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Treatment outcomes: what we know and what we need to know

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In brief

Background and aims

This paper reviews what we have learned from the following four major national drug treatment outcome studies:

UK

- NTORS (National Treatment Outcome Research Study).

US

- DARP (the Drug Abuse Reporting Programme)
- TOPS (Treatment Outcome Prospective Study)
- DATOS (Drug Abuse Treatment Outcome Study).

Findings and main implications

Substantial reductions in illegal drug misuse and other outcomes were found after treatment.

Improved outcomes were also found for injecting risk behaviours.

Most drug dependent clients were multiple substance misusers and often had multiple dependencies. To focus on single substance disorders is outdated and misleading.

Overdose remained a serious problem among drug misusers with a greatly increased risk of mortality.

Time in treatment and treatment completion were found to be associated with better treatment outcomes. Treatment effectiveness may be increased through improved rates of patient retention.

The reductions in crime levels provide substantial and immediate cost savings for society.

Methadone programmes achieved a range of improved client outcomes.

Case-mix differences were found, with more severely problematic drug misusers receiving treatment in residential programmes.

Most drug dependent clients received more than one episode of treatment. Little is known about possible cumulative effects of multiple treatments, or how separate and/or different treatment episodes interact or interfere with each other.

Drinking outcomes were often poor with many clients continuing to drink heavily.

Treatment of drinking problems among drug misusers should be strengthened.

Aims of the paper

This paper reviews what we have learned from the major national treatment outcome studies.

Prospective treatment outcome studies have played an important role in improving our understanding of treatment effectiveness. They provide information about drug misusers and their problems as well as the nature of their involvement with treatment services. They also help us to understand the changes that occur in drug misuse and other problem behaviours after treatment.

Studies examined

The following major studies were considered:

DARP (Drug Abuse Reporting Programme[1])

Commencing in 1968, DARP investigated four treatment types:

- methadone maintenance
- therapeutic communities
- outpatient drug-free services
- outpatient detoxification.

Data were collected from treatment entry until treatment termination on an initial sample of 44,000 clients at 52 treatment agencies. Follow-up data were available at one, two, and three years after treatment. Follow-up interviews were conducted after treatment with over 6,000 patients in the first wave of post-treatment follow-up interviews (on average, after six years). In 1982, a second wave of follow-ups was conducted with a sample of about 700 people approximately 12 years after admission to treatment. The programme also looked at a comparison group which enrolled for, but never started, treatment.

TOPS (Treatment Outcome Prospective Study[2])

This study was modelled closely on DARP and also provided data on clients entering US drug treatment programmes. Setting out to assess short and long term treatment outcomes, the first intake of data was collected in 1979. In this case, the four treatment modalities investigated were:

- methadone maintenance
- detoxification
- residential
- outpatient drug-free programmes.

TOPS involved almost 12,000 clients entering treatment in 41 addiction treatment programmes across ten US cities. The sample was recruited in three waves in 1979, 1980 and 1981. Interviews were conducted at the point of admission to treatment as well as during treatment. Over 4,000 patients were selected for post-treatment interviews, with samples followed up at three months, one year, two years, and three to five years after treatment.

DATOS (Drug Abuse Treatment Outcome Study[3])

Initiated in 1989 as a continuation of NIDA's (National Institute on Drug Abuse) long-term investment in national treatment outcome studies, DATOS investigated the links between patient outcome, treatment process and programme structure. Looking at clients who entered treatment between 1991 and 1993, intake data were collected on over 10,000 clients from 99 treatment programmes in 11 US cities - both during treatment and 12 months after treatment.

The four types of treatment programmes investigated were:

- methadone maintenance
- short-term residential (hospital inpatient and chemical dependency)
- long-term residential (therapeutic community)
- outpatient drug-free treatment.

NTORS (National Treatment Outcome Research Study[4])

Commissioned by a Department of Health Task Force in 1994, this study recruited 1,075 clients from 54 treatment programmes during 1995. Forming the largest prospective longitudinal cohort study of treatment outcome for drug misusers to be conducted in the UK, it investigated problem drug misusers in the following four treatment modalities throughout England:

- specialist inpatient treatment (residential)
- rehabilitation programmes (residential)
- methadone maintenance (as a community-based treatment)
- methadone reduction (as a community-based treatment).

An important feature of the studies that form the foundation of this paper is that they investigated treatment outcomes in existing services under day-to-day clinical circumstances. Such studies are rare – not only because of the high financial costs involved, but also because of the degree of effort and organisation required to implement, coordinate and sustain data collection systems over a number of years.

Findings

Outcome measures

The main outcome measures across the treatment outcome studies are:

- substance misuse behaviour (including substance type, frequency and quantity of use)
- health (psychological and physical health problems)
- social functioning (employment, accommodation and crime)
- harm (injecting and sharing injecting equipment).

These measures are similar to those in commonly used assessment instruments, such as:

- ASI (Addiction Severity Index) which assesses problem severity for drug and alcohol misuse, medical, legal, employment, family/social and psychiatric problems
- OTI (Opiate Treatment Index) which contains measures of drug misuse, HIV risk-taking behaviour, social functioning, criminality, health status and psychological adjustment.

The selection of outcome measure(s) may lead to different findings and have different implications. The definition of relevant and priority outcomes may also be made in different ways by individual clients, clinicians, treatment purchasers, public health agencies and researchers.

Client outcomes

Client outcomes can be extremely variable. Some individuals who become drug-free following treatment stay that way, while some relapse. Others achieve varying degrees of improvement regarding reduced frequency or quantity of use, or reductions in drug-related problems. Many fluctuate between improvement and deterioration in terms of drug use, alcohol use, crime, social functioning, and mental and physical health problems – but the trend is generally positive.

Because drug addiction is associated with a wide range of other problems, it is easy to construct a lengthy list of potential targets for treatment and evaluation.

Drug misuse outcomes

The most stringent criterion for treatment outcome is abstinence, and this was an explicit treatment goal of the residential treatment programmes. Almost half (49 per cent) of the residential patients were abstinent from heroin after five years, and the percentage of residential clients who were abstinent from all six illicit target drugs increased from one per cent at intake, to 38 per cent after five years. This is an encouraging finding considering that it is such a strict outcome criterion and that it applies to such a severely problematic group of drug misusers.

NTORS showed substantial reductions in a range of drug misuse behaviours, including misuse of heroin and non-prescribed methadone and benzodiazepines. For example, frequency of heroin use after one year was reduced to about half of the intake levels – and remained at this lower level throughout the follow-up period. Instances of injecting and sharing injecting equipment were also reduced over time.

Categories of drug misuse

Categorising drug misusers according to a single drug type does not reflect contemporary patterns of drug use and abuse. The most frequently reported drug problem among NTORS clients was heroin dependence, but the majority of clients were multiple drug misusers.

Terms implying single substance misuse - such as 'heroin addict' or 'cocaine user' - can be misleading. It is probably not adequate to classify drug takers according to a primary or 'main' drug of preference, with other types of drugs being seen as 'secondary'.

Patterns in drug misuse

Since the 1960s, heroin has consistently been the most frequently reported 'main' problem drug among drug misusers in treatment in the UK. However, heroin use almost never occurs in isolation. Cocaine, amphetamines and benzodiazepines are also widely used by drug misusers seeking treatment for heroin dependence. Almost two thirds of the NTORS sample were using three or more substances before admission to treatment, and more than a third was using stimulants on a frequent basis[5]. The most commonly used stimulant among drug misusers seeking treatment for heroin dependence was crack cocaine.

Crack misuse

Abstinence from crack increased, and there were reductions in the frequency of crack misuse between intake and one year. However, these improvements appeared to diminish over time. At the five year follow-up, the overall rates for crack use and the frequency of use had returned to approximately the same levels as at intake.

This apparently poor outcome for crack cocaine misuse requires careful interpretation. While results appear to show no change in rates of use at five years, the overall figures disguise different patterns of crack misuse among those who were using it, and those who were not, during the period prior to intake. Levels among those misusing crack at intake dropped by more than half at all follow-up points. In contrast, there was a gradual increase in the use of this drug among those who were not misusing crack at intake.

The results regarding the misuse of crack cocaine should therefore be put down to the initiation of crack misuse among those who were not using this drug at intake[6] – and not a tendency to relapse to pre-admission patterns among those already using this drug at intake.

Injecting risk behaviours

Most drug treatment services provide interventions targeted at injecting risk behaviours. NTORS showed significant reductions in injecting and the sharing of injecting equipment among both the residential and the methadone clients. The overall rate of sharing of injecting equipment fell to less than five per cent - approximately a quarter of intake levels.

Alcohol misuse problems

Heavy drinking – especially alcohol dependence – is an important and often under-rated problem in drug misuse treatment. It may aggravate other drug-related and health problems, and also adversely affect treatment outcomes.

There is wide variation in drinking patterns among drug misusers. Of the NTORS sample, about a third had abstained from alcohol throughout the three month period prior to treatment. This abstinence rate is much higher than for age-matched samples from the non drug misusing population. However, many of those who were drinkers reported problematic patterns of drinking. Nearly a fifth was co-dependent on alcohol and regularly drinking excessively (that is, on average, the equivalent of a bottle of spirits per day).

NTORS clients who were severely co-dependent on alcohol were found to be more likely to have had drug-related problems such as abscesses, vein scarring, and overdoses.

Drinking outcomes

Drinking outcomes after drug misuse treatment were often poor, with many drinkers making little or no change in their pre-treatment drinking[7]. With the exception of a fluctuation in frequency of drinking (in the form of a reduction at one year followed by an increase at two year follow-up), there was no reduction in drinking among clients on residential treatment programmes. Among the methadone clients, no change was found at any point during the follow-up period. With clients from both settings, alcohol consumption was no different from intake levels.

Even where there were reductions in alcohol misuse, these were often unsatisfactory in that they consisted of reductions from very heavy to heavy – as opposed to moderate – levels of drinking. Heavy drinking represents a serious threat to the health of this group, especially as so many have liver disease and impaired liver function, often as a result of hepatitis C infection.

Drinking problems often receive insufficient attention in the treatment of illicit drug misusers. Drug misusers and clinical staff may either deliberately or unintentionally focus upon what is perceived to be the 'main' illicit problem drug – typically, heroin or cocaine. By doing so they may neglect or minimise the misuse of other substances.

The continued heavy drinking of so many clients after treatment contrasts with the widespread changes and substantial improvements found within the same group in terms of reduced use of most illicit drugs. Furthermore, the extent and severity of their heavy drinking, both before and after treatment, points to the need to develop programmes and interventions which are specifically designed to tackle alcohol-related problems in this patient group.

Poor drinking outcomes represent an area of weakness requiring urgent attention by drug misuse treatment services, especially by methadone treatment services. Treating drug and alcohol dependent clients in separate treatment services can be problematic for clients who are dually dependent upon both drugs and alcohol. Separate treatment systems can lead to a lack of liaison between drug and alcohol dependence services and placing the burden of accessing the different services upon the clients, who are often poorly equipped for this task.

Psychological health

Improvement in psychological health and functioning is an important treatment goal for drug misusers. At intake to treatment, NTORS clients reported many symptoms, with about one in five having previously received treatment for a psychiatric health problem other than substance misuse. Anxiety and depression were common. Rates of depression and suicide were particularly high among women drug misusers.

Reductions in psychological symptoms were found after one year among both residential and methadone clients. Among residential clients, there was a further drop in symptom levels after the one year follow-up. These were lower than intake levels at the final five year follow-up.

These overall improvements suggest that gains in mental health are achieved after treatment in existing services. At the same time, the severity of psychiatric disorder has been found to be related to poorer treatment outcomes. The high prevalence of psychiatric symptoms among drug misusers seeking treatment indicates the importance of conducting as thorough a psychiatric assessment as the context of routine clinical practice allows.

Overdose and mortality

Drug overdose is one of the most frequent causes of death among drug misusers. The annual mortality rate of the NTORS sample was 1.2 per cent. This is about six times higher than for a general, age-matched population.

Heroin is frequently implicated in fatal overdoses as a result of respiratory depression. However, overdoses commonly attributed to the use of opiates are seldom due to the use of opiates alone. In the majority of cases, more than one drug was detected. Indeed, a single substance was found at postmortem in only about one in five of the cases. In more than half of the overdose deaths, three or more different drugs were detected. The most common drug combinations associated with death involved opiates and alcohol, opiates and benzodiazepines, or a mixture of all three of these drugs[8].

In addition to overdoses and deaths resulting from blood borne diseases, the risk of death is also affected by environmental factors. Ten per cent of the NTORS clients were homeless or not in stable accommodation at intake. Results showed that homelessness also increased the risk of mortality, emphasising the need to obtain adequate accommodation for drug misusers.

Crime

The reductions in crime are among the more striking findings from NTORS. The NTORS sample reported committing a very large number of acquisitive crimes during the 90 day period prior to treatment intake. The most common type of offence, both in terms of total number of crimes and in terms of percentages of clients committing that offence, was shoplifting. After treatment, there were substantial reductions both in the numbers of crimes committed and in the percentage of clients engaged in acquisitive crime. At one year, acquisitive crimes were reduced to one third of intake levels, and involvement in crime was reduced to about half of intake levels[9].

These reductions in crime were maintained through to the five year follow-up. Reductions were found both for acquisitive crimes and for drug selling crimes. Overall, both types of crime were reduced to about a quarter of the levels at intake. Criminality on the scale reported at intake represents a formidable social and economic problem. These results point to the role that treatment interventions can play in helping to tackle crime among drug misusers. The reductions in crime provide substantial and immediate benefits to society through the reduced economic costs of crime, and they provide equally important, if less tangible, benefits through the reduced levels of distress caused to victims.

The impact of different modalities

NTORS found generally good responses to treatment in both residential and community settings across the four treatment modalities. Those in the residential modalities reported more serious problems at intake than the clients in the two community treatments. Residential rehabilitation clients presented with the longest heroin careers, and were more likely to be polydrug users. They were also more likely to be dually dependent upon alcohol and drugs, and to have shared injecting equipment. Additionally they were more likely to have been involved in crime, and had been arrested more times than other clients. However, little is known about how most effectively to allocate individual clients to one or other treatment setting.

Treatment in a residential setting provides the potential for an intensive and comprehensive treatment programme. It can provide a place of safety, and psychological and social respite for clients by removing them from their drug taking environments, and by supporting drug-free functioning. It may also be useful for clients who do not respond to less intense interventions. With this in mind, it seems appropriate that the more severely problematic drug misusers receive treatment in the more intensive programmes.

Hospital settings permit a high level of medical supervision and safety for clients needing intensive psychiatric care. This makes it appropriate for the treatment of clients with complex dual diagnosis disorders.

One of the most conspicuous differences between treatment in an inpatient or an outpatient setting is cost. However, discussion of treatment costs are misleading if not informed by, and adjusted for, evidence of effectiveness. This is especially important where there are marked differences in patient characteristics and problems in different settings, or where different treatments lead to different outcomes.

Changes in behaviour after treatment have often been attributed in a non-specific manner to therapeutic and cognitive processes which may have occurred during and after treatment. For some time there has been broad agreement that we need to identify those treatment factors and treatment processes which affect outcomes.

Among the treatment process concepts which have been identified as of potential importance are ‘treatment dose’, ‘therapeutic relationship’ and ‘treatment engagement’. If treatment is to produce improved outcomes, clients should stay for long enough to be exposed to, and to participate in, treatment of sufficient quality and intensity to bring about change.

Time in treatment

Better treatment outcomes were found to be associated with time in treatment and whether treatment is completed. In NTORS, this treatment duration effect was found both for treatments in residential settings and for methadone maintenance. It is thought that achieving higher client retention rates is a significant factor in increasing the effectiveness of treatment services.

In several instances, the planned duration of some inpatient programmes was shorter than minimum thresholds identified as associated with improved outcomes[10]. In some cases the programme duration was less than 28 days. It is a matter for concern that this falls below the minimum duration suggested by this analysis – and may be too brief to provide improved outcomes. Unfortunately, both in the UK and other countries, many decisions about treatment duration appear to be driven by financial pressures rather than by evidence about treatment effectiveness. The US studies reviewed for the purposes of this paper indicated that the two elements under the most threat were programme duration and provision of residential treatment.

Methadone maintenance treatment (MMT) and methadone reduction treatment (MRT)

Clients receiving both MMT and MRT showed improvements in a range of problem behaviours after treatment. However, more detailed analyses identified problems regarding MRT, particularly treatment integrity (i.e. was treatment delivered as intended). If you include all those for whom treatment was planned, the majority of MMT clients were found to receive maintenance, whereas only about one third of MRT clients actually received methadone reduction as planned. Instead, they received a form of methadone maintenance (stable doses over a prolonged period). Where it was intended for clients to receive MRT, the treatment was frequently not delivered in this form[11].

Where MRT was delivered as intended, it was associated with poor outcomes. Methadone dose is an important treatment factor – and in MMT higher doses were associated with better outcomes than lower doses. MRT clients were more likely than MMT clients to receive low doses both at the beginning and during the course of treatment. Eighty per cent of those allocated to MRT were prescribed a starting dose of 60mg or less, and 15 per cent received a starting dose of less than 30mg.

MMT clients were more likely to remain in treatment at all follow-up points. To some extent, this is to be expected since, some MRT clients may have completed their treatment programmes. However, this was not reflected in any improved outcomes among this client sample. Nor is it consistent with the finding that many intended MRT programmes were extended over timescales well beyond what might be regarded as reasonable. This is borne out by the fact that some 50 per cent of the MRT clients were still in their index treatment after one year, and almost a third were still in treatment after two years.

NTORS raised other doubts about the effectiveness of MRT. For clients who received MMT, improved outcomes were associated with higher methadone doses and retention in treatment. For the clients who received MRT, the only treatment factor which was found to be (negatively) associated with outcome was the percentage of reducing doses which was linked to more frequent heroin use at two year follow-up. A high percentage of reducing doses is indicative of a more rapid reduction schedule. The more rapidly methadone was reduced, the worse the heroin misuse outcomes.

More severely dependent clients achieved better heroin use outcomes when they received MMT rather than MRT. When allocating clients to either MMT or MRT, NTORS recommended that more severely opiate dependent clients should be offered MMT as the preferred outpatient treatment.

The bigger picture

Interventions taking place during treatment are just part of a much wider range of factors that can influence outcome. In many cases, treatment may be neither the most important nor the most powerful influence upon outcome. Environmental supports and stresses can influence outcomes. Peer and family relationships, unemployment and living arrangements can all have an important effect. The gains produced by an effective treatment programme can be undermined or neutralised by adverse social and environmental factors. Nonetheless, treatment interventions can seek to develop and strengthen coping responses that increase the probability of improved treatment outcomes and this can be further supported by aftercare services[12].

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