Effects of A Multisensory-Based Mindfulness Program on Stress and Anxiety Levels in People Living with HIV Who Use Methamphetamine

Jeerawit Jaknissai[1], Chakkraphan Suebphanphoe[2], Choosak Nithikathkul[3]

[1]Rehabilitation Department, Thanyarak Khonkaen Hospital, Khonkaen Province, Thailand

[2]Faculty of Medicine, Mahasarakham University, Mahasarakham Province, Thailand

Abstract

HIV infection is associated with methamphetamine use, particularly among men who have sex with men (MSM), and may contribute to neuropsychiatric consequences such as heightened stress and anxiety, which can adversely affect daily functioning and engagement in meaningful daily activities. Although various interventions are available to address stress and anxiety, many present practical and clinical limitations in their application. This case study investigated the effects of a multisensory-based mindfulness program on stress and anxiety in an individual with methamphetamine use and co-existing HIV infection.

The program was implemented through three principal occupational therapy processes: (1) evaluation, (2) intervention, and (3) outcome assessment. Occupational history and occupational performance were evaluated using the Occupational History Interview (OHI), Suanprung Stress Test-20 (SPST-20), Generalized Anxiety Disorder Scale-7 (GAD-7), and Canadian Occupational Performance Measure (COPM), administered before and after the intervention. The findings indicated that participation in the multisensory-based mindfulness program was associated with reductions in both stress and anxiety. Specifically, stress scores decreased from 50 (high) to 33 (moderate), while anxiety scores declined from 7 (mild) to 2 (minimal). In addition, improvement was observed in the health management domain, reflected by increased occupational performance (4.5-point increase) and satisfaction (5.5-point increase).

However, these results are preliminary and based on a single participant; therefore, studies with larger samples and longer-term follow-up are needed to confirm the program's effectiveness and assess the sustainability of its outcomes.

Keywords: Multisensory mindfulness, Methamphetamine use, HIV, Stress and anxiety, Occupational therapy intervention

Introduction

Methamphetamine, commonly referred to as crystal methamphetamine, is a highly addictive psychostimulant that acts on the central nervous system (National Institute on Drug Abuse, 2013). Methamphetamine use is frequently associated with high-risk sexual behaviors, particularly among men who have sex with men (MSM), a population in which the prevalence of use is often reported to be elevated. A study in the United States, substance use was reported in up to 73% of participants, with methamphetamine the most commonly used substance (50 %) (Fulcher et al., 2021). In Southeast Asia, methamphetamine use has increased substantially, with some reports indicating a rise from approximately 30% to 50% (Feelemyer et al., 2020). Similarly, in Thailand, methamphetamine use has been reported at 44.4% and appears to be particularly prevalent among MSM living with HIV, potentially reflecting increased recreational use in recent years (Boonruang et al., 2025; Muccini et al., 2024). These findings highlight the significant neuropsychiatric effects observed in methamphetamine users living with HIV, extending beyond addiction itself and contributing to stress and anxiety (Glasner-Edwards et al., 2010). This may be related to difficulties in managing addictive behaviors and coexisting health problems that interfere with daily functioning and everyday activities.

Stress and anxiety are closely linked among methamphetamine users living with HIV. Stress can act as a trigger for substance use, as individuals may use substances to cope with distress and escape life's problems, with the substance providing a temporary sense of relief (Nevendorff & Praptoraharjo, 2015). Among MSM, stress related to social stigma, family rejection, and shame associated with sexual identity can be major factors driving substance use as a coping strategy. In addition, some people living with HIV who use substances to manage illness-related stress and cope with feelings of social isolation (Cebo, 2017; Gómez et al., 2024). In terms of anxiety, crystal methamphetamine use is strongly associated with anxiety-related symptoms. One study reported that 76% of regular users experienced severe anxiety, and 33% experienced panic attacks after initiating use. Continued use may also lead to severe paranoid and anxiety-related symptoms that can progress to psychosis, in which users may feel watched or threatened. In addition, during withdrawal, users often experience "Crash" marked by

intense anxiety (Salo et al., 2011). These emotional disturbances may be linked to dysregulation of the brain's hypothalamic pituitary adrenal (HPA) axis, which plays a central role in the stress and anxiety response.

The HPA axis is a core neuroendocrine system that regulates the body's response to stress and anxiety. Activation begins with the release of corticotropin-releasing hormone (CRH) from the hypothalamus, which stimulates the pituitary gland to secrete adrenocorticotropic hormone (ACTH). ACTH then triggers the adrenal cortex to release glucocorticoids (cortisol in humans) into the bloodstream (Stephens & Wand, 2012; Zuloaga et al., 2015). Under normal conditions, this system is regulated by a negative feedback mechanism that suppresses further hormone release once the stressor has resolved (Herman et al., 2016). In methamphetamine users, the HPA axis is often chronically overactivated, leading to maladaptive neurobiological changes involving the amygdala and dopaminergic signaling. Long-term methamphetamine use is associated with dysregulated dopamine activity, which can impair neuronal function in the prefrontal cortex (PFC)—a region essential for executive control, decision-making, and cognitive regulation. This dysfunction may contribute to reduced analytical thinking and compulsive behaviors. At the same time, activity in the amygdala and striatal circuits, which are involved in emotional reactivity and habitual behavior, may become heightened (Arnsten, 2009; Zuloaga et al., 2015). An imbalance between the brain's prefrontal and limbic systems can lead to impulsive, emotion-driven responses and impaired regulation of stress and anxiety.

Widely used approaches for managing stress and anxiety includes: (1) Cognitive behavioral therapy (CBT), a first-line treatment that focuses on identifying and restructuring maladaptive thoughts, modifying behaviors, and using evidence-based techniques (e.g., exposure-based and skills-based strategies) to reduce fear and distress (Curtiss, Levine, Ander, & Baker, 2021). However, CBT is a cognitively demanding, thought-based therapy that emphasizes cognitive restructuring and behavior change. It requires higher-order (metacognitive) skills and sustained mental effort, which may be challenging for some patients compared with interventions that make fewer demands on cognitive processing (Fresco & Mennin, 2019). Therefore, this may be a limitation for patients with coexisting impairments in memory and frontal lobe function. (2) Psychosocial

interventions are often used in specific clinical and community settings and typically integrate multiple strategies, including stress management, resilience training, problem-solving therapy, and supportive counseling (Ozturk, San, & Yildiz, 2025). This type of intervention often faces a substantial gap between theory and clinical practice, which can limit its implementation in real-world care. In addition, some approaches may be overly prescriptive and difficult to apply consistently in routine practice (Institute of Medicine, 2015). And (3) Mindfulness-based training programs focus on awareness. That is intentionally attending to present-moment experiences in a nonjudgmental way, to strengthen emotional regulation, reduce stress and anxiety (Alvarado-García, Soto-Vásquez, Infantes Gomez, Guzman Rodriguez, & Castro-Paniagua, 2025). Nevertheless, some cases of intensive mindfulness practice may precipitate acute psychiatric symptoms (e.g., psychosis) in vulnerable individuals. In addition, approximately 6 % to 14 % of participants in mindfulness programs have been reported to experience persistent adverse effects such as hyperarousal, dissociation, or increased anxiety, which may be associated with difficulties in emotional regulation (Britton, Lindahl, Cooper, Canby, & Palitsky, 2021; Joshi, Manandhar, & Sharma, 2021). Based on the limitations of existing approaches, particularly the heavy reliance on higher-order cognitive skills and the need to promote realistic, present-moment awareness in a clinically engaging environment, multisensory stimulation combined with mindfulness practice was applied as a guiding approach for managing stress and anxiety in methamphetamine users living with HIV.

Multisensory stimulation involves the structured and appropriate delivery of two or more basic sensory stimuli simultaneously, such as touch, smell, sound, visual input, and movement. Its goal is not primarily to train cognitive skills, but rather to promote active engagement with ongoing sensory experiences (Silva et al., 2018; Vorayot & Thamrongsottisakul, 2022). Multisensory stimulation promotes active self-engagement in clients, which may enhance self-awareness of their thoughts, emotions, and actions (Fowler, 2007). Similarly, mindfulness practice emphasizes awareness of present-moment experience and is associated with reduced negative affect (e.g., stress and anxiety) and increased positive affect. Mindfulness and breathing practices may also help regulate sympathetic and parasympathetic balances, which can contribute to lower cortisol levels (Mutumba et al., 2021; Dsouza, Aghili, Nasiri, & Asghari, 2021).

Therefore, multisensory-based mindfulness focuses on helping participants explore diverse sensory experiences across multiple sensory systems while engaging in mindfulness practice that cultivates full, nonjudgmental awareness of present-moment experience and free from automatic judgments shaped by prior beliefs or past experiences. In this approach, sensory stimulation is not used merely for physical activation, but to foster deep, moment-to-moment awareness of each sensory experience (Garland et al. 2015; Whear et al., 2014). Therefore, this case study aims to examine the effects of a multisensory-based mindfulness program on stress, anxiety, and occupational performance in a methamphetamine user.

Process conceptual framework

This case study applied the occupational therapy process in accordance with the Occupational Therapy Practice Framework: Domain and Process (4th ed.) (American Occupational Therapy Association, 2020). This framework guided the clinical reasoning process for the design, implementation, and evaluation of the multisensory-based mindfulness intervention in this study, which consists of the following three process components:

1. **Evaluation:** The evaluation process begins with consultation and screening conducted by the multidisciplinary team within occupational therapy services. It is followed by interviews regarding daily life experiences, including assessment of occupational performance, contextual factors, and the client's skills, capacities, and patterns of daily living. Finally, the information gathered is synthesized to determine occupational outcomes and the impact on everyday activities.

2. **Intervention**: During the intervention phase, the multisensory-based mindfulness program was
implemented through structured sessions designed to engage multiple sensory modalities while promoting present-moment awareness. This phase also involved ongoing reassessment and review of the participant's response to treatment, and modification of the plan as needed.

3. **Outcomes:** This process involves using outcome measures to evaluate progress toward desired goals, as reflected by changes in stress, anxiety, and

occupational performance scores. It also included discharge to planning of daily life performance following the completion of rehabilitation.

Instruments

The instruments used in this study were divided into two categories: data collection instruments and activity implementation instruments.

1. **Data collection instruments**

1.1 The Occupational History Interview (OHI) was adapted form Saolorm et al. (2007) and consists of five main sections: educational history, work history, family history, leisure history, and time-use habits.

1.2 The Suanprung Stress Test-20 (SPST-20) was developed by Mahatnirankul et al. (1997). It consists of 20 items; each rated on a 5-level scale.

1.3 The Generalized Anxiety Disorder Scale (GAD-7) was translated into Thai by the Faculty of Medicine, Ramathibodi Hospital, Mahidol University (2015), based on the original instrument developed by Spitzer et al. (2006). It consists of 7 items; each rated on a 4-level scale.

1.4 The Self-Assessment of Occupational Performance is an adapted version of the Canadian Occupational Performance Measure (COPM). The Thai version was translated by Khemthong (2023).

2. **Activity implementation instruments**

The multisensory-based mindfulness program was delivered over seven consecutive days, from August 29 to September 4, 2024. It consisted of seven sessions, each lasting approximately 60 minutes and organized into the following two activity sets:

2.1 Activity Set 1 consisted of three psychoeducational components: mindful sensory awareness, the brain and addiction cycles, and the effects of substances on sensory processing. It also incorporated multisensory stimulation–based mindfulness activities, including environmental modification through the use of musical instruments and Thai spa–scented essential oils, as well as yoga and loving-kindness practices.

2.2 Activity Set 2 consists of two psychoeducational components: stress on sensory processing, and anxiety on sensory processing. In addition, it included multisensory stimulation–based mindfulness activities, such as environmental

modification using musical instruments and Thai spa–scented essential oils, together with yoga and loving-kindness practices., mindfulness using sand trays, and relaxation techniques.

Case study information

1. General information: A 22-year-old Thai male undergraduate student was diagnosed with methamphetamine dependence (F15.2) and had comorbid conditions, including HIV infection (B24), syphilis (A53.9), and allergic rhinitis (J30.4).

2. Chief Complaint: The participant presented to the hospital 6 days after crystal methamphe- tamine use.

3. Medical history: The participant was referred for methamphetamine dependence treatment, which the participant had not previously received treatment. The participant expressed a desire to stop using drugs and informed his mother, who then brought him for care. At the time of initial admission, he was able to respond to questions clearly.

4. History of substance use: The participant began using crystal methamphetamine at age 21, injecting it intravenously once weekly at a dose of 0.2 cc for approximately 8 months. Approximately 3 months prior to admission, he developed auditory hallucinations (hearing voices), paranoia, tremors, restlessness, and intense cravings when not using the drug. The participant decided to take a leave of absence from school in an effort to quit and was able to abstain for about 1 month before relapsing, reportedly due to peer influence and exposure to drug-related advertising. His last reported dose of crystal methamphetamine was 0.2 cc.

5. Psychosocial context: The participant was a man who has sex with men (MSM) who reported methamphetamine use primarily in association with sexual activity. The participant was unable to discontinue use until neurological symptoms emerged. Furthermore, he experienced considerable stress, and the diagnosis of HIV and other sexually transmitted infections further heightened his anxiety about the future.

Ethical Consideration

This case study was conducted as part of the occupational therapy service. Before the study commenced, the participant provided written informed consent and agreed to the disclosure of relevant information for research purposes, without infringement of rights or risk of harm. The researcher explained the study objectives, the occupational therapy services, the data collection procedures, and the expected benefits. Participation was entirely voluntary, and the participant was informed of the right to withdraw from the study at any time without providing a reason and without any adverse effects on safety or care. All information obtained from this case study was treated confidentially and is presented only in an anonymized, general form.

Application of the conceptual process framework in a case study

1. Evaluation process

The therapist reviewed the participant's medical history, introduced themselves, and invited to participate in the case study. The purpose of the study was explained, and the participant was interviewed regarding daily living activities using the OHI. Assessments were then conducted using instruments including the SPST-20, GAD-7, and COPM. The collected data were interpreted to determine the impact on occupational performance and daily activities, and to inform analysis of rehabilitation needs and intervention planning. The assessment results were as follows:

1.1 Occupational history: The participant is a third-year undergraduate student who has taken a two semester leave from his studies. He remains interested in completing his degree, and his parents continue to support his education. He previously worked part-time at an ice cream shop and also earned additional income as a VJ (live streamer) after school. Currently, he helps his mother sell beverages, such as tea and coffee at home. His interests and passions include design. His family consists of four members: his father, mother, younger sister, and himself. His preferred leisure activities include listening to music, drawing, and watching movies. His time-use patterns are presented in Table 1.

Based on the time-use patterns, daily activities can be categorized using the concept of occupational balance, which Backman (2004) described in terms of major

activity domains (e.g., self-care, productivity, and leisure). As shown in Chart 1, while at home, leisure activities accounted for the largest proportion of time (37.5%), followed by self-care activities (33.33%) and productivity activities (29.17%). In contrast, while living at dormitory, self-care activities accounted for the largest proportion (50%), followed by productivity activities (33.33%) and leisure activities (16.67%).

1.2 Occupational performance: A pre-program SPST-20 assessment showed a stress score of 50, indicating a high level of stress. A pre-program GAD-7 assessment yielded an anxiety score of 7, indicating a moderate level of anxiety. The COPM assessment indicated that the client placed the highest importance on health management in relation to irritability associated with stress and anxiety (importance score = 9). Prior to the program, the participant's self-rated performance in managing stress and anxiety was 5 scores, and satisfaction with that performance was also rated as 5 scores.

Table 1 shows details of the time-use pattern

Location	Activities domain	Activities	Time (hours)
At home	**Self-care**	- Wake up and grooming	1
		- Breakfast	1
		- Lunch	1
		- Dinner	1
		- Sleep	4
		Total	**8**
	Productivity	- Assisted mother with work	1
		- Wash clothes	1
		- Assisted with managing the shop	4
		- Housework	1
		Total	**7**
	Leisure	- Listening to the news and watching movies	1
		- Playing computer games	3
		- watching movies with family members	2
		- Playing on a mobile phone	3
		Total	**9**
At dormitory	**Self-care**	- Sleep	9
		- Wake up and grooming	1
		- Lunch	1
		- Dinner	1
		Total	**12**
	Productivity	- Studying	8
		Total	**8**
	Leisure	- Methamphetamine using	4
		Total	**4**

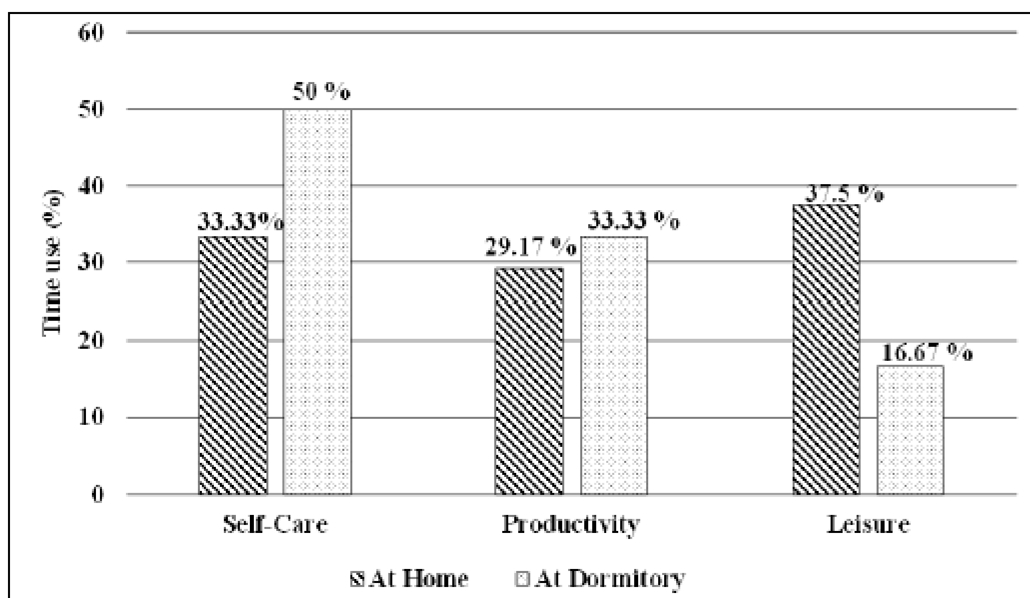

Chart 1 Compare time use across each domain of daily living activitiesbetween at home and at dormitory.

2. **Intervention process**

This process involves establishing short-term and long-term goals (Table 2) and the program was structured as seven 60-minute multisensory stimulation–based mindfulness sessions incorporating visual, auditory, olfactory, movement-based (vestibular and proprioceptive), and interoceptive modalities. Throughout each session, participants were encouraged to maintain present-moment awareness, focus on their ongoing activities, and respond to all perceptions with a nonjudgmental attitude, consistent with the core principles of mindfulness practice, as outlined in Table 3.

Table 2 shows details of the goals

Goals	Details
1. Short-term	- To reduce SPST-20 scores by at least 41 points after 7 sessions. - To reduce GAD-7 scores by at least 4 points after 7 sessions.
2. Long-term	- To improve readiness for role resumption in education (e.g., increased engagement in structured daily routines)

Table 3 shows the mindfulness-based multisensory stimulation activities plan

Sessions	Activities	Time (mins)
1	- Greeting, introduce the study and written informed consent for case study participation.	20
	- Assess occupational history using the OHI and evaluate occupational performance and related outcomes using the SPST-20, GAD-7, and COPM.	35
	- Summary of session and next appointment.	5
2	- Greeting and an introduction to today's activities.	5
	- Psychoeducation was provided on "Sensory Awareness".	10
	- Activities set 1 practice.	35
	- Summary of session and next appointment.	10
3	- Greeting and an introduction to today's activities.	5
	- Psychoeducation was provided on "Brain & Addiction Circuit".	10
	- Activities set 1 practice.	35
	- Summary of Activities and Next Appointment	10
4	- Greeting and an introduction to today's activities.	5
	- Psychoeducation was provided on "Substances Use & Sensory Processing"	10
	- Activities set 1 practice.	35
	- Summary of session and Next Appointment.	10
5	- Greeting and an introduction to today's activities.	5
	- Psychoeducation was provided on "Stress & Sensory Processing"	10
	- Activities Set 2 practice.	35
	- Summary of session and Next Appointment.	10
6	- Greeting and an introduction to today's activities.	5
	- Psychoeducation was provided on "Anxiety & Sensory Processing"	10
	- Activities Set 2 practice.	35
	- Summary of session and next appointment.	10
7	- Greeting and an introduction to today's activities.	5
	- Activities Set 2 practice.	35
	- Evaluate occupational performance and related outcomes using the SPST-20, GAD-7, and COPM.	15
	- Summary and conclusion of the program.	5

3. Outcome process

This involves comparing the data to identify changes in rehabilitation progress and summarizing outcomes in line with the objectives, as follows:

3.1 Stress scores

This section compares stress scores (SPST-20) before and after the program. Details are presented in Table 4.

Table 4 shows a comparison of stress scores before and after participation in the program

Evaluations	Stress scores	Interpretations
Before	50	High
After	33	Moderate

According to Table 4, before participating in the program, a participant had a stress score of 50, indicating a high level of stress. After completing the program, his stress score decreased to 33, indicating a moderate level of stress. Overall, stress levels decreased by 17 points following the program.

3.2 Anxiety scores

This section compares anxiety scores (GAD-7) before and after the program. Details are presented in Table 5.

Table 5 shows a comparison of anxiety scores before and after participation in the program

Evaluations	Anxiety scores	Interpretations
Before	7	Mild
After	2	Minimal

Table 5 shows that, before participating in the program, the participant's anxiety score was 7, indicating a mild level of anxiety. After completing the program, the score decreased to 2, reflecting a minimal level of anxiety. Overall, this represented a 5-point reduction in anxiety by the end of the program.

3.3 The Self-Assessment of Occupational Performance

This section compares occupational performance, based on performance and satisfaction scores from the Canadian Occupational Performance Measure (COPM), before and after participation in the program. Details are presented in Table 6.

Table 6 shows a comparison of performance and satisfaction scores before and after participation in the program

Area	Problems	Performance scores		Satisfaction scores	
		Before	After	Before	After
Health management	- Gets irritated easily when stressed.	5	10	4	10
	- Gets irritated easily when anxious.	5	9	4	9
	Average scores	5	9.5	4	9.5
		Changes in performance scores = 4.5 points Changes in Satisfaction scores = 5.5 points			

Table 6 shows that after completing the program, participants' performance and satisfaction scores for managing stress and anxiety improved. Overall, the participant demonstrated improvements in perceived performance and satisfaction, with performance scores increasing by 4.5 points and satisfaction scores increasing by 5.5 points. The observed improvements exceed the clinically meaningful threshold for COPM.

Case study discussion

1. Occupational Pattern

The participant entered the program on August 26, 2024. The initial assessment indicated that, while staying in the dormitory, the participant used his time inappropriately and engaged in maladaptive leisure activities. Specifically, methamphetamine use during a high-risk period from 8.00 p.m. to midnight. This suggests that the participant's daily living activities and time-use patterns, particularly during unstructured free time that contributed to engagement in inappropriate leisure activities during this critical period (i.e., drug use). This finding is consistent with Farhadian et al. (2024), who reported that unstructured time is associated with increased relapse risk, highlighting the importance of structured activity engagement. Therefore, facilitating engagement in meaningful leisure occupations is a key strategy to support relapse prevention. Accordingly, the participant should be supported to identify meaningful leisure activities, then encouraged to participate during free time. Especially, during the identified high-risk period to promote healthier and more adaptive patterns of daily activity.

2. **Effects of multisensory stimulation program**

Firstly, the multisensory-based mindfulness program creates varied sensory experiences through structured environments (multisensory environments: MSEs), similar to a Snoezelen room. A systematic review and meta-analysis by Helbliing et al. (2024) reported that multisensory environment therapy can support rehabilitation outcomes related to anxiety, depression, cognitive impairment, and associated behaviors such as restlessness. This aligns with Halliwell et al. (2024), who found that multisensory environment therapy positively reduced stress and anxiety and increased relaxation among community participants, which may explain the observed reductions in stress and anxiety in this case. However, Silva et al. (2018) noted that these effects may not be sustained over the long term. Therefore, to enhance maintenance of benefits, it may be helpful to provide an ongoing space in which participants can choose and engage with the sensory systems that best meet their needs. Such individualized engagement may support effective sensory processing and integration, which in turn can strengthen self-regulation skills and promote greater awareness and understanding of one's emotions.

Secondly, incorporating contemporary mindfulness principles into the activities, particularly through yoga-based mindfulness, Satipatthana mindfulness, and sand-tray mindfulness, engages multiple sensory modalities. Yoga-based mindfulness can promote deep muscular relaxation. From the perspective of reciprocal inhibition, Yin yoga mindfulness may function similarly to a relaxation-based systematic desensitization approach: relaxation responses are physiologically incompatible with heightened fear and anxiety, and cultivating relaxation may therefore help reduce anxiety-related arousal (Jaknissai, 2017). It is therefore possible that reductions in stress and anxiety may stem from muscle relaxation and reduced exposure to stimulating events, at the same time, with mindfulness practice that supports observing emotions as they arise in the present moment. This awareness may represent an initial step in self-regulation, helping individuals manage their thoughts, feelings, and actions. Similarly, the mindfulness model, this practice reflects a process-like interaction among intention, attention, and attitude (Shapiro, 2006). Therefore, while engaging in physical movement, individuals direct their attention to the present moment by attending to their actions and sustaining continuous awareness of the breath. This process may be interpreted as cultivating

insight and heightened awareness and, when practiced repeatedly, may parallel the repeated working-through process in mindfulness-based dynamic psychotherapy. (Disayavanish & Disayavanish, 2014). It is therefore possible that the participant may develop greater understanding of emotions and experience relief from stress and anxiety. In mindfulness-based sand-tray training, a sensory experience is created through intentional, creative activity performed with mindful awareness of the breath and body movement within a multisensory environment (MSE). This allows participants to use imagination and symbolic expression to support emotional coping and psychological well-being. This is consistent with the study by Saritnirun & Kunthajun (2015) on sand-tray therapy based on the Satir model, which emphasizes beliefs about people, adaptation, and change, with the overall goal of growth (metagoal) alongside individualized goals (specific goal). Through arranging objects in the sand tray, the participant may gain insight into their true selves, needs, and desires, resolve internal conflicts, and process both positive and negative feelings. Similarly, in activities such as arranging marbles on a sand tray, thoughts and emotions may naturally arise. When participants engage in the task with mindful attention without resistance, force, or judgment, this may support a smoother, "flow-like" emotional processing through symbolic arrangement, which may contribute to reduced stress and anxiety.

Thirdly, an additional finding relates to psychoeducation in occupational therapy. Psychoeducation involves providing the participant with information that builds a foundational understanding of their condition, appropriate treatment approaches, and available support services. In this program, occupational therapy psychoeducation used an executive approach to reshape participant's understanding by incorporating current, socially appropriate information delivered in a structured, step-by-step manner (Padilla, 2002). Consistent with the SLA (Sharing–Learning–Application) framework for mental health education, which emphasizes sharing experiences, learning new knowledge, and applying it in real-life situations. As a result, a participant of SLA-based mental health education may develop greater understanding of mental health conditions, experience reduced stress, improve quality of life, enhance self-confidence, and become better able to recognize and manage symptoms and warning signs (Limpitikiat, Sasok, and Phawo 2023). Therefore, providing a participant with information about brain mechanisms

related to emotion and the effects of substance use on the brain may enhance awareness and engagement in therapeutic activities, contributing to reduced stress and anxiety levels and improving COPM from pre- and post-programs.

However, based on the summary discussions conducted after each activity and considering motivation for behavior change, this increased awareness may reflect progression in the participant's readiness for change related to substance-use cessation. The participant appeared to be in the contemplation stage and trending toward the determination/preparation stage. Therefore, interventions should emphasize the consequences and benefits of change, address perceived barriers and potential negative aspects of change, and provide ongoing support and skills training to encourage and reinforce appropriate, substance-free behaviors.

Conclusion

This case study involved a participant who completed a multisensory stimulation–based mindfulness program consisting of seven 60-minute sessions conducted from August 29, 2024, to September 4, 2024. Following the intervention, the results indicated a reduction in stress from a high to a moderate level and a decrease in anxiety from a moderate to a low level. In addition, improvements were observed in performance and satisfaction related to daily living activities. These findings should be interpreted as preliminary, as they are derived from a single-case study and are therefore subject to inherent limitations. Further research is needed to confirm and extend these results.

Limitations

1. The limited duration and frequency of participation meant the activities could not be planned and delivered as intensively as intended.
2. The limited space in the activity room made it difficult to fully implement the intended walking pace and the planned duration for observing feelings.
3. The participant received various treatment programs from a multidisciplinary team, which may lead to fatigue during activities.
4. The single-case design and absence of a control condition limit the ability to generalize findings and establish causal relationships.

Future research

1. Follow up on the effects of a multisensory-based mindfulness program on stress and anxiety levels after discharge, including continued practice at home.
2. Develop a standardized program model and evaluate it further using multiple participant groups to compare outcomes and confirm the findings.
3. Future studies should employ rigorous research designs commonly accepted in medical and health science research, such as randomized controlled trials (RCTs).
4. Valid and reliable instruments should be developed or selected to assess stress, anger, and performance in daily activities, with careful consideration of their suitability for the target population.
5. Longitudinal research should be conducted to examine the program's effects over time and to complement findings from cross-sectional clinical studies.

Reference

Alvarado-García, P. A. A., Soto-Vásquez, M. R., Infantes Gomez, F. M., Guzman Rodriguez, N. M., & Castro-Paniagua, W. G. (2025). Effect of a mindfulness program on stress, anxiety, depression, sleep quality, social support, and life satisfaction: A quasi-experimental study in college students. *Frontiers in Psychology,* 16, 1508934. https://doi.org/10.3389/fpsyg.2025.1508934.

American Occupational Therapy Association. (2020). Occupational therapy practice framework: domain and process—fourth edition. *The American journal of occupational therapy,* 74(Supplement_2), 7412410010p1-7412410010p87. https://doi.org/10.5014/ajot.2020.74S2001.

Arnsten, A. F. T. (2009). Stress signalling pathways that impair prefrontal cortex structure and function. *Nature Reviews Neuroscence,* 10(6), 410-422. https://doi.org/10.1038/nrn2648.

Backman, C. (2004). Occupational balance: Exploring the relationships among daily occupations and their influence on well-being. *Canadian Journal of Occupational Therapy,* 71, 202-209.

Boonruang, J., Colby, D., Nonenoy, S., Teeratakulpisarn, N., Rungnirundorn, T., Kalayasiri, R., Hongchookiat, P., Tongmuang, S., Promjantuek, K., Kanetrat, K., Makphol, J.,

Klinsukontakul, A., Tasomboon, W., Suriwong, S., Ramautarsing, R. A., & Phanuphak, N. (2025). Amphetamine-type stimulant use and associated factors among men who have sex with men in bangkok. *AIDS and Behavior,* 29(9), 2675-2688. https://doi.org/10.1007/s10461-025-04725-8.

Britton, W. B., Lindahl, J. R., Cooper, D. J., Canby, N. K., & Palitsky, R. (2021). Defining and measuring meditation-related adverse effects in mindfulness-based programs. *Clinical Psychological Science: A Journal of the Association for Psychological Science,* 9(6), 1185-1204. https://doi.org/10.1177/2167702621996340.

Cebo, D. (2017). Crystal Meth and HIV/AIDS: A pilot study of behavioral and clinical correlates. *Worldwide Journal of Multidisciplinary Research and Development,* 3(8), 211-215.

Curtiss, J. E., Levine, D. S., Ander, I., & Baker, A. W. (2021). Cognitive-behavioral treatments for anxiety and stress-related disorders. *Focus,* 19(2), 184-189. https://doi.org/10.1176/appi.focus.20200045.

Disayavanish, C., & Disayavanish, P. (2014). Mindfulness-based dynamic psychotherapy. *Journal of the Psychiatric Association of Thailand,* 59(3), 179-194.

Dsouza, L., Aghili, M., Nasiri, Z., & Asghari, A. (2021). The influence of mindfulness on cravings, stress, and cortisol levels in Crystal Meth-using males in Mashhad. *Iranian Journal of Health Psychology,* 4(4), 17-26. https://doi.org/10.30473/ijohp.2021.54845.1116.

Farhadian, M., Akbarfahimi, M., Hassani Abharian, P., Khalafbeigi, M., & Yazdani, F. (2024). The effect of leisure intervention on occupational performance and occupational balance in individuals with substance use disorder: A pilot study. *Occupational Therapy International,* 2024, 6299073. https://doi.org/10.1155/2024/6299073.

Feelemyer, J., Arasteh, K., Huong, D. T., Oanh, K. T. H., Khue, P. M., Giang, H. T., Thanh, N. T. T., Moles, J. P., Vinh, V. H., Vallo, R., Quillet, C., Rapoud, D., Le, S. M., Michel, L., Laureillard, D., Nagot, N., & Des Jarlais, D. (2020). Associations between methamphetamine use and lack of viral suppression among a cohort of HIV positive persons who inject drugs in Hai Phong Vietnam. *AIDS (London, England),* 34(13), 1875-1882. https://doi.org/10.1097/QAD.0000000000002680.

Fowler, S. (2007). *Sensory stimulation: sensory-focused activities for people with physical and multiple disabilities.* Jassica Kingsley Publishers.

Fresco, D. M., & Mennin, D. S. (2019). All together now: utilizing common functional change principles to unify cognitive behavioral and mindfulness-based therapies. *Current Opinion in Psychology,* 28, 65-70. https://doi.org/10.1016/j.copsyc.2018.10.014.

Fulcher, J. A., Javanbakht, M., Shover, C. L., Ragsdale, A., Brookmeyer, R., Shoptaw, S., & Gorbach, P. M. (2021). Comparative impact of methamphetamine and other drug use on viral suppression among sexual minority men on art. *Drug and Alcohol Dependence,* 2021, 108622. https://doi.org/10.1016/j.drugalcdep.2021.108622.

Garland, E. L., Farb, N. A., Goldin, P., & Fredrickson, B. L. (2015). Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological Inquiry, 26(*4), 293-314. https://doi.org/10.1080/1047840X.2015.1064294.

Glasner-Edwards, S., Mooney, L. J., Marinelli-Casey, P., Hillhouse, M., Ang, A., & Rawson, R. (2010). Anxiety disorders among methamphetamine dependent adults: Association with post-treatment functioning. *The American Journal on Addictions,* 19(5), 385-390. https://doi.org/10.1111/j.1521-0391.2010.00061.x.

Gómez, W., Organista, K. C., Sacks, T. K., Holmes, S. M., & Carrico, A. W. (2024). Narratives of disconnection: A life course perspective of methamphetamine use among sexual minority men living with HIV. *International Journal of Behavioral Medicine.* https://doi.org/10.1007/s12529-024-10299-x.

Halliwell, N., Patro, J. R., Storino, F., & Aguilar, T. (2024). Multisensory environment program improving relaxation and reducing stress and anxiety for community health. *American Journal of Occupational Therapy,* 78(Supplement_2), 7811500083p1. https://doi.org/10.5014/ajot.2024.78S2-PO83.

Helbling, M., Grandjean, M.-L., & Srinivasan, M. (2024). Effects of multisensory environment/stimulation therapy on adults with cognitive impairment and/or special needs: A systematic review and meta-analysis. *Special Care in Dentistry,* 44, 381-420.

Herman, J. P., McKlveen, J. M., Ghosal, S., Kopp, B., Wulsin, A., Makinson, R., Scheimann, J., & Myers, B. (2016). Regulation of the hypothalamic-pituitary-adrenocortical stress response. *Comprehensive Physiology,* 6(2), 603-621. https://doi.org/10.1002/cphy.c150015.

Institute of Medicine. (2015). *Psychosocial interventions for mental and substance use disorders: a framework for establishing evidencebased standards.* The National Academies Press.

Jaknissai, J. (2017). *Effects of Yin yoga-based mindfulness practice on anger among female juvenile in juvenile training centre region 7, Chiang Mai province.* [Master's thesis, Chiang Mai University]. ThaiLIS. https://www.thailis.or.th/tdc/search_result.php.

Joshi, S., Manandhar, A., & Sharma, P. (2021). Meditation-induced psychosis: trigger and recurrence. *Case Reports in Psychiatry,* 2021, 6615451. https://doi.org/10.1155/2021/6615451.

Khemthong, S. (2023). *Teaching document: Guidelines for administering the COPM assessment tool for individuals with schizophrenia.* Occupational therapy Department, Mahidol University.

Limpitikiat, S., Sasok, A., & Phawo, P. (2023). Effectiveness of psychoeducational using the SLA model toward on knowledge, stress, and quality of life among new schizophrenia cases. *BCNNON Health Science Research Journal,* 17(1), Article 1.

Mahatnirunkul, S., Pumpaisalchai, W., & Tapanya, P. (1997). The construction of Suan Prung stress test for Thai population. *Journal of Suan Prung Psychiatric Hospital,* 13(3), Article 3.

Muccini, C., Pinyakorn, S., Kolsteeg, C., Kroon, E., Sacdalan, C., Crowell, T. A., Chan, P., Paul, R., Hsu, D., Phanuphak, N., & Colby, D. J. (2024). Chemsex and rising substance use linked to sexually transmitted infections among men who have sex with men living with HIV in Bangkok, Thailand. *IJID Regions,* 13, 100465. https://doi.org/10.1016/j.ijregi.2024.100465.

Mutumba, M., Moskowitz, J. T., Neilands, T. B., Lee, J.-Y., Dilworth, S. E., & Carrico, A. W. (2021). A mindfulness-based, stress and coping model of craving in methamphetamine users. *PLOS ONE,* 16(5), e0249489. https://doi.org/10.1371/journal.pone.0249489.

National Institute on Drug Abuse. (2013, September). *Research report series: Methamphetamine.* https://nida.nih.gov/sites/default/files/methrrs.pdf.

Nevendorff, L., & Praptoraharjo, I. (2015). *Crystal-meth use and HIV-related risk behaviors in Indonesia.* AIDS Research Centre.

Ozturk, C. S., San, E. G., & Yildiz, S. (2025). Effectiveness of psychosocial interventions on stress, anxiety, depression, and quality of life in parents of children, adolescents,

and young adults with cancer: A meta-analysis of RCTs. *Nursing & Health Sciences,* 27(2), e70156. https://doi.org/10.1111/nhs.70156.

Padilla, R. (2002). Teaching approaches and occupational therapy psychoeducation. *Occupational Therapy in Mental Health,* 17(3-4), 81-95. https://doi.org/10.1300/J004v17n03_06.

Salo, R., Flower, K., Kielstein, A., Leamon, M. H., Nordahl, T. E., & Galloway, G. P. (2011). Psychiatric comorbidity in methamphetamine dependence. *Psychiatry Research,* 186(2-3), 356-361. https://doi.org/10.1016/j.psychres.2010.09.014.

Saolorm, S., Pongsaksri, M., Sirisatayawong, P., & Srikhamjak, T. (2007). *Guidelines for using occupational therapy assessment tools in psychiatry.* Occupational therapy Department, Chiang Mai University.

Saritniran, P., & Kunthajun, N. (2015). The Satir model in sand tray therapy for children with psychiatric disorder. *Sanpasitthiprasong Medical Journal,* 36(3), 151-159.

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62(3),* 373-386.

Silva, R., Abrunheiro, S., Cardoso, D., Santos-Costa, P., Couto, F., Agrenha, C., & Apóstolo, J. (2018). Effectiveness of multisensory stimulation in managing neuropsychiatric symptoms in older adults with major neurocognitive disorder: A systematic review. *JBI Database of Systematic Reviews and Implementation Reports,* 16, 1663-1708. https://doi.org/10.11124/JBISRIR-2017-003483.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The gad-7. *Archives of Internal Medicine,* 166(10), 1092-1097. https://doi.org/10.1001/archinte.166.10.1092.

Stephens, M. A. C., & Wand, G. (2012). Stress and the HPA axis. *Alcohol Research: Current Reviews,* 34(4), 468-483. https://doi.org/10.35946/arcr.v34.4.11.

The Faculty of Medicine Ramathibodi Hospital, Mahidol University. (2015). *General anxiety disorder assessment scale (GAD-7).* https://www.rama.mahidol.ac.th/ramamental/questionnair.

Vorayot, J., & Thamrongsottisakul, W. (2022). The development of learning activities according to the multi-sensory approach for reading ability of primary 1 student. *Academic MCU Buriram Journal,* 7(1), Article 1.

Whear, R., Coon, J. T., Bethel, A., Abbott, R., Stein, K., & Garside, R. (2014). What is the impact of using outdoor spaces such as gardens on the physical and mental well-being of those with dementia? a systematic review of quantitative and qualitative evidence. *Journal of the American Medical Directors Association,* 15(10), 697-705. https://doi.org/10.1016/j.jamda.2014.05.013.

Zuloaga, D. G., Jacobskind, J. S., & Raber, J. (2015). Methamphetamine and the hypothalamic-pituitary-adrenal axis. *Frontiers in Neuroscience,* 9, 178. https://doi.org/10.3389/fnins.2015.00178.