

Review Article

Attention Problems and Cognitive-Behavioural Therapy for Methamphetamine Users: Implications for Treatment

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Abstract

Methamphetamine is a highly addictive psychostimulant drug with dramatic effects on attention. Impaired attention is a serious health concern among regular methamphetamine users especially when they are referred to cognitive-behavioural therapy. This review summarizes evidence that problems in different aspects of attention can significantly persist into abstinence and recovery. Continued problems in sustained attention, selective attention, focused attention, divided attention and alternating attention could result in treatment failure and returning to regular methamphetamine use. Impaired attention could prevent the effectiveness of cognitive-behavioural therapy which is the most common method to treat regular methamphetamine use. The continuity of attention problems especially in cognitive-behavioural therapy should be considered as a potential target for treatment. Rehabilitating attention including using environmental modification and support, attention process training, self-management strategies, orienting procedures, and psychosocial support may contribute to treating attention problems among regular methamphetamine users in cognitive-behavioural therapy. This issue may also increase treatment adherence and outcomes. No single technique of rehabilitation is universally accepted for treating attention problems in regular methamphetamine users but long-term attention rehabilitation is required in cognitive-behavioural therapy. Applying attention rehabilitation techniques could be associated with improved functioning in attention on a day-to-day basis as well as engagement of regular methamphetamine patients in cognitive-behavioural therapy. Attention rehabilitation techniques should be used as adjunct treatment services during implementing cognitive-behavioural therapy for regular methamphetamine users. Nonetheless, further studies on the effectiveness of the available attention rehabilitation techniques for regular methamphetamine users are still suggested.

INTRODUCTION**Methamphetamine**

Methamphetamine is an addictive psychostimulant drug. Methamphetamine-associated problems constitute a critical public health concern in the world [1]. Methamphetamine is a synthetic derivative of amphetamine, but due to the addition of a methyl group in its chemical structure, it has relatively high lipid solubility, allowing more rapid transport of the drug across the blood-brain barrier [2]. The side effects of methamphetamine use

are related to the dose and duration of methamphetamine use [3].

ATTENTION PROBLEMS IN REGULAR METHAMPHETAMINE USERS

Short-term methamphetamine use could increase attention for a short period of time. However, a number of studies have shown serious attention problems among regular methamphetamine users [4,2] which could persist for many years into abstinence and recovery. Attention is primarily a cognitive process that allows

an individual to filter in or filter out environmental events [5]. Attention has some subcategories including sustained attention, selective attention, focused attention, divided attention and alternating attention. Selective attention is a cognitive function that facilitates the processing of relevant stimuli and inhibits less relevant stimuli. Selective attention increases the likelihood that most appropriate stimuli will control behavior [6-8].

Sustained attention refers to the ability to maintain a consistent behavioral response during continuous and repetitive activity. Selective attention refers to the ability to maintain a behavioural or cognitive set in the face of distracting or competing stimuli. Focused attention refers to the ability to respond discretely to specific stimuli. Divided attention involves the ability to respond simultaneously to multiple tasks and demands. Alternating attention refers to the capacity for mental flexibility that allows individuals to shift their focus of attention and move between tasks having different cognitive requirements, thus controlling which information will be selectively processed [9].

Many regular methamphetamine users find it difficult to continue performing tasks, even when no distraction exists. For a number of them, poor attention leads to fatigue. They realize that they make errors or have difficulty with a task that requires attention [9].

In addition, persistent attention problems negatively impact the communication skills and vocational opportunities of the newly recovered methamphetamine addicts. Smart and colleagues (1969) reported that regular methamphetamine users were the most likely of substance users to have an increased accident rate over the driving population [10].

PROLONGED ATTENTION PROBLEMS DURING ABSTINENCE

Using psychostimulant drugs, such as methamphetamine could result in significant problems in attention [11] which persists into abstinence [12]. Efforts to prevent methamphetamine use in abstinence could increase attention problems, hence intensifying methamphetamine users' urge to relapse. This issue may contribute to methamphetamine users' preoccupation with methamphetamine use and their lack of confidence in their ability to manage daily routine and achieving treatment success. The early stage of abstinence from regular methamphetamine use is an important period, because it is the time during which methamphetamine users experience deprivation from methamphetamine use [13]. This issue can lead to craving and problems in sustaining attention. In addition, the first weeks of abstinence from methamphetamine use is an important period for establishing engagement in treatment, and thus achieving positive treatment outcomes [13]. Nordahl and colleagues (2005) reported recovery with prolonged abstinence from methamphetamine use and this was positively correlated with duration of methamphetamine abstinence [14]. However, after two months of abstinence, methamphetamine-dependent patients were found to demonstrate serious problems in attention [15].

COGNITIVE-BEHAVIOURAL THERAPY

Several studies have shown that some cognitive problems

correlate with clinical or treatment outcomes [16]. However, Gardini and colleagues (2009) showed that treatment could contribute to decreases in attention problems [17]. This issue also plays a significant role in enhancing treatment efficacy and positive treatment outcomes among regular methamphetamine users [18].

Psychosocial and behavioural approaches currently constitute the primary treatments for regular methamphetamine users [19]. There are no readily available substitution therapies for regular methamphetamine use. As a result, cognitive-behavioural therapy is considered the most approved method to address regular methamphetamine use. In general, Marlatt and Gordon (1985) introduced the concept of using cognitive-behavioural strategies in treating substance use disorders [20]. Cognitive-behavioural therapy includes a range of interventions such as cognitive restructuring and motivational interviewing which may be supplemented by strategies such as support groups [21, 22]. Cognitive-behavioural therapy modifies the client's thinking, expectancies and behaviours and increases skills in coping with various stresses and barriers.

Brief interventions consisting of motivational interviewing and cognitive-behavioural therapy have been shown to increase the likelihood of abstinence from amphetamine use [23]. In addition, the Matrix Model, a manualised 16-week outpatient treatment approach for treating regular methamphetamine use, combines techniques and materials from the cognitive behavioural therapy to include accurate information on the effects of stimulants, family education, twelve-step program, and positive reinforcement for behaviour change and treatment compliance [24]. In general, the treatment response of regular methamphetamine users to cognitive behavioural therapy has been positive [24]. Recent reviews of controlled trials of psychosocial interventions have concluded that motivational interviewing and cognitive-behavioural therapy are primarily effective in treating regular amphetamine users [25, 26].

REHABILITATION OF ATTENTION PROBLEMS IN COGNITIVE-BEHAVIOURAL THERAPY

Cognitive-behavioural therapy cannot be successful if patients show a considerable number of attention problems. The cognitive problems decrease users' cognitive sharpness [27] which in turn, reduces their ability to remain in treatment and this issue could predict later dropout. Attention problems especially during treatment could contribute to craving or relapse if they have not been treated, but study on effective rehabilitation for attention problem is scarce. Partial recovery of cognitive function following both short (i.e., two weeks) [28] and long (i.e., more than six months) [29] periods of abstinence can occur. Rehabilitating attention in cognitive-behavioural therapy can be followed by pharmacological interventions. For example, Ritalin can be prescribed for those methamphetamine patients who suffer from adult ADHD because Ritalin enhances focus and attention especially in activities such as driving [30].

Successful cognitive-behavioural therapy should be associated with reductions in problematic attention problems among regular methamphetamine users. In general, five approaches to address difficulties in attention have been

proposed [8] which could be used for rehabilitating attention problems among regular methamphetamine users in cognitive-behavioural therapy. These approaches are as follows:

Environmental modifications and supports

Environmental modifications and support include reducing distraction and increasing organization. The outcome of this approach includes improving content for cognitive processing. Establishing environmental supports requires planning and monitoring. Careful assessment of the context, having a plan for measuring success or lack of success, ensuring the patient and others involved in the modification, and allowing them to get familiar with using the supports are important for the effectiveness of this intervention [31,32].

Attention process training

Attention process training includes providing opportunities for stimulating a particular aspect of attention. Reducing cognitive exercises and generalization training are the components of attention process training. Treatment involves having clients engage in a series of repetitive drills or exercises that are designed to provide opportunities for practicing tasks with greater attentional demands. Studies show that repeated activation and stimulation of attentional systems increase changes in cognitive capacity [33,7]. There are some attention training packages available for use. One example is the Attention Process Training program (APT) [7, 34]. APT is widely used to rehabilitate attention problems in people with brain injury but it may be used for rehabilitating attention problems in regular methamphetamine users in cognitive-behavioural therapy.

Self-management strategies

Self-management strategies could be used in conjunction with attention process training for regular methamphetamine users in cognitive-behavioural therapy. Self-management strategies include reducing, orienting, pacing, and key ideas. They involve self-instructional routines that help a client focus attention on a task. The outcome of this approach includes increased sense of self-control, and personal empowerment to focus on different attention-related works [35].

Orienting procedures

Orienting procedures could be used in increasing sustaining attention or screening out distractions. Orienting procedures encourage an individual to consciously monitor his/her activities, thereby avoiding attentional lapses. Teaching clients to ask themselves orienting questions at a specified time is an example of implementing orienting procedures. Clients with attention problems generally report fatigue or problem in maintaining concentration over an extended period of time, therefore teaching pacing strategies may be helpful. Pacing allows clients to continue for a longer period of time. Involving the client and relevant key persons in the design and piloting of a pacing strategy are important in ensuring that it is well-utilized. Another attention problem that interferes with day-to-day functioning is difficulty in switching between tasks. A common complaint is that individuals cannot resume an activity if they are interrupted or temporarily divert their attention. To manage this difficulty, individuals learn to rapidly jot key questions or ideas that come

to mind that need to be addressed later on. This allows them to continue with a particular task. There are a number of external devices and aids that assist individuals in tracking information and initiating planned activities such as written calendar systems with day planners, task-specific devices and checklists [35].

Psychosocial support

The importance of psychosocial support for managing attention problems cannot be underestimated. Effective management of attention problems requires a clinician to be skilled at providing psychosocial support as well as cognitive intervention. Decreased attention is important to acknowledge the interaction between cognitive dysfunction and psycho-emotional difficulties when designing a rehabilitation program for rehabilitating attention problems. Helping clients track the contexts where their attention processes break down, as well as situations where their attention is functioning well, generally results in a perception that attention is improving [35].

DISCUSSION

Regular methamphetamine use leads to serious problems in inhibition and filtering out irrelevant information upon acute administration [36]. Regular methamphetamine use also results in decreases in ability to filter information [36].

Cognitive impairments reported in regular methamphetamine users have the potential to compromise their ability to engage in, and benefit from cognitive-behavioural therapy, arguably the most effective treatment [37]. Considering its highly addictive potential, regular methamphetamine use leads to adverse psychosocial and behavioral outcomes. Regular methamphetamine use generally results in irritability, agitation, poor coping skills and disorganized lifestyles [38,39]. Impulsive behavior may exacerbate their psychosocial difficulties and promote maintenance of drug-seeking behavior, and this impulsivity and lack of adequate attention may be greater in those who use large amounts of methamphetamine [40]. These issues are followed with clinical observations that show methamphetamine users are distractible and have difficulty in maintaining attention [4]. Findings from this review suggest that regular methamphetamine users show critical attention problems which could persist into abstinence and recovery [2,4].

In addition, attention problems among regular methamphetamine users could increasingly impair their procedure of cognitive-behavioural therapy [9]. Studies show that people with brain injury show serious attention problems which can be treated with some approved attention rehabilitation techniques. Alternatively, these people may experience more in control when they are assisted to pay attention to their own functioning in everyday life [35].

Rehabilitating attention include using environmental modification and support, attention process training, self-management strategies, orienting procedures, and psychosocial support. There is a growing literature suggesting they can be effective in people diagnosed with brain injury and other disorders. For example, in their study on brain damaged patients, Sturm and colleagues (1993) showed the effectiveness of attention training in increasing attention [41].

Sivak and colleagues (1984) reported improved driving performance following perceptual skills and attention training in a group of individuals with brain damage [42]. The attention rehabilitation techniques could also be used for regular methamphetamine users in cognitive-behavioural therapy. No single technique of rehabilitation is universally accepted for treating attention problems in regular methamphetamine users but long-term attention rehabilitation is required for many months during cognitive-behavioural interventions [9].

It should be noted that certain cognitive-behavioural interventions including the Matrix Model and brief interventions have been mainly used to treat regular methamphetamine users [43, 23]. Cognitive-behavioural interventions cannot be solely successful while attention rehabilitation techniques are not simultaneously applied. Applying attention rehabilitation techniques may be associated with improved functioning in attention on a day-to-day basis as well as engagement of regular methamphetamine patients in cognitive-behavioural therapy.

As an adjunct treatment service, clinicians can apply these approaches to rehabilitate attention problems in regular methamphetamine users during implementing cognitive-behavioural therapy but the effectiveness of these approaches in reducing attention problems should be studied. It should be noted that the measurement of improvement at the level of everyday functioning is the most important indicator of success or failure of attention rehabilitation techniques [9].

The reason for the current focus on attention problems in this review is that these problems fuel the motivation to use methamphetamine in cognitive-behavioural therapy and can eventuate actual use of it and as a result, poor treatment outcomes. In addition, attention problems are undesirable for abstainers because of mood disturbances and interference with thought processes and daily activities [44].

The prolonged attention problems of regular methamphetamine users suggest that cognitive-behavioural therapy should be partly allocated to rehabilitate attention problems. This issue could act as an important facilitating factor in increasing patients' engagement in cognitive-behavioural therapy and enhancing treatment efficacy.

The understanding of how attention problems recover as a function of prolonged methamphetamine abstinence in cognitive-behavioral interventions has important clinical and treatment implications. If improvement in attention occurs across prolonged periods of abstinence, this finding would be clinically important for psychotherapists. These cognitive improvements can then be applied in cognitive-behavioural therapy and can be utilized as predictors of treatment effectiveness in difficult patients [45]. Such information could also contribute to optimizing the timing of cognitively demanding interventions. Hard efforts to design novel rehabilitation techniques to manage attention may contribute to emerging new treatment options to improve attention problems in regular methamphetamine users.

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