufficient data in the published evidence to comment on uncommon adverse events.

Buprenorphine

Buprenorphine is a synthetic opioid partial agonist with mixed agonist and antagonist properties. It was originally recognized in the 1970s as a potentially useful treatment for opioid dependence [73]. Research has shown buprenorphine to be an effective maintenance agent and to have a better safety profile in overdose than methadone and other agonists [74-76]. Buprenorphine (Subutex®) has been used for many years in France [77] for maintenance treatment of dependent heroin users. There is now a growing number of patients treated with buprenorphine in several other European countries, including Austria [78], Switzerland [79] and the United Kingdom. There is also interest in this treatment agent in the region of Asia and the Pacific and an ongoing research and development programme in Australia [80].

The general view is that buprenorphine can be prescribed in higher doses in maintenance treatment with-

out undue sedation. Ling and his colleagues have reported results from a multi-centre, double-blind trial of treatment in 12 sites in the United States and Puerto Rico [81]. The team contrasted 1 mg/day and 8 mg/day and found that the higher-dosing group achieved significantly better retention and drug use outcomes. Buprenorphine is also effective for detoxification, producing less severe and protracted withdrawal symptoms than methadone [79, 82]. Another advantage of buprenorphine is that it has a longer half-life than methadone and is capable of less than daily dosing. The research evidence suggests that a doubled dose every two days or a tripled dose every three days are acceptable to patients and do not induce untoward agonist or withdrawal effects [83, 84].

Further research and development work is now required to assess the patient groups and delivery arrangements best suited to buprenorphine maintenance. At the time of writing, buprenorphine has not yet been approved for use in the United States.

Antagonist medications

Naltrexone

The opioid antagonist naltrexone may be used as part of relapse prevention programmes. A single maintenance dose of naltrexone binds to opioid receptor sites in the brain and blocks the effects of any opioids taken for the next 24 hours. It produces no euphoria, tolerance or dependence. Patients generally require 10 days of abstinence before induction onto naltrexone (but see the accelerated detoxification procedures above). The effectiveness of naltrexone treatment clearly hinges on a patient's compliance with treatment and the motivation to take their medication each day. In the largest multi-site study comparing naltrexone with placebo, compliance was found to be the main weakness of this treatment [85]. Patient attrition from the trial was substantial, with 543 of 735 people selected for inclusion failing to commence treatment; of the 192 who did begin treatment just 13 (7 of 60 in the naltrexone group and 6 of 64 in the placebo group) completed their scheduled nine-month programme. This has been a general problem with naltrexone outcome studies. In their review of 11 evaluations, Tucker and Ritter note that, in 4 studies, of those patients who were offered naltrexone, between 3 per cent and 49 per cent actually commenced treatment; in a further 5 studies, between 23 per cent and 58 per cent of participants left within the first week; and in another 4 studies between 39 per cent and 74 per cent of participants left treatment by the end of the second week [86]. These reviewers also identified nine studies that involved unselected participants (i.e. those not necessarily

demonstrating high motivation or with external reinforcers for abstinence). In these studies retention periods varied between 43 days and eight months. Several interesting outcome studies have compared naltrexone and methadone maintenance treatment. In one, 60 consecutive patient admissions were able to select which of the treatments they wished to enter [87]. The patients in the methadone group were retained in treatment significantly longer than those in the naltrexone group; 8 of 30 naltrexone patients compared with 26 of 30 methadone patients remained in treatment for the full 12 weeks of treatment. However, there were no differences in illicit heroin abuse during treatment or in the numbers attaining complete abstinence. Finally, a large cohort study in Italy reported one-year retention rates for 40 per cent of patients in methadone maintenance and 18 per cent for those in naltrexone treatment [88]. In contrast, for highly motivated or compliant patients, the effectiveness of naltrexone is generally good (at least for the duration of treatment). For example, Brahen and colleagues reported a retention rate of 75 per cent when naltrexone treatment was used as part of a prisoner work-release programme [89]. In another study 61 per cent of business executives and 74 per cent of physicians remained in naltrexone treatment for six months with good outcomes [90]. A Cochrane review of naltrexone concludes that the available trials do not permit a firm assessment of the worth of naltrexone maintenance, but the data do support this treatment approach for those who are highly motivated and when used in conjunction with various psychosocial therapies (see below) [91].

Cocaine antagonists, agonists and adjunctive pharmacotherapies

There have been many attempts to develop antagonists for the treatment of cocaine dependence; while the research is quite extensive, the results have been disappointing [92, 93]. At the time of writing, there is no convincing evidence that any of the various types of cocaine blocking agent are truly effective for even a significant minority of affected patients. Research continues in this important area and there have been indications of a potentially successful "vaccine" that may be able to immediately metabolize and inactivate active metabolites of cocaine [94]. This promising work is currently being tested in animal models, but there are no treatment relevant medications available for cocaine rehabilitation at the present time.

People who have acute cocaine dependence experience depletion in levels of the neurotransmitter dopamine. Dopamine agonists have been proposed as an effective treatment for managing cocaine withdrawal, craving and negative mood effects. Amantadine and bromocrip-

tine have been the most widely studied [95]. A Cochrane review by Soares and colleagues of 12 placebo-controlled studies has concluded that there is no significant effect of these medications [96]. Several types of (mainly tricyclic) anti-depressant have also been evaluated as pharmacotherapy for cocaine withdrawal symptoms and dysphoria. In two Cochrane reviews of 23 studies, Lima and colleagues concluded that the overall evidence was not favourable, principally because of high patient dropouts [97, 98].

Counselling

Access to regular substance abuse counselling can make an important contribution to the engagement and participation of the patient in a treatment programme and to its outcome [99, 100]. For example, in an important study, patients in methadone maintenance were randomly assigned to receive counselling or no counselling in addition to their methadone dose [101]. Results showed that 68 per cent of patients assigned to the no-counselling group failed to reduce drug abuse and that one third of those patients required at least one episode of emergency medical care. In contrast, 63 per cent of the patient group assigned to receive counselling showed sustained elimination of opiate use and 41 per cent showed sustained elimination of cocaine use over the six months of the trial. The positive impact of individual or group counselling and attendance at 12-step meetings has been observed in another study where greater frequency of attendance at counselling and self-help groups were associated with lower risk of relapse over the subsequent six months [102]. Several types of counselling and behavioural treatments have been studied, as described below.

General outpatient drug-free counselling

General outpatient drug-free counselling provision in the United States has been evaluated in a variety of studies and by national outcome investigations. Results suggest that abstinence-oriented counselling is associated with reductions in drug use and crime involvement together with improvements in health and well-being [103]. In one study, the proportion of patients using cocaine weekly or more frequently dropped from 41 to 18 per cent at one-year follow-up, while weekly or more frequent cannabis use was reduced from 25 to 9 per cent and heroin from 6 to 3 per cent [25]. In a study of counselling for cocaine dependence, Alterman's group contrasted a structured day programme delivering around 30 hours of counselling per week with an intensive four-week inpatient programme [41]. Substantial improve-

ments were seen for patients in both treatment settings at 7- and 12-month follow-up [54]. Another evaluation demonstrated that increased frequency of attendance in individual and group counselling in community counselling treatment was related to a lower risk of relapse over a six-month follow-up [102].

Specific cognitive psychotherapies

A group of studies has also examined the relative effectiveness of general counselling or specific forms of psychotherapy. In one study, patients were randomly assigned to receive standard non-specific counselling or counselling with the addition of either supportive-expressive psychotherapy or cognitive-behavioural psychotherapy over six months [104]. Results showed that patients receiving psychotherapy showed greater improvements in illicit drug use, health and crime involvement than those receiving standard counselling. In a contrasting study, Crits-Christoph and colleagues randomly assigned patients with cocaine dependence to six months of 12-step group counselling only or to one of three forms of supplementary individual counselling (12-step, cognitive psychotherapy or supportive expressive psychotherapy) [105]. Results showed that reductions in cocaine use were greater amongst those patients receiving both group and individual 12-step counselling. Patients receiving the supplementary cognitive psychotherapies were found to have equivalent outcomes to the patients receiving group counselling only.

William Miller and his colleagues have developed a style of brief therapeutic intervention known as "motivational interviewing" designed to facilitate a patient's internally motivated commitment to change [106]. This has been applied in the context of treating heroin users. In Australia, Saunders and colleagues reported the results of using a one-hour motivational session using a controlled trial design with patients receiving methadone maintenance [107]. At six-month follow-up, patients who received the motivational intervention reported less illicit drug use, remained in treatment longer and relapsed to heroin use less quickly as compared with controls. Brief motivational counselling techniques have also been adapted for the treatment of cannabis use disorders and positive results have been reported in two United States trials [108, 109] and also by a research team working in Australia [110, 111].

Cognitive-behavioural approaches

Of all the psychosocial counselling approaches, relapse-prevention-oriented cognitive-behavioural therapy has

received the most frequent evaluation. Considerable research efforts have gone into evaluating the effectiveness of cognitive-behavioural therapy with patients with alcohol dependence, focusing on social and communication skills training, stress and mood management and assertion training [112-115]. A smaller set of studies has addressed the impact of the treatment with other drug abusers, with favourable results [116, 117]. In the United States, several cognitive-behavioural therapy protocols, notably contingency reinforcement therapy, that incorporate behavioural elements have also produced encouraging results with abstinent cocaine users [118]. For example, in two studies involving 90 severely disadvantaged cocaine users (88 per cent of whom were using crack cocaine), Kirby and colleagues investigated the effect of adding voucher payments for cocaine-free urine screens to a comprehensive treatment package [119]. The treatment package was delivered over three months and comprised 26 sessions of cognitive-behavioural therapy and 10 one-hour sessions of interpersonal problem-solving. In the first study, voucher delivery was on a weekly basis with initial values low, increasing with production of consecutive negative results, and reset to zero on production of positive screens. In that study the use of vouchers was found to have no effect. The second study involved 23 subjects. Half the group received vouchers on a weekly basis, while the other half received vouchers immediately on producing the cocaine-free urine. There were significant improvements on measures of abstinence for immediate compared with weekly voucher delivery. About half the participants on immediate voucher delivery completed treatment and showed continuous abstinence at one month following treatment, whereas none of the participants on weekly voucher delivery achieved one month of continuous abstinence. Another study examined the effects of adding brief coping skills training or a control "attention placebo" condition to a comprehensive treatment package incorporating both 12-step and social learning principles [120]. Both approaches were administered on an individual basis in eight one-hour sessions with three to five sessions per week based on length of stay. One hundred and eight subjects from an original sample of 128 were considered to have received at least 50 per cent treatment exposure and 73 per cent of these were approached for follow-up. There were no differential effects of the two additional interventions in terms of total abstinence during the three-month follow-up period. However, there were significant reductions in days of use as well as length of bingeing for participants in the coping skills treatment group compared with those receiving a placebo. Overall, the authors concluded that the brief skills intervention led to shorter and less severe relapses.

Trial evaluations have also provided good evidence for the effectiveness of structured cognitive-behavioural therapy with cocaine users compared with no-treatment controls [121]. However, a more useful test of cognitive-behavioural therapy involves contrasts with existing treatments. Here the evidence is somewhat mixed. In one study, 42 dependent cocaine users were assigned at random to receive a 12-week programme of individual cognitive-behavioural therapy or interpersonal psychotherapy [18]. Results showed that the cognitive-behavioural therapy patients were more likely to complete treatment (67 per cent versus 38 per cent), achieve three or more continuous weeks of abstinence (57 per cent versus 33 per cent) and be continuously abstinent for four or more weeks after they left treatment (43 per cent versus 19 per cent). Treatment gains were most evident in a group of severe cocaine users, who were more likely to achieve abstinence if assigned to receive cognitive-behavioural therapy. Maude-Griffin and colleagues assigned crack cocaine smokers at random to either cognitive-behavioural therapy or 12-step counselling and Cocaine Anonymous participation [122]. Participants attended three group and one individual therapy session per week over 12 weeks. Attendance at treatment groups was low, with just 17 participants (13 per cent) attending at least 75 per cent of both group and individual sessions. Overall 44 per cent of the cognitive-behavioural group and 32 per cent of the 12-step facilitated group achieved four consecutive weeks of abstinence from cocaine. In another study, cocaine-dependent patients who continued to use cocaine during a four-week intensive outpatient treatment programme had much better cocaine use outcomes if they subsequently received aftercare that included a combination of group therapy and a structured relapse prevention protocol delivered through individual sessions rather than aftercare that consisted of group therapy alone [123].

Community reinforcement and contingency contracting

In the late 1970s Azrin and colleagues developed the community reinforcement approach as a treatment for alcohol dependence with favourable results [124]. Using that model, Higgins and colleagues examined multiple variations on the community reinforcement approach with cocaine-dependent patients [118, 125, 126]. In their studies cocaine-dependent patients seeking outpatient treatment were randomly assigned to receive either standard drug counselling and referral to Alcoholics Anonymous or a multi-component behavioural treatment integrating contingency-managed counselling, community-based incentives and family therapy comparable to the community reinforcement

approach model. The latter retained more patients in treatment, produced more abstinent patients and longer periods of abstinence and produced greater improvements in personal function than the standard counselling approach. Following the overall findings, this group of investigators systematically “disassembled” the community reinforcement approach model. They examined the individual “ingredients” of family therapy (incentives and contingency-based counselling) by comparing outcomes for groups who received comparable amounts of all components except the target ingredient [118, 125, 127]. In each case, their systematic and controlled examinations indicated that the targeted individual component made a significant contribution to the outcomes observed, thus proving their added value in the rehabilitation effort.

Counsellor and therapist effects

Several studies have looked at the acquisition and influence of positive therapeutic working relationships between the treatment therapist or counsellor and the patient [29, 128, 129]. Therapeutic involvement (measured by rapport between counsellor and patient and the patient's ratings of their commitment to treatment and its perceived effectiveness) together with counselling session attributes (the number of sessions attended and the number of health and other topics discussed) have a direct positive effect on retention [29]. These findings are supported by several other valuable studies that suggest that programme counsellors who possess strong interpersonal skills, are organized in their work, see their clients more frequently, refer clients to ancillary services as needed and generally establish a practical and “therapeutic alliance” with the patient achieve better outcomes [99, 130]. It is important to stress that not all counsellors are equally effective with their patients [131]. Differences in outcome are found between professional psychotherapists with doctoral-level training and among paraprofessional counsellors. For example, Luborsky and colleagues found outcome differences in a variety of areas among nine professional therapists providing ancillary psychotherapy to methadone maintenance patients [132]. McLellan and the same group found that assignment to one of five methadone maintenance counsellors resulted in significant differences in treatment progress over the following six months [133]. Specifically, patients transferred to one counsellor achieved significant reductions in illicit drug use, unemployment and arrests, while concurrently reducing their average methadone dose. In contrast, patients transferred to another counsellor showed increased unemployment and illicit drug abuse as well as needing higher doses of methadone.

Participation in self-help groups

Narcotics Anonymous (and Cocaine Anonymous) are peer-support networks of individuals who meet for the purpose of supporting each other's efforts to maintain sobriety and to lead productive, fulfilling lives. While there has always been consensual agreement that peer-support forms of treatment are valuable, evaluations of the impact of meeting attendance has not been widespread. McKay and colleagues found that participation in post-treatment self-help groups predicted better outcome among a group of cocaine- or alcohol-dependent veterans in a day hospital rehabilitation programme [123].

“Matching” patients and treatments

There have been a substantial number of research studies that have attempted to “match” particular “kinds” of patient with specific types, modalities or settings of treatment. The approach to patient-treatment “matching” that has received the greatest attention from substance abuse treatment researchers involves attempting to identify the characteristics of individual patients that predict the best response to different forms of addiction treatments, such as cognitive-behavioural therapy versus 12-step, or inpatient versus outpatient [115]. In general, the majority of these “patient-to-treatment” matching studies have not shown robust or generalizable findings [134]. Another approach to matching has been to assess the nature and severity of patients' problems at intake and then to “match” the specific and necessary services to the particular problems presented at the assessment. This has been called “problem-to-service” matching [135]. This approach may have more practical application as it is consonant with the “individually tailored treatment” philosophy that has been espoused by most practitioners. In this regard, McLellan and colleagues attempted to match problems to services in two inpatient and two outpatient private treatment programmes [135]. Patients in the study were assessed at intake and placed in a programme that was acceptable to both the referrer and the patient. At intake, patients were also assigned randomly to either the standard or “matched” services conditions. In the standard condition, the treatment programme received assessment information and personnel were instructed to treat the patient in the “standard manner, as though there were no evaluation study ongoing”. The programme staff was instructed not to withhold any services from patients in the standard condition. Patients who were randomly assigned to the matched services condition were also placed in one of the four treatment programmes and assessment information was forwarded to that programme. The programmes agreed to provide at least

three individual sessions in the areas of employment, family/social relations or psychiatric health delivered by a professionally trained staff person to improve functioning in those areas when a patient showed a significant degree of impairment in one or more of the areas at intake. In fact, matched patients received significantly more psychiatric and employment services than standard patients, but similar family/social services or alcohol and drug services. Matched patients were also more likely to complete treatment (93 per cent versus 81 per cent), and showed more improvement in the areas of employment and psychiatric functioning than the standard patients. Furthermore, they were also less likely to be retreated for substance abuse problems after discharge during the six-month follow-up. These findings suggest that matching treatment services to adjunctive problems can improve outcomes in key areas and may also be cost-effective as they reduce the need for subsequent treatment due to relapse.

Substance abusers with co-morbid psychiatric problems may be particularly good candidates for the “problem-to-service” matching approach, especially the addition of specialized psychiatric services for those most severely affected by psychiatric problems. As compared with less

structured interventions, highly structured relapse revention interventions may also be more effective in decreasing cocaine use in cocaine abusers with co-morbid depression [136]. Woody and colleagues evaluated the value of individual psychotherapy when added to paraprofessional counselling services in the course of methadone maintenance treatment [104]. Patients were randomly assigned to receive standard drug counselling alone or drug counselling plus one of two forms of professional therapy (supportive-expressive psychotherapy and cognitive-behavioural therapy) over a six-month period. Results showed that patients receiving psychotherapy showed greater reductions in drug use, more improvements in health and personal function and greater reductions in crime than those receiving counselling alone. Stratification of patients according to their levels of psychiatric symptoms at intake showed that the main psychotherapy effect was seen in those with greater than average levels of psychiatric symptoms. Specifically, patients with low symptom levels made considerable gains with counselling alone and there were no differences between types of treatment. However, patients with more severe psychiatric problems showed few gains with counselling alone but substantial improvements with the addition of the professional psychotherapy.

4. Conclusion

In this review, we have briefly discussed the substance abuse treatment research literature and identified patient and treatment-related variables associated with outcome. There is an established evidence base for the effectiveness of both the detoxification-stabilization phase and rehabilitation-relapse prevention phase. There is no simplistic summary that can be given for

this body of work. However, there is strong evidence to show that treatment programmes are able to meet their goals and objectives and confer important benefits on patients, their families and the wider community and society. There are differences in outcome associated with different types of treatment approach, setting, medication and patient group.

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