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Systematic Review of CBT Techniques and their Alignment with the Transtheoretical Model Stages of Change

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Abstract: Cognitive-behavioral therapy (CBT) encompasses a diverse range of techniques designed to facilitate behavior change. Evaluation of these techniques through the transtheoretical model (TTM) may provide insight into their effectiveness and the progressive nature of change in individuals with substance use disorders and the gradual nature of change in individuals with substance use disorders. This systematic review aims to identify and evaluate the methods and techniques used in CBT and examine their relationship to the stages of change as defined by the Transtheoretical Model (TTM). A comprehensive search of databases such as PubMed, PsycINFO, and the Cochrane Library was conducted, focusing on studies published between 2000 and 2023. The review focused on peer-reviewed articles that examined CBT (cognitive behavioral therapy) techniques and their alignment with stages of transformation, especially the transtheoretical model (TTM), in the context of substance use disorders. The review identified several CBT techniques, including cognitive restructuring, mindfulness, problem solving, and skills training. These techniques have been found to align with the various stages of the TTM and effectively promote progression through the stages of change, particularly in facilitating the transition from contemplation to preparation and from action to maintenance. The integration of CBT techniques with the TTM stages of change offers a structured approach to behavioral modification in substance use disorders. Understanding and applying these techniques within the TTM framework can enhance the efficacy of interventions.

Keywords: drug addiction; coping strategies; CBT; TTM.

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1. Introduction

Cognitive coping strategies are essential mechanisms individuals use to manage stress and emotional distress by altering their perception and interpretation of stressors. These strategies can significantly impact mental health, as evidenced by various studies. For instance, cognitive avoidance, which involves diverting attention away from distressing stimuli, has been linked to reduced automatic neural responses to threats in brain regions associated with emotion perception and attention, suggesting a potential resilience to stress (Günther et al., 2023). In the context of depression, maladaptive cognitive coping strategies like rumination and catastrophising are prevalent, whereas adaptive strategies like acceptance and positive re-evaluation contribute to better therapeutic outcomes when combined with pharmacotherapy (Hoff et al., 2022).

The relationship between cognitive coping and mental health is further highlighted in studies on depression and suicide risk, where specific cognitive-emotional strategies can predict and potentially prevent suicidal ideation. (Nicoara et al., 2022). Cognitive theories of stress, such as Lazarus's transactional theory, emphasise the role of cognitive appraisal in mediating the relationship between stressors and stress responses, highlighting the importance of cognitive processes in managing stress (Lazarus, 1993).

Cognitive coping strategies are essential for individuals with drug addictions to manage stress and prevent relapse. These strategies can be broadly categorised into emotion-focused and problem-focused coping. Emotion-focused coping involves managing emotions that arise from stressful situations, while problem-focused coping addresses the root cause of the stress (Andyastanti et al., 2022). Resilience is considered to be a key approach to cognitive behavioral therapy (CBT) in treating patients with active interventions, and research suggests that if individual coping strategies are explored addressing substance use problems before seeking treatment improves treatment outcomes (Penberthy et al., 2011). Studies have shown that CBT-based interventions, including computer versions such as CBT4CBT, can significantly improve the use of coping strategies and reduce drug use use control This suggests that psychological coping mechanisms play an important role in the outcome of substance use treatment. Thus, individuals who use drugs may benefit from incorporating psychological coping strategies, such as those taught in CBT programs, to support their recovery journey (Sugarman et al., 2010).

Other research suggests that adaptive coping strategies and problem-focused approaches are associated with fewer relapses and better treatment outcomes, particularly for patients with substance use disorders – in SUD (Marquez-Arrico et al., 2015) coping strategies and treatment outcomes The relationship is complex and affected by a variety of factors, including the type of substance used and the psychological state of the individual (House et al., 2017). Thus, effective addiction treatment and relapse prevention requires a comprehensive approach that includes cognitive and behavioral coping strategies, self-efficacy enhancement, and cognitive skills training (Handayani, 2010).

Cognitive strategies used by individuals with substance abuse and other addictive behaviors include recognising and evaluating dysfunctional thoughts, satisfying cravings, exposure to stimuli discipline, avoiding addictive behaviors, encouraging participatory activities, relaxation training, and preparing for possible relapse.

These strategies are part of cognitive-behavioral therapy, which focuses on restructuring maladaptive beliefs, regulating emotions, and developing problem-solving skills. The therapy aims to break the cycle of addictive behaviors by addressing the underlying cognitive processes and emotional triggers associated with the addiction (Kleszczewska-Albińska, 2022).

2. Methodology

The primary objective of this systematic review is to identify, describe, and evaluate the cognitive coping strategies used by individuals with drug addictions. The review aims to synthesise existing literature on the effectiveness of various cognitive-behavioral strategies in reducing relapse

rates and improving psychological well-being among drug-addicted individuals. A comprehensive search was conducted across multiple databases including PubMed, PsycINFO, Cochrane Library, and Google Scholar. The search terms included "cognitive behavioral therapy," "CBT," "cognitive coping strategies," "drug addiction," "substance use disorder," "mindfulness," "emotion regulation," "relapse prevention," and "skills training." The inclusion Criteria were: (1) Peer-reviewed articles and studies published between 2000 and 2023; (2) studies focusing on cognitive coping strategies or CBT for individuals with drug addictions; (3) articles written in English; (4) both qualitative and quantitative studies, including randomised controlled trials (RCTs), longitudinal studies, and meta-analyses. The exclusion criteria were: (1) studies not specifically addressing cognitive coping strategies or CBT in the context of drug addiction; (2) articles not written in English; (3) grey literature such as dissertations, theses, and conference papers.

As this study is a systematic review, it did not involve direct contact with human participants, thus ethical approval was not required. However, ethical standards were maintained by ensuring the accurate and unbiased reporting of data, and by giving proper credit to the original authors through appropriate citations.

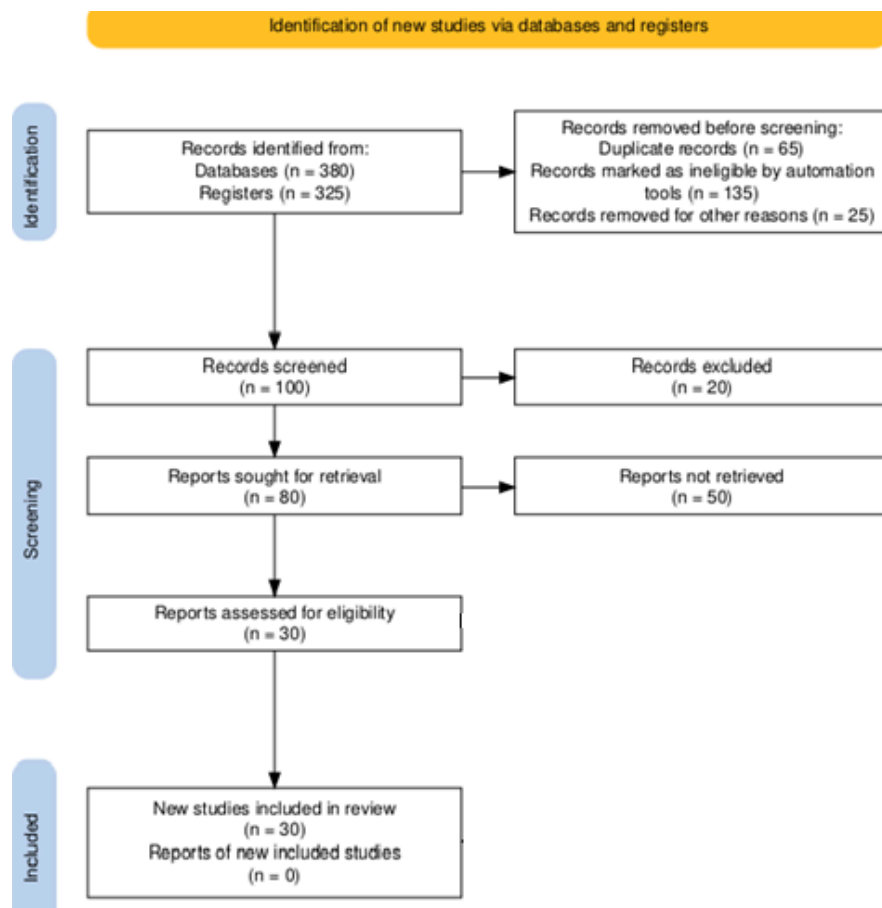


Figure 1. PRISMA flow diagram of the study selection process

3. Results

The data were synthesised narratively, with a focus on the description and effectiveness of different cognitive coping strategies. The strategies were categorised into themes such as cognitive restructuring, mindfulness, problem-solving, avoidance strategies, emotion regulation, acceptance and commitment therapy (ACT), cognitive-behavioral coping skills therapy, dialectical behavior therapy (DBT), stress management, self-monitoring, skills training, computerised CBT, relapse prevention, online mutual support, and integrated treatments.

Cognitive restructuring involves identifying, challenging, and modifying negative or irrational thought patterns. This technique helps individuals recognise distorted thinking, evaluate the validity of their thoughts, and develop healthier thought patterns. It assumes that thoughts, feelings, and behavior are interconnected and that by changing thoughts, feelings and behavior can be changed. This strategy is highly effective in reducing relapse rates and improving psychological well-being (Magill & Ray, 2009). It helps individuals gain control over their thoughts, leading to more positive emotional and behavioral outcomes (Beck, 2011).

Mindfulness includes practices such as meditation that focus on being present in the moment and accepting thoughts and feelings without judgment. It helps individuals become aware of their thoughts and emotions and manage them in a non-reactive way. Mindfulness techniques can include breathing exercises, body scans, and mindful walking. Mindfulness has been shown to reduce cravings, stress, and anxiety, leading to improved outcomes in addiction treatment (Grant et al., 2017). It helps individuals develop a greater sense of self-awareness and emotional regulation (Kabat-Zinn, 1990).

Problem Solving teaches individuals how to effectively solve problems without resorting to substance use. It involves defining the problem, generating several possible solutions, evaluating the pros and cons of each solution, and selecting and implementing the best one. The emphasis is on finding practical solutions to everyday challenges. Problem-solving skills training is moderately effective in helping individuals manage stress and problems without turning to drugs or alcohol (Lydecker et al., 2010; D'Zurilla & Goldfried, 1971).

Avoidance strategies involve steering clear of triggers and high-risk situations that may lead to substance use. This can include avoiding specific places, people, or activities associated with drug use. The aim is to minimise exposure to cues that can trigger cravings and relapse. Avoidance strategies can be effective in the short term but may not be sustainable long-term. They are often used in conjunction with other coping strategies (Carroll & Onken, 2005; Marlatt & Gordon, 1985).

Emotion regulation strategies help individuals manage their emotions effectively to prevent negative feelings from leading to substance use. Techniques include recognising emotions, understanding their impact, and developing healthy coping mechanisms such as deep breathing, meditation, or cognitive reappraisal. These strategies are highly effective in controlling impulsivity and emotional distress, which are common triggers for substance use (Gross, 2002; MacKillop et al., 2011).

Acceptance and Commitment Therapy (ACT) combines acceptance and mindfulness strategies to enhance psychological flexibility. It encourages individuals to accept their thoughts and feelings while committing to behavioral changes that align with their values. The goal is to create a rich and meaningful life while accepting the pain that inevitably goes with it. ACT is highly effective in maintaining long-term recovery and improving overall mental health (Hayes, Strosahl, & Wilson, 2012; Powers, Zum Vörde Sive Vörding, & Emmelkamp, 2009).

Cognitive-Behavioral Coping Skills Therapy focuses on equipping individuals with practical skills to manage substance use by employing cognitive and behavioral strategies. This approach includes training in coping mechanisms, cognitive restructuring, and relapse prevention. Key techniques taught in therapy involve refusal skills, problem-solving, and stress management to help individuals better navigate challenges related to substance use. Cognitive-behavioral coping skills therapy is highly effective in reducing relapse rates and enhancing coping mechanisms (Carroll & Onken, 2005; Marlatt & Gordon, 1985).

Dialectical behavior therapy (DBT) combines cognitive-behavioral techniques with cognitive-emotional regulatory techniques. Originally designed to treat borderline personality disorders, it has been adapted for substance use disorders. DBT focuses on teaching skills in four key areas: mindfulness, anxiety tolerance, emotion regulation, and effective interpersonal communication. DBT is effective, especially for individuals with co-occurring disorders such as

borderline personality disorders and substance use disorders (Haktanır & Callender, 2020; Linehan, 1993).

Stress management strategies include relaxation, time management, and other strategies that reduce stress and do not encourage the use of these resources. Techniques include meditation, relaxation exercises, gentle muscle relaxation, and effective time management techniques. These strategies are effective in reducing the frequency of stressful arousal and improving overall stress management (Kabat-Zinn, 1990; Shirotzaki et al., 2011).

Addiction management involves tracking thoughts, feelings, and behaviors to identify active substances. This heightened awareness helps individuals develop targeted coping strategies. Strategies may include keeping a diary or journal to record triggers and reactions. Self-assessment is effective because it increases awareness and helps develop personal autonomy strategies (Beck, 2011; Carroll et al., 1999).

Skills Training focuses on teaching individuals specific skills to handle social and environmental pressures effectively. This training can include developing communication skills, assertiveness training, and strategies for handling peer pressure. The goal is to equip individuals with the tools they need to navigate high-risk situations without resorting to substance use. Skills training often involves role-playing scenarios, practicing refusal skills, and learning how to seek support from others. Skills training is highly effective in reducing relapse rates and improving overall coping mechanisms by empowering individuals with practical tools to manage challenging situations (Beck, 2011; Carroll & Onken, 2005; Magill & Ray, 2009).

Computerised CBT involves delivering cognitive-behavioral therapy through computer programs. These programs provide interactive sessions that include exercises and activities designed to teach CBT principles and techniques. The digital format allows for consistent practice and easy accessibility, making it possible for individuals to engage in therapy at their convenience. Computerised CBT is moderately effective, providing a flexible and accessible option for individuals who may not have access to traditional face-to-face therapy. It is particularly useful for maintaining consistent engagement with therapeutic activities (Andersson & Cuijpers, 2009; Carroll & Rounsaville, 2010).

Relapse Prevention is designed to help individuals maintain abstinence by using cognitive and behavioral techniques to anticipate and cope with potential triggers. These strategies often involve identifying high-risk situations, developing coping strategies to manage cravings, and creating a plan for dealing with potential setbacks. Relapse prevention is highly effective in maintaining long-term recovery by equipping individuals with the skills and strategies needed to handle challenging situations and prevent relapse (Carroll & Onken, 2005; Marlatt & Gordon, 1985).

Online Mutual Support involves using online forums and support groups where individuals can share experiences, provide encouragement, and discuss coping strategies with others facing similar challenges. These platforms offer a sense of community and support, which can be crucial for individuals in recovery. Online mutual support is moderately effective, providing additional support and shared coping mechanisms. It offers an accessible and often anonymous way for individuals to connect with others who understand their experiences (Barak, Boniel-Nissim, & Suler, 2008; Griffiths & Reynolds, 2010).

Integrated Treatments combine CBT with other therapeutic approaches, such as medication, motivational interviewing, or other forms of therapy, to create a comprehensive treatment plan. This holistic approach addresses multiple aspects of addiction and co-occurring disorders, providing a more tailored and effective treatment experience. Integrated treatments are highly effective, especially for individuals with co-occurring disorders. They improve overall treatment outcomes by addressing various facets of the individual's condition and providing a more comprehensive approach to recovery (Barak, Boniel-Nissim, & Suler, 2008; Griffiths & Reynolds, 2010; Lydecker et al., 2010; McGovern & Carroll, 2003).

According to the Transtheoretical Model of Behavior Change (TTM) developed by James Prochaska & Carl DiClemente (1983), the concept of incremental change is central and reflects the processes individuals take as they change their behavior. The model assumes that change is a progressive process rather than an instantaneous one (Prochaska & DiClemente, 1983). The items shown in their photo are as follows: pre-contemplation, contemplation, preparation, action, maintenance, and cessation.

The following are the most important concepts and key elements in the graduality of change:

1. **Non-linear Process:** Change is often non-linear, meaning individuals might cycle through the stages multiple times before achieving stable change. This cyclic nature acknowledges the complexity of behavioral change and the potential for relapse (Prochaska, DiClemente, & Norcross, 1992).

2. **Relapse:** A common part of the change process, where individuals revert to earlier stages. It is viewed not as a failure but as a part of the learning process. Relapse serves as an opportunity to gain insights and strengthen one's strategies for future attempts (Miller & Rollnick, 2002).

3. **Decisional Balance:** The weighing of pros and cons that influences progression through the stages. As individuals progress, the perceived benefits of change typically outweigh the perceived costs (Janis & Mann, 1977).

4. **Self-efficacy:** The confidence individuals have in their ability to sustain the change, which increases as they move through the stages. Higher self-efficacy is associated with greater perseverance and likelihood of maintaining change (Bandura, 1977).

According to Prochaska & DiClemente (1983) understanding the graduality of change provides a framework for recognising that behavior change is a dynamic and ongoing process, requiring patience, support, and appropriate strategies at each stage.

The graduality of change, as articulated by James Prochaska & Carlo DiClemente (1983) in their Transtheoretical Model of Behavior Change (TTM), underscores that behavior change is a progressive and often cyclical process rather than a single, abrupt event. This model outlines a series of stages that individuals typically pass through when altering their behaviors. The stages include Precontemplation, Contemplation, Preparation, Action, and Maintenance, with Termination sometimes considered an additional stage.

Table 1 Methods and techniques used in Cognitive Behavioral Therapy (CBT) and their connection to the graduality of change according to the Transtheoretical Model

Coping Strategy	Description	Effectiveness	Primary References	Connection to Graduality of Change
Cognitive Restructuring	Identifying, challenging, and modifying negative or irrational thought patterns.	High; reduces relapse rates and improves psychological well-being	Magill & Ray (2009); Beck, (2011);	It helps individuals in the contemplation and preparation phase by challenging and changing thoughts.
Mindfulness	Practices such as meditation that focus on being present and accepting thoughts and feelings.	High; reduces cravings, stress, and anxiety	Grant et al. (2017); Kabat-Zinn (1990)	It supports the individual in the action and maintenance phase by managing cravings and stress.
Problem-Solving	Teaching effective problem-solving skills to handle difficult situations without drug use.	Moderate; helps manage stress and challenges	Lydecker et al. (2010); D'Zurilla & Goldfried (1971)	It helps individuals in the preparation and action phase by creating practical solutions.

Avoidance Strategies	Steering clear of triggers and high-risk situations associated with substance use.	Mixed; effective short-term, less certain long-term	Carroll & Onken (2005); Marlatt & Gordon (1985)	Helpful early in action to avoid relapse triggers.
Emotion Regulation	Managing emotions effectively to prevent negative feelings from leading to substance use.	High; controls impulsivity and emotional distress	MacKillop et al. (2011); Gross (2002)	Useful in action and maintenance phases for emotional control.
Acceptance and Commitment Therapy (ACT)	Combining acceptance and mindfulness to enhance psychological flexibility.	High; effective in maintaining long-term recovery	Hayes, Strosahl, & Wilson, (2012); Powers, Zum Vörde Sive Vörding, & Emmelkamp, (2009)	Effective in all phases, especially the effect and maintenance of mental flexibility.
Cognitive-Behavioral Coping Skills Therapy	Developing skills to manage substance use through cognitive and behavioral techniques.	High; reduces relapse and improves coping mechanisms	Marlatt & Gordon (1985); Carroll & Onken (2005)	It relates to the action phase by providing skills to manage substance use.
Dialectical Behavior Therapy (DBT)	Combining cognitive-behavioral techniques with mindfulness and emotional regulation.	Moderate; effective for co-occurring disorders	Haktanır & Callender (2020); Linehan (1993)	It supports individuals with co-occurring disorders, especially in the Action and Maintenance phases.
Stress Management	Techniques to reduce stress and prevent it from triggering substance use.	Moderate; reduces stress-related relapse triggers	Shirotsuki et al. (2011); Kabat-Zinn (1990)	Helpful at all stages, especially when dealing with stress triggers.
Self-Monitoring	Tracking thoughts, emotions, and behaviors to identify patterns leading to substance use.	High; increases awareness and helps develop targeted strategies	Carroll et al., (1999); Beck, (2011)	Useful in the Preparation and Action phases to identify and address triggers.
Skills Training	Teaching specific skills to handle social and environmental pressures effectively.	High; reduces relapse rates and improves coping mechanisms	Magill & Ray (2009); Beck, (2011); Carroll & Onken (2005)	Useful in preparation and action stages to cope with social pressures.
Computerised CBT	Delivering cognitive-behavioral therapy through computer programs.	Moderate; accessible and useful for consistent practice	Carroll & Rounsaville (2010); Andersson & Cuijpers (2009)	Supports the action phase by providing consistent therapeutic engagement.
Relapse Prevention	Using cognitive and behavioral techniques to anticipate and cope with potential triggers.	High; effective in maintaining long-term recovery	Marlatt & Gordon (1985); Carroll & Onken (2005)	Crucial in the maintenance phase to prevent relapse.
Online Mutual Support	Using online forums and support groups to share experiences and coping strategies.	Moderate; provides additional support and shared coping mechanisms	Griffiths & Reynolds (2010); Barak, Boniel-Nissim, & Suler, 2008	It offers support at all stages, especially during Maintenance.
Integrated Treatments	Combining CBT with other therapeutic approaches for a comprehensive treatment plan.	High; effective for co-occurring disorders and improving overall outcomes	Lydecker et al. (2010); McGovern & Carroll (2003)	Effective at all stages, especially for individuals with complex needs.

4. Discussions

Understanding the connection between Cognitive Behavioral Therapy (CBT) techniques and the Transtheoretical Model (TTM) of change is crucial for several reasons.

By aligning CBT techniques with the stages of change outlined in the TTM, therapists can tailor their interventions to the client's current stage. This targeted approach increases the likelihood of successful behavior modification because interventions are more relevant to the client's readiness to change. For example, using cognitive restructuring during the contemplation and preparation phases can help individuals challenge and change negative thought patterns and make them more receptive to subsequent action-oriented strategies.

Clients are more likely to remain engaged in therapy when interventions are perceived as relevant and helpful to their current needs and stage of change. By integrating CBT techniques with TTM, therapists can provide more personalised, stage-appropriate interventions, improve client motivation, and reduce dropouts. For example, mindfulness techniques can be particularly effective during the action and maintenance phases, helping clients manage stress and prevent relapse.

TTM provides a framework that recognises the complexity and non-linear nature of behavior change. Studying the connection between CBT and TTM techniques allows therapists to appreciate and address the cyclical nature of change, including the potential for relapse. This comprehensive understanding supports the development of more robust and flexible treatment plans that accommodate setbacks and encourage continued progress.

Integrating CBT techniques with TTM enhances evidence-based practice by grounding therapeutic interventions in well-established theoretical models. This integration supports the use of empirically validated techniques at appropriate stages of change and promotes more effective and science-based therapeutic outcomes. Techniques such as self-monitoring and problem-solving can be used strategically based on empirical evidence linking them to specific stages of change.

The ultimate goal of therapy is to achieve sustainable behavior change. By utilising the TTM framework, therapists can design interventions that not only initiate change but also support long-term maintenance. Techniques like relapse prevention and skills training are crucial during the maintenance stage, ensuring that clients develop the necessary skills and strategies to sustain their progress and avoid relapse.

Many clients present with co-occurring disorders, making behavior change more complex. The TTM, in conjunction with CBT techniques, provides a structured approach to addressing multiple issues simultaneously. Techniques such as Dialectical Behavior Therapy (DBT), which integrates CBT with mindfulness and emotional regulation, can be particularly effective for clients with co-occurring disorders, offering comprehensive support across various stages of change.

Understanding the stages of change empowers clients by providing them with a clear framework for their journey toward behavior change. This knowledge, combined with CBT techniques, helps clients recognise their progress, understand the challenges they may face, and develop a proactive approach to overcoming these challenges. The emphasis on self-efficacy and personal agency is central to both CBT and the TTM, fostering a sense of empowerment and autonomy in clients.

The integration of Cognitive Behavioral Therapy (CBT) techniques with the Transtheoretical Model (TTM) of Behavior Change is essential for enhancing the efficacy of interventions targeting substance use disorders. By aligning specific CBT methods with the stages of change outlined in the TTM, therapeutic strategies can be precisely tailored to the individual's current stage of readiness, thereby optimising the potential for successful and sustained behavior change.

Cognitive restructuring involves identifying, challenging, and modifying negative or irrational thought patterns. This technique is particularly effective during the contemplation and preparation stages, where it helps individuals recognise and alter distorted thinking, thus preparing them for subsequent action-oriented strategies. The effectiveness of cognitive restructuring in

reducing relapse rates and improving psychological well-being has been well-documented (Magill & Ray, 2009; Beck, 2011).

Mindfulness practices such as meditation and mindful breathing focus on being present and accepting thoughts and feelings without judgment. These practices are beneficial during the action and maintenance phases because they help manage cravings, stress, and anxiety, thereby promoting emotional regulation and reducing the risk of relapse. Studies have shown that mindfulness can significantly improve addiction treatment outcomes (Grant et al., 2017; Kabat-Zinn, 1990).

Learning effective problem-solving is essential to coping with difficult situations without resorting to substance abuse. This technique is essential during the preparation and action phase as it helps manage stress and develop practical solutions to everyday problems. Problem-solving skills training is moderately effective in promoting sustained behavior change (Lydecker et al., 2010; D’Zurilla & Goldfried, 1971).

Avoidance strategies include avoiding triggers and high-risk situations that may lead to substance use. These strategies are particularly useful in the early stages of action to prevent relapse. Although effective in the short term, avoidance strategies must be complemented by other coping mechanisms for long-term sustainability (Carroll & Onken, 2005; Marlatt & Gordon, 1985).

Emotion regulation strategies help individuals manage their emotions effectively to prevent negative feelings from leading to substance use. Techniques such as recognising and understanding emotions and developing healthy coping mechanisms are highly effective in the action and maintenance phases, controlling impulsivity and emotional distress, which are common triggers of substance use (MacKillop et al., 2011; Gross, 2002).

ACT combines acceptance and mindfulness strategies to enhance psychological flexibility. It encourages individuals to accept their thoughts and feelings while committing to behavioral changes aligned with their values. ACT is effective across all stages, particularly in the action and maintenance stages, and has been shown to maintain long-term recovery and improve overall mental health (Hayes, Strosahl, & Wilson, 2012; Powers, Zum Vörde Sive Vörding, & Emmelkamp, 2009).

This therapy focuses on developing specific skills to manage substance use through cognitive and behavioral techniques. It includes training in refusal skills, problem-solving, and stress management. Cognitive-behavioral coping skills therapy is highly effective in reducing relapse and improving coping mechanisms during the action stage (Marlatt & Gordon, 1985; Carroll & Onken, 2005).

DBT combines cognitive-behavioral techniques with mindfulness and emotional regulation strategies. Initially developed for treating borderline personality disorder, DBT has been adapted for substance use disorders and is moderately effective, particularly for individuals with co-occurring disorders, supporting them in the action and maintenance stages (Haktanır & Callender, 2020; Linehan, 1993).

Stress management techniques, including relaxation exercises, time management, and progressive muscle relaxation, are beneficial across all stages, especially in managing stress triggers. These techniques are moderately effective in reducing stress-related relapse triggers and improving overall stress management (Shirotzaki et al., 2011; Kabat-Zinn, 1990).

Self-monitoring involves tracking thoughts, emotions, and behaviors to identify patterns leading to substance use. This increased awareness helps individuals develop targeted coping strategies. Self-monitoring is highly effective in the preparation and action stages, as it increases awareness and helps develop individualised coping strategies (Carroll et al., 1999; Beck, 2011).

Skills training focuses on teaching individuals specific skills to handle social and environmental pressures effectively. This training includes developing communication skills, assertiveness training, and strategies for handling peer pressure. Skills training is highly effective in reducing relapse rates and improving overall coping mechanisms, particularly in the preparation and action stages (Magill & Ray, 2009; Beck, 2011; Carroll & Onken, 2005).

Computerised CBT involves delivering cognitive-behavioral therapy through computer programs, and providing interactive sessions that include exercises and activities designed to teach CBT principles and techniques. This digital format allows for consistent practice and easy accessibility, making it a useful tool for maintaining therapeutic engagement, particularly in the action stage (Carroll & Rounsaville, 2010; Andersson & Cuijpers, 2009).

Relapse prevention strategies are designed to help individuals maintain abstinence by using cognitive and behavioral techniques to anticipate and cope with potential triggers. These strategies involve identifying high-risk situations, developing coping strategies to manage cravings, and creating a plan for dealing with potential setbacks. Relapse prevention is crucial in the maintenance stage to prevent relapse and ensure long-term recovery (Marlatt & Gordon, 1985; Carroll & Onken, 2005).

Online mutual support involves using online forums and support groups where individuals can share experiences, provide encouragement, and discuss coping strategies. These platforms offer a sense of community and support, which is crucial for individuals in recovery. Online mutual support is moderately effective, providing additional support and shared coping mechanisms across all stages, particularly in maintenance (Griffiths & Reynolds, 2010; Barak, Boniel-Nissim, & Suler, 2008).

Integrated treatments combine CBT with other therapeutic approaches, such as medication, motivational interviewing, or other forms of therapy, to create a comprehensive treatment plan. This holistic approach addresses multiple aspects of addiction and co-occurring disorders, providing a more tailored and effective treatment experience. Integrated treatments are highly effective, especially for individuals with co-occurring disorders, and improve overall treatment outcomes (Lydecker et al., 2010; McGovern & Carroll, 2003).

6. Conclusion

This systematic review highlights the importance of integrating CBT techniques with the TTM framework to provide a structured and effective approach to behavioral modification in substance use disorders. This integration enhances therapeutic outcomes by addressing the specific needs of individuals at different stages of their behavior change journey, thereby promoting long-term recovery and improved mental health. Integrating Cognitive Behavioral Therapy (CBT) techniques with the Transtheoretical Model (TTM) of Behavior Change significantly enhances the effectiveness of interventions for substance use disorders. By aligning specific CBT methods with the stages of change outlined in the TTM, therapeutic strategies can be tailored to the individual's current stage of readiness. This targeted approach increases the likelihood of successful and sustained behavior change. Techniques such as cognitive restructuring, mindfulness, problem-solving, and relapse prevention are particularly effective when applied at appropriate stages, supporting long-term recovery and improving overall mental health. Understanding and utilising the connection between CBT and the TTM empowers clients, improves engagement, and promotes evidence-based, personalised interventions.

References

- Andersson, G., & Cuijpers, P. (2009). Internet-based and other computerized psychological treatments for adult depression: a meta-analysis, *Cognitive Behaviour Therapy*, 38 (4), 196 - 205. <https://doi.org/10.1080/16506070903318960>
- Andyastanti, T. M., Soedirham, O., & Subarniati, R. (2022). Stres dan strategi coping remaja pengguna narkoba yang menjalani program pasca rehabilitasi di Badan Narkotika Nasional Provinsi Jawa Timur. *Jurnal Preventia*, 7(1). <https://doi.org/10.17977/um044v7i12022p1-7>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215. <https://doi.org/10.1037/0033-295X.84.2.191>

- Barak, A., Boniel-Nissim, M., & Suler, J. (2008). Fostering empowerment in online support groups. *Computers in Human Behavior*, 24(5), 1867-1883. <https://doi.org/10.1016/j.chb.2008.02.004>
- Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond* (2nd ed.). The Guilford Press.
- Carroll, K. M., & Onken, L. S. (2005). Behavioral therapies for drug abuse. *The American journal of psychiatry*, 162(8), 1452–1460. <https://doi.org/10.1176/appi.ajp.162.8.1452>
- Carroll, K. M., & Rounsaville, B. J. (2010). Computer-assisted therapy in psychiatry: Be brave—it's a new world. *Current Psychiatry Reports*, 12(5), 426-432. <https://doi.org/10.1007/s11920-010-0146-2>
- Carroll, K. M., Nich, C., Frankforter, T. L., & Bisighini, R. M. (1999). Do patients change in the way we intend? Treatment-specific skill acquisition in cocaine-dependent patients using the Cocaine Risk Response Test. *Psychological Assessment*, 11(1), 77-85.
- D’Zurilla, T. J., & Goldfried, M. R. (1971). Problem solving and behavior modification. *Journal of Abnormal Psychology*, 78(1), 107-126. <https://doi.org/10.1037/h0031360>
- Grant, S., Colaiaco, B., Motala, A., Shanman, R., Booth, M., Sorbero, M., & Hempel, S. (2017). Mindfulness-based relapse prevention for substance use disorders: A systematic review and meta-analysis. *Journal of Addiction Medicine*, 11(5), 386-396. <https://doi.org/10.1097/ADM.0000000000000338>
- Griffiths, K. M., & Reynolds, J. (2010). Online mutual support bulletin boards. In J. Bennett-Levy, D. Richards, P. Farrand, H. Christensen, K. M. Griffiths, & D. J. Kavanagh (Eds.), *Oxford guide to low intensity CBT interventions* (pp. 97-121). Oxford University Press.
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, 39(3), 281-291. <https://doi.org/10.1017/s0048577201393198>
- Günther, V., Strukova, M., Pecher, J., Webelhorst, C., Engelmann, S., Kersting, A., Hoffmann, K. T., Egloff, B., Okon-Singer, H., Lobsien, D., & Suslow, T. (2023). Cognitive Avoidance Is Associated with Decreased Brain Responsiveness to Threat Distractors under High Perceptual Load. *Brain sciences*, 13(4), 618. <https://doi.org/10.3390/brainsci13040618>
- Handayani, F. K. (2010). Keterampilan psikologis untuk meningkatkan strategi coping kognitif adaptif pengguna napza di panti rehabilitasi (Doctoral dissertation, Universitas Gadjah Mada).
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2012). *Acceptance and commitment therapy: The process and practice of mindful change*. The Guilford Press.
- Haktanır, A., & Callender, K. A. (2020). Meta-analysis of dialectical behavior therapy (DBT) for treating substance use. *Research on Education and Psychology*, 4 (Special Issue), 74–87.
- Hoff, I. H., Farkas, A., Melicherova, U., Köllner, V., Hoyer, J., Strobel, A., & Strobel, A. (2022). The role of cognitive motivation and self-regulation in coping with occupational demands. *Journal of Behavioral Sciences*. <https://doi.org/10.31234/osf.io/5fk6x>
- House JS, Grimm FA, Jima DD et al. (2017). A pipeline for high-throughput concentration response modeling of gene expression for toxicogenomics. *Front Genet* 8 (168). <https://doi.org/10.3389/fgene.2017.00168>
- Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice, and commitment*. Free Press.
- Kabat-Zinn, J. (1990). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. Delacorte Press.
- Kleszczewska-Albińska, A. (2022). Selected cognitive-behavioural models of behavioural addictions. *Journal of Psychiatry and Clinical Psychology*, 22(1), 10. <https://doi.org/10.15557/PiPK.2022.0002>
- Lazarus R. S. (1993). Coping theory and research: past, present, and future. *Psychosomatic medicine*, 55(3), 234–247. <https://doi.org/10.1097/00006842-199305000-00002>
- Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. The Guilford Press.

- Lydecker, K. P., Tate, S. R., Cummins, K. M., McQuaid, J., Granholm, E., & Brown, S. A. (2010). Clinical outcomes of an integrated treatment for depression and substance use disorders. *Psychology of addictive behaviors : journal of the Society of Psychologists in Addictive Behaviors*, 24(3), 453–465. <https://doi.org/10.1037/a0019943>
- MacKillop, J., Amlung, M. T., Few, L. R., Ray, L. A., Sweet, L. H., & Munafò, M. R. (2011). Delayed reward discounting and addictive behavior: a meta-analysis. *Psychopharmacology*, 216(3), 305–321. <https://doi.org/10.1007/s00213-011-2229-0>
- Magill, M., & Ray, L. A. (2009). Cognitive-behavioral treatment with adult alcohol and illicit drug users: a meta-analysis of randomized controlled trials. *Journal of studies on alcohol and drugs*, 70(4), 516–527. <https://doi.org/10.15288/jsad.2009.70.516>
- Marlatt, G. A., & Gordon, J. R. (1985). *Relapse prevention: Maintenance strategies in the treatment of addictive behaviors*. The Guilford Press.
- Marquez-Arrico, J. E., Benaiges, I., & Adan, A. (2015). Strategies to cope with treatment in substance use disorder male patients with and without schizophrenia. *Psychiatry research*, 228(3), 752–759. <https://doi.org/10.1016/j.psychres.2015.05.028>
- McGovern, M. P., & Carroll, K. M. (2003). Evidence-based practices for substance use disorders. *The Psychiatric clinics of North America*, 26(4), 991–1010. [https://doi.org/10.1016/s0193-953x\(03\)00073-x](https://doi.org/10.1016/s0193-953x(03)00073-x)
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). The Guilford Press.
- Nicoara, R. D., Coman, H. G., & Cosman, D. (2022). The relationships between depression, suicide risk, and emotional cognitive coping. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 13(3), 85-103. <https://doi.org/10.18662/brain/13.3/355>
- Penberthy, J. K., Wartella, J. A., & Vaughan, M. (2011). Cognitive behavioral therapy for addiction. In *Addiction medicine: Science and practice* (pp. 729-750).
- Powers, M. B., Zum Vorde Sive Vording, M. B., & Emmelkamp, P. M. (2009). Acceptance and commitment therapy: a meta-analytic review. *Psychotherapy and psychosomatics*, 78(2), 73–80. <https://doi.org/10.1159/000190790>
- Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: toward an integrative model of change. *Journal of consulting and clinical psychology*, 51(3), 390–395. <https://doi.org/10.1037//0022-006x.51.3.390>
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change. Applications to addictive behaviors. *The American psychologist*, 47(9), 1102–1114. <https://doi.org/10.1037//0003-066x.47.9.1102>
- Shirotsuki, K., Nonaka, Y., Takano, J., Abe, K., Adachi, M., & Yamamoto, S. (2011). Stress management for students with academic failure and peer problems. *Japanese Journal of Psychosomatic Medicine*, 51(8), 693-701.
- Sugarman, D. E., Nich, C., & Carroll, K. M. (2010). Coping strategy use following computerized cognitive-behavioral therapy for substance use disorders. *Psychology of addictive behaviors: journal of the Society of Psychologists in Addictive Behaviors*, 24(4), 689–695. <https://doi.org/10.1037/a0021584>