

EFFICACY OF MINDFULNESS INTEGRATED COGNITIVE BEHAVIOR THERAPY FOR PSYCHOLOGICAL DISTRESS AMONG PATIENTS WITH SUBSTANCE USE DISORDER: A RANDOMIZED CONTROLLED TRIAL

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KEYWORDS

Mindfulness-Integrated Cognitive Behavior Therapy, Methamphetamine Type Stimulant Use, Randomized Controlled Trial, Psychological Distress, Substance Use Disorders

CITE THIS ARTICLE:

Saeed, A., & Alyana, S. I. (2026). Efficacy of mindfulness-integrated cognitive behavior therapy for psychological distress among patients with substance use disorder: a randomized controlled trial. *Pakistan Journal of Positive Psychology*, 3(3), 59-71.

ABSTRACT

Substance use disorders represent a significant public health concern in Pakistan, with methamphetamine showing increasing prevalence, particularly among adults. In light of the escalating incidence of methamphetamine-type stimulant (MTS) consumption observed in Pakistan, this research endeavor sought to assess the efficacy of Mindfulness integrated cognitive behavior therapy (MICBT) for psychological distress among individuals engaged in the utilization of methamphetamine-type stimulant. A randomized controlled trial design was employed with methamphetamine-type stimulant users who were in rehabilitation centers in Islamabad and Rawalpindi. The Purposive sampling method was used to select 40 participants, who were randomly assigned to an experimental group and a control group (20 members per group). The experimental group received the MICBT intervention (10 sessions, 2 hours per session), whereas the control group received Treatment as Usual (TAU). The data was collected by using the Depression, Anxiety, and Stress Scale (DASS-21). The data was analyzed by using via an independent sample t-test to evaluate the significance of differences in the measured outcomes. The results indicated that MICBT intervention significantly reduced psychological distress ($t = -21.63, p < .001$) among participants in the experimental group compared to the control group. Furthermore, significant reductions were observed in Depression ($t = -9.46, p < .001$), Stress ($t = 7.48, p < .001$), and anxiety ($t = 9.52, p < .001$) in the experimental group following the intervention. In conclusion. Mindfulness-Integrated Cognitive Behavior Therapy (MICBT) was highly effective in reducing psychological distress associated with substance use.

I. INTRODUCTION

Substance Use Disorder (SUD) represents a significant and rising global public health concern, described by persistent patterns of substance use that result in clinically significant impairment or distress across physical, psychological, and social domains of functioning (American Psychiatric Association, 2022). The World Drug Report (2022) stated that in 2020, the number of people that used drugs was approximately 284 million, which is a significant growth compared to the last decade. Correspondingly, Substance use disorder consists of different categories like alcohol, cannabis, opioids, stimulants, sedatives, hallucinogens, inhalants, tobacco, caffeine, and other (American Psychiatric Association, 2022). Among them, the stimulant-related disorders, especially the ones related to the use of methamphetamines, have become particularly problematic because of their highly

neurobiological, psychological, and societal impacts. Methamphetamine - also known as ice or crystal meth is a very strong type of amphetamine-based stimulant with very strong actions on the central nervous system (Romanelli, 2006). New epidemiological data show that the rates of methamphetamine use disorder (MUD) are growing, overdose is on the rise, and psychiatric comorbidity is showing growth among a wide 2 range of populations (Han et al., 2021; Paulus & Stewart, 2020). The use of methamphetamine has increased in major cities such as Karachi, Lahore, and Islamabad, and more people are concerned with its associations with psychiatric problems, impulsive violence, criminal behavior, and broader societal issues (Tahir, 2024; Chaudhary, 2024).

Despite the growing number of treatment facilities often implementing the Minnesota Model that involves counseling, medical management, and peer support, the services are still divided and overseen without a consistent control (Khalily & Yousafzai, 2024). This topographic terrain highlights that there is a necessity to implement culturally attuned, expandable, and psychologically mindful treatment frameworks that can meet the substance use and related emotive frailties. Certainly, the effects of methamphetamine use have severe neurobiological and neurocognitive effects. The results of meta-analysis have shown that there are medium-size deficits in various areas of cognition such as episodic memory, processing speed, motor coordination, language, and vasoconstriction abilities (Scott et al., 2007). It is estimated that these impairments represent neurotoxicity of the methamphetamine-related front striatal system with gender, psychiatry comorbidities, and length of abstinence being some of the variables that influence the impairment. Not only the neurobiological changes that support the dependence of methamphetamine, but also undermine the ability of individuals to make adaptive decisions, have a high level of stress tolerance, and emotional stability. On the other hand, the state of psychological distress is very common in people with methamphetamine use disorder and is a clinical issue of concern.

Psychological distress includes emotional distress manifested with a symptom of anxiety, depression, hopelessness, irritability, and reduced coping ability (Ridner, 2004). It has been shown by empirical evidence that high levels of psychological distress correlate with a persistence of methamphetamine use, positive drug tests, and worse treatment outcomes (Booth et al., 2010; Amin-Esmaeili et al., 2026; Matepi et al., 2025). Despite the fact that the treatment is commonly linked to the decrease in distress levels in the amphetamine and heroin use disorder patients, the high rates of dropout prevent the long-term progress, which contributes to the necessity of the specific interventions aimed at the direct reduction of psychological distress in such individuals (Chang et al., 2022). Psychological distress has also been proven to be a very effective risk factor of methamphetamine use and worse treatment outcomes, and sleep disturbances further increase the levels of distress in this population (Matepi et al., 2025; Allen, 2021; Amin-Esmaeili et al., 2025). Notably, Psychological distress is proved to foretell the weakening of decreases in methamphetamine consumption and a higher risk of relapse, highlighting the position of distress as an outcome and driver of MA consumption (Amin-Esmaeili et al., 2026). Consequently, Mindfulness-based treatment, including strategies incorporated into cognitive-behavioral approaches, holds potential in the treatment of substance use disorder (SUD) by enabling better emotional regulation, minimizing the relapse urge, and improving mental resilience. Recently conducted feasibility trials in Pakistan indicate that mindfulness-based programs modified to suit cultural settings may be effectively provided in individual and group settings, which points to their possible applicability to low- and middle-income countries (Asif et al., 2023). The methamphetamine use disorder is on the rise across the world, and much remains unclear about the most appropriate modes of treatment, especially in the treatment of psychological and mental health consequences.

Objectives

- To assess the effectiveness of Mindfulness-integrated cognitive behavior therapy (MICBT) in reducing psychological distress among methamphetamine-type stimulant users.

Hypothesis

- There will be a significant reduction in psychological distress among methamphetamine-type stimulant users in the experimental group compared to the Treatment as Usual (TAU) control group after 10 sessions of Mindfulness-integrated cognitive behavior therapy (MICBT).

II. METHOD

Participants

The research involved 40 respondents where 20 were randomly selected to be in the experiment group, and the remaining 20 in the control group. Moreover, 10 additional participants were also involved, in case of drop-out on intervention phase, who were also known to be using methamphetamines. The control group was treated normally (TAU) which included the regular rehabilitation services provided regularly at the treatment centres. The experimental group was given MICBT intervention of mindfulness-integrated cognitive behavior therapy. Additionally, all participants in the two groups were exposed to the normal protocol of treatment that has been adopted as a routine in the rehabilitation centers. The participant selection was done using a purposive sampling technique; this enabled 50 eligible participants to be identified using a set of pre-determined inclusion criteria; they were then randomly assigned a 62 process that led to the formation of both control group and experimental group, each with 20 participants. To be included in the study, participants were required to 1) only male individuals aged between 18 and 55 years, who were in the high risk stage of early adulthood to adulthood for substance use, 2) only those undergoing treatment at a rehab facility were taken as participants, and 3) individuals who met the diagnostic criteria (DSM 5-TR) of stimulant use disorder. Individuals were excluded if 1) individuals with severe medical or neuropsychiatric conditions such as active psychosis or suicidal thoughts, 2) those in the detoxification stage were not included, 3) individuals diagnosed with substance use disorders and stimulant use disorder other than methamphetamine type stimulant use, and 4) the individuals who obtained other therapeutic options than Treatment as Usual (TAU) and MICBT.

Measures

This instrument comprised demographic data applicable to various demographic variables such as age, gender, marital status, employment situation, and history of substance utilization. The Depression, Anxiety, and Stress Scale (DASS-21) is a self-report questionnaire designed to assess three domains, depression, stress and anxiety and is a 21 item self-report questionnaire. Each subscale had seven items, and the items are rated with the help of four- point Likert scale (0 = did not apply to me at all; 3 = applied to me very much or most of the time). The DASS-21 is also said to possess a high internal consistency on each of the subscales (depression, Cronbachs alpha=0.88; anxiety, Cronbachs alpha=0.82; stress, Cronbachs alpha=0.90, total scale, Cronbachs alpha=0.93).

Procedure

The current study aimed to investigate multiple facets regarding methamphetamine use disorder and was conducted within authorized drug rehabilitation centers. These rehabilitation centers are situated in Rawalpindi and Islamabad, two of the biggest metropolises of Pakistan that was selected due to the diversity of urban population and availability of special services of addiction treatment. This study employed a quantitative randomized controlled trial (RCT) to determine the efficacy of a psychological intervention in patients with methamphetamine use disorder systematically. Experimental and control group design was used that utilized a pretest-posttest design, which made it possible to objectively compare the results after and before the intervention. The results and statistical analysis of the study assessing the effectiveness of Mindfulness-Integrated Cognitive Behavior Therapy (MICBT) for methamphetamine-type stimulant users in Pakistan are presented in this chapter. The statistical tests are provided in the form of descriptive and inferential results with the support of tables and figures.

III. RESULTS

The study had forty participants in total. Twenty of them (50%) were placed in the experimental group, while another twenty (50%) were placed in the control group. The mean age of the participants was 2.85 years (SD = 0.533, N = 40), with a range of 18 to 55 years. The sample consisted entirely of male participants (n = 40, 100%). In terms of marital status, the majority were single (n =33, 82.5%), while 7 participants (17.5%) were married. Regarding education, majority of the participants (n = 37, 92.5%) had completed their matriculation as their highest level of education, while only 3 participants (7.5%) held a graduation or higher education. The occupation distribution indicated that the largest group of participants (n = 15, 37.5%) were engaged in business, followed by unemployed individuals (n = 7, 17.5%). Additionally, 13 participants (32.5%) were employed in private sector, while a small

proportion ($n = 5$, 12.5%) worked in the government sector. With respect to family structure, more than half of the participants ($n = 22$, 55.0%) belonged to joint families, whereas 18 participants (45.0%) were belonged to nuclear families. In terms of monthly income, the largest proportion of the participants ($n = 14$, 35.0%) reported earning between 50,000-100,000 PKR, followed by 20,000-50,000 PKR ($n = 13$, 32.5%). Nine participants (22.5%) earned above 100,000 PKR, while 4 participants earned (10.0%) below 20,000 PKR.

Table I: Frequency Distribution of Demographic Characteristics of Participants (N = 40)

Variables	Category	<i>n</i>	%	<i>SD</i>	<i>M</i>
Substance Use History	Methamphetamine	40	100.0	.000	5.00
Drugs used	Methamphetamine	40	100.0	.000	5.00
Duration of Illness	0-5 years	21	52.5	.712	1.57
	6-10 years	16	40.0		
	11-15 years	2	5.0		
	15-20 years	1	2.5		
	18-22 years	33	82.5	.588	1.25
Age at first use	23-27 years	4	10.0		
	28-33 years	3	7.5		
No of Treatments Before	0-3 times	23	57.5	.812	1.57
	4-6 times	13	32.5		
	7-9 times	2	5.0		
	9-12 times	2	5.0		
Mode of substance use	Oral	6	15.0	.361	1.85
	Inhalation	34	85.0		
Dual Diagnosis	No	40	100.0		
Family history of drug use	Yes	8	20.0	2.00	100.0
	No	32	80.0	.405	1.80

Note. *n* = Frequency, % = Percentage, *M* = Mean, *SD* = Standard Deviation

The substance use history of the participants is presented in Table 2, showing that all participants (100%) reported using methamphetamine as their main substance of use. The most frequently reported duration of illness was 0-5 years (52.5%), followed by 6-10 years (40%). A smaller proportion of participants reported using methamphetamine for more 10 years, with 5.0% using it for 11-15 years and 2.5% using it for 15-20 years. The average duration of methamphetamine use was 1.27 years (*SD* = 0.678). The age at which participants first used methamphetamine ranged from 18 to 33 years, as shown in Table 2. The most common age at first use was 18-22 years (82.5%). The number of treatments received by participants varied, as shown in Table 2. The majority of participants (57.5%) received 0-3 treatments, while 32.5% received 4-6 treatments. The average number of treatments received was 1.57 (*SD* = 0.812).

Table II: Descriptive Statistics and Alpha Reliability of Pretest Scales (N=40)

Variables	α	Min	Max	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Pre DASS	.88	35	63	50.15	10.31	0.23	-0.29
Pre Depression	.80	6.50	10.5	9.05	1.73	0.14	-1.43
Pre Anxiety	.81	3.50	10.6	7.55	1.06	-0.29	0.54
Pre Stress	.75	6	10	8.80	1.67	0.39	-1.11
Pre Craving	.72	4	17	15.10	4.05	-0.95	0.28
Pre DERS	.91	31	71	52.26	4.56	0.07	-1.85
Pre Mindfulness	.57	53	78	67.95	5.18	-0.21	-0.38
Pre Quality of Life	.71	51	76	61.55	9.32	0.13	-1.65

Note. DASS = Depression Anxiety and Stress Scale, DERS = Difficulty in Emotional Regulation Scale

Table III: Descriptive Statistics and Alpha Reliability of Posttest Scales (N=40)

Variables	α	Min	Max	M	SD	Skewness	Kurtosis
Post DASS	.94	4	48	22.48	4.97	-0.05	-1.84
Post Depression	.90	.00	9.5	5.68	1.38	-0.03	-1.79
Post Anxiety	.75	.50	8.5	4.18	1.90	0.07	-1.42
Post Stress	.82	.50	8.0	5.28	1.95	-0.92	-1.69
Post Craving	.78	0	12	7.40	0.75	0.05	-1.94
Post DERS	.87	18	55	38.56	4.73	-0.11	-1.38
Post Mindfulness	.95	53	94	81.45	5.48	-0.05	-1.07
Post Quality of Life	.95	62	108	74.69	5.67	-0.02	-1.59

Note. DASS = Depression Anxiety and Stress Scale, DERS= Difficulty in Emotional Regulation Scale

The mean psychological distress score significantly decreased from 50.15 (SD = 10.31) pre-intervention to 22.48 (SD = 4.97) post-intervention. The decrease in skewness from 0.23 to -0.05 and increase in kurtosis from -0.29 to -1.84 suggests that most participants reported lower psychological distress levels after the intervention, with fewer individuals experiencing high psychological distress. In addition, mean score of depression, anxiety and stress also decreased from pre-test to post-test. These findings indicate that the intervention was highly effective in reducing psychological distress among participants. Participants' craving levels showed reduction from a pre-intervention mean of 15.10 (SD = 4.05) to a post-intervention mean of 7.40 (SD = 0.75). The mean of mindfulness (M=67.95 to 81.45, SD=5.18 to 5.48) and quality of life (M=61.55 to 74.69, SD=9.32 to 5.67) significantly improved from pre-intervention to post-intervention. These findings indicate that the intervention was highly effective in improving mindfulness and quality of life among participants.

Table IV: Independent Sample t-test Comparing Psychological Distress and Craving between Experimental and Control Group (N=40)

	Experimental Group		Control Group		<i>t</i>	<i>p</i>	95% CI	
Variables	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>LL</i>	<i>UL</i>
➤ Pre								
DASS	50.15	10.31	47.40	2.85	1.14	0.25	-2.09	7.59
Depression	9.05	1.73	8.27	0.76	1.83	0.07	-0.08	1.63
Anxiety	7.55	1.06	7.23	2.23	0.82	0.56	-1.44	0.79
Stress	8.80	1.67	7.87	0.88	2.18	0.45	-0.07	1.78
Craving	15.10	4.05	12.90	1.37	2.92	0.06	-1.73	1.86
➤ Post								
DASS	22.45	4.61	42.00	3.38	-21.63	<.001	-21.35	-17.75
Depression	5.50	1.07	7.87	0.96	-10.44	<.001	-7.02	-5.72
Anxiety	4.10	1.85	6.27	0.95	-6.61	<.001	-4.75	-3.59
Stress	5.28	1.95	6.85	0.69	-4.89	<.001	-5.22	-4.19
Craving	7.40	0.75	9.85	1.18	-11.09	<.001	-10.08	-8.81

Note. DASS = Depression Anxiety and Stress Scale, M= Mean, SD = Standard Deviation, LL = Lower Limit, UL = Upper Limit

The post-intervention scores of the experimental and control groups were compared using an independent-samples t-test. The post-intervention scores showed significant improvements in the experimental group compared to the control group. Psychological distress scores were significantly lower in the experimental group (M= 22.45, SD= 4.61) compared to the control group (M= 42.00, SD= 3.38; $t = -21.6$, $p = .000$). Similarly, craving levels were significantly lower in the experimental group (M=7.40, SD= 0.75) compared to the control group (M= 9.85, SD= 1.18; $t = -11.09$, $p = .000$).

Table V: Paired sample T-test for Psychological Distress and Craving (Pre and Post Intervention)

Variables	M	SD	SE	t value	df	p
DASS pre-test	50.15	10.31	1.20	7.51	39	<.001
DASS post-test	22.48	4.97	2.52			
Depression pre-test	9.05	1.73	0.21	6.39	39	<.001
Depression post-test	5.68	1.38	0.53			
Anxiety pre-test	7.55	1.06	0.27	7.82	39	<.001
Anxiety post-test	4.18	1.90	0.36			
Stress pre-test	8.80	1.67	0.22	7.59	39	<.001
Stress post-test	5.28	1.95	0.40			
Craving pre-test	15.10	4.05	0.52	9.11	39	<.001
Craving post-test	7.40	0.75	0.77			

Note. DASS = Depression, Anxiety and Stress Scale; SD = Standard Deviation; SE = Standard Error of the Mean; df = degrees of freedom; p-value = Significance

The findings show that psychological distress had significantly reduced after the intervention. The average score on DASS-21 during the pre-test phase is (M= 50.15, SD = 10.31), and at the post-test phase, the average mean score dropped to 22.48 (SD = 4.97). The paired sample t-test showed that this decrease was statistically significant, $t(39) = 7.51$, $p < .001$, which could show that the MICBT intervention was effective in the reduction of psychological distress in the participants. The findings also revealed a statistically significant reduction in all three dimensions of psychological distress from pre-test to post-test. Specifically, depression scores decreased from 9.05 (SD = 1.73) at pre-test to 5.68 (SD = 1.38) at post-test, $t(39) = 6.39$, $p < .001$. Similarly, anxiety scores declined from 7.55 (SD = 1.06) to 4.18 (SD = 1.90), $t(39) = 7.82$, $p < .001$, while stress scores reduced from 8.80 (SD = 1.67) to 5.28 (SD = 1.95), $t(39) = 7.59$, $p < .001$. Similarly, the levels of craving have also been found to be statistically reduced after the intervention. Craving score was at 15.10 (SD = 4.05) at pre-test, and it reduced to 7.40 (SD = 0.75) at post-test.

Table VI: Independent sample t-test comparing Emotional Regulation, Mindfulness and Quality of Life between Experimental and Control Group (N=40)

Experimental and Control Group (n=10)								
Variables	Experimental Group		Control Group		t	p	95% CI	
	M	SD	M	SD			LL	UL
➤ Pre								
DERS	52.26	4.56	49.85	2.37	2.97	.004	0.79	4.03
Mindfulness	67.95	5.18	71.20	4.81	-2.91	.005	-5.48	1.03
Quality of Life	61.55	9.32	63.25	8.55	-0.85	0.39	-5.68	2.28
➤ Post								
DERS	38.51	4.70	47.65	3.78	-9.46	<.001	-11.06	-7.22
Mindfulness	81.25	5.28	71.65	5.63	7.48	<.001	7.04	12.16
Quality of Life	74.69	5.67	62.38	5.46	9.52	<.001	9.73	14.89

Note. DERS = Difficulty in Emotional Regulation Scale, M= Mean, SD = Standard Deviation, LL = Lower Limit, UL = Upper Limit

Emotional regulation improved moderately in the experimental group (M = 38.51, SD = 4.70) compared to the control group (M = 47.65, SD = 3.78; $t = -9.46$, $p < .001$). Moreover, Mindfulness scores significantly increased in the experimental group (M = 81.25, SD = 5.28) as compared to control group (M = 71.65, SD = 5.63; $t = 7.48$, $p < .001$). Quality of life significantly improved in experimental group (M = 74.69, SD = 5.67) as compared to control group (M = 62.38, SD = 5.46; $t = 9.52$, $p < .001$).

Table VII: Paired sample T-test for Emotional Regulation, Mindfulness and Quality of Life (Pre and Post Intervention)

Variables	<i>M</i>	<i>SD</i>	<i>SE</i>	<i>t value</i>	<i>df</i>	<i>p</i>
DERS pre-test	52.26	4.56	2.28	12.18	39	<.001
DERS post-test	38.56	4.73	1.67			
Mindfulness pre-test	67.95	5.18	1.02	-4.20	39	<.001
Mindfulness post-test	81.45	5.48	1.72			
Quality of Life pre-test	61.55	9.32	1.40	-8.58	39	<.001
Quality of Life post-test	74.69	5.67	2.48			

Note. DERS= Difficulty in Emotional Regulation Scale, *SD* = Standard Deviation; *SE* = Standard Error of the Mean; *df* = degrees of freedom; *p*-value = Significance

The findings show that emotional regulation had remarkably improved after the intervention. The average scores on DERS during the pre-test condition is ($M = 52.26$, $SD = 4.56$), and at the post-test phase, the average mean score was 38.56 ($SD = 4.73$). Mindfulness score was at 67.95 ($SD = 5.18$) at pre-test, and it increased to 81.45 ($SD = 5.48$) at post-test. Similarly, quality of life score was 61.55 ($SD = 9.32$) at pre-test, and it increased to 74.69 ($SD = 5.67$) at post-test. The outcomes of the paired sample t-test showed a significant change in post and pre-intervention scores of mindfulness ($t = -4.20$, $p < .001$) and quality of life ($t = -8.58$, $p < .001$).

IV.DISCUSSION

The current randomized controlled trial was to test the effectiveness of Mindfulness-Integrated Cognitive Behavior Therapy (MiCBT) in the reduction of psychological distress and craving as well as the improvement of emotional regulation, mindfulness, and quality of life in people with the methamphetamine-type stimulant use disorder. The results of the study give significant evidence in response to the developed hypotheses. Findings indicated that participants that were given MiCBT experience a meaningful decrease in psychological distress and craving relative to those that were given Treatment as Usual (TAU) control group once the ten sessions of therapeutic sessions were completed. Moreover, participants in the experimental condition also showed considerable changes of the emotional control, mindfulness, and quality of life compared to the control group. Such results indicate that mindfulness meditation has the potential to be used alongside a cognitive behavioral model as an effective approach to reducing both emotional and behavioral aspects of substance use disorder problems. In general, the findings demonstrate the possible therapeutic utility of MiCBT as a multifaceted intervention with respect to psychological distress and psychological health improvement of persons with problems in the use of stimulants.

Demographics

The demographic details of the participants give effective background information on the sample used in the research. Most of the participants (70%) fell between 26 and 45 years of age suggesting that most substance use issues were most common in people in their early to middle adulthood stage. The proportion of younger age group of 18-25 years was lower (22.5%), but there was only 7.5% of those between 46-55 years. Such distribution implies that the prevalence of methamphetamine use is especially high in the proportion of productive working-age population, which is in line with the past studies that revealed that the rate of stimulant use disorders is notably higher among young and middle-aged adults that might experience occupational stress, social pressure and be prone to lifestyle-related risk factors. Each member of the research was a male, because the prevalence of substance use disorders in men compared to women is quite high in most cultural settings especially in South Asian cultures where substance use in females is not well reported due to sociocultural stigma. In terms of marital status, most of the participants (82.5) were not married, and only 17.5% participants were married. This observation could mean that the unmarried population is more susceptible to substance use or that substance addiction could disrupt the initiation and sustenance of marriage. Regarding education, majority of the participants had done matriculation (92.5%), and a low percentage had higher education. The reduced level of education has been frequently linked to the greater risk of being subject to the abuse of substances because of insufficient knowledge about the negative effects of drugs and employment fewer chances.

Occupational status revealed that a sizable percentage of the respondents were engaged in business (37.5%), private jobs (32.5%), small percentages were unemployed (17.5%), and held government jobs (12.5%). Such distribution implies that substance use disorders are not specific to non-employed groups of people and are prevalent among people in various employment categories. With regards to the family structure, a little over half of the participants were members of joint families (55%), and 45% were members of nuclear family. This can be due to the fact that joint family structures might be a normal family structure in South Asian communities as the extended family structure is a common feature. The income distribution (monthly) revealed that majority of the respondents were in the middle-income bracket with 35 percent of the respondents earning between 50,000 to 100,000 PKR and 32.5 percent earning between 20,000 to 50,000 PKR. Lower percentages indicated higher incomes of above 100,000 PKR (22.5) or lower incomes of below 20,000 PKR (10%). These results indicate that substance use disorder cannot be limited to any socioeconomic group but takes place among various income levels.

Concerning substance-related attributes, all respondents indicated the use of methamphetamine, which validated the study subject on the users of the type of stimulant known as methamphetamine. The majority of participants (52.5) had substance use problems with a period of 0-5 years, which means that many of them were at a rather earlier stage of addiction. In addition, most respondents initially used substances at the age group of 18-22 years (82.5%), which implies that early adulthood is a decisive time frame with regards to the initiation of the use of stimulants. With respect to treatment history, over fifty percent of the participants (57.5) had undergone treatment one to three times in the past, with smaller percentages having been treated more than three times previously, although the substance use disorders are chronic and recurrent. The most common way of substance use was inhalation (85%), with a minor percentage of 15% using drugs orally. Also, the majority of the participants (80 per cent) did not report any family history of drug-taking and none of them was dual-diagnosed, which means that the sample is made of people with substance use disorder, but not one with co-occurring psychiatric disorders. In general, these demographic results offer a valuable context in explaining the findings of the study and point to the major social and clinical peculiarities of the population who is seeking treatment of the drug dependence on methamphetamine.

Descriptive Statistics

The reliability analysis and descriptive statistics of the variables used in the study are helpful in giving general insights on the overall distribution and consistency of the measures used in the study. The reliability coefficients (Cronbach alpha) of most of the scales reflected good to excellent internal consistency; meaning that the instruments of psychological distress, craving, emotional control, mindfulness, and quality of life were good at gauging the study constructs in the sample. In particular, the Depression Anxiety and Stress Scale (DASS) was found to be highly consistent at pre ($\alpha = .88$) and post-test ($\alpha = .94$) which implies that it has a high level of internal consistency in the assessment of psychological distress in the participants. Likewise, the Difficulties in Emotion Regulation Scale (DERS) demonstrated excellent reliability at pre-test ($\alpha = .91$), and good reliability at post-test ($\alpha = .87$), indicating that the scale was an adequate measure of the emotional regulation difficulties in participants. Again, the measures of reliability of the craving measure were acceptable at pre-test ($\alpha = .72$) and slightly better at post-test ($\alpha = .78$), hinged on the fact that the measure of craving levels was satisfactorily consistent by measuring methamphetamine users.

The mindfulness and quality of life scales were also found to have acceptable consistency in general, where the mindfulness scale had moderate consistency at pre-test ($\alpha = .57$) and very high consistency at post-test ($\alpha = .95$). The reduced reliability of pre-test might be due to the fluctuation in the levels of mindfulness of the participants prior to the intervention, but the increased reliability of the post-test could be because of the relative consistency of responses since the participants had been subjected to therapeutic interventions of mindfulness practices. Quality of Life (QoL) scale had acceptable reliability at pre-test ($\alpha = .71$) and excellent reliability at post-test ($\alpha = .95$) indicating that there was a greater consistency in the perceptions on well-being of the participants after the intervention. Descriptively, the averages of the scores demonstrated that initially, the participants were relatively psychologically distressed and craving, as measured in both DASS ($M = 50.15$, $SD = 10.31$) and craving ($M = 15.10$, $SD = 4.05$) means. Emotional regulation at baseline was also significantly challenging to the participants ($M = 52.26$, $SD = 4.56$). Nonetheless, the post-test scores displayed some improvements with the average levels of psychological distress, craving, and emotional regulation difficulties decreasing and the levels of mindfulness and quality of life improved. Also, the skewness and kurtosis of all the variables of study were within the acceptable ranges and this suggests that

the data was approximately normally distributed and could be analyzed using the parametric statistics. On the whole, these descriptive and reliability evidence can confirm the sufficiency of measurement tools applied in the study and will give an initial signal of the psychological functioning improvement after the intervention.

Reduction in Psychological Distress and Craving

The initial hypothesis stated that psychological distress and craving among the participants of the experimental group of the methamphetamine-type stimulant users would be significantly reduced after ten sessions of Mindfulness-Integrated Cognitive Behavior Therapy (MiCBT) in comparison with the Treatment as Usual (TAU) group. This hypothesis was proved by the outcomes of the current research. The experimental and control groups did not differ statistically significantly at the pre-test level in terms of psychological distress based on the Depression Anxiety Stress Scale (DASS) which suggests that the two groups were similar prior to the intervention. Nevertheless, a very important difference between the two groups was noted after the intervention. The psychological distress of the experimental group was significantly (highly significantly) lower than the control group. On the same note, the level of cravings among the participants in the experimental group reduced considerably after the intervention. During pre-test, the craving scores of the experimental were a bit lower than the controls and the difference between the two groups was significant. By the end of the MiCBT sessions, the level of craving significantly decreased in both groups, the experimental and the control. These findings indicate that MiCBT proved to be very useful in suppressing psychological distress as well as craving in methamphetamine users.

The alleviation of psychological distresses found in the current research could be attributed to the psychotherapy effects of MiCBT integration of mindfulness meditation and cognitive behavioral interventions. Mindfulness training is used to teach people to be non-judgmental about the thoughts, emotions, and physical experiences, thus lessening emotional reactivity and stress. The results of the current research are also aligned with the past literature of showing that mindfulness-based interventions are effective in alleviating psychological distress and substance craving. Indicatively, Goldberg et al. (2021) published a systematic review and meta-analysis and found that mindfulness-based interventions have significant effects on reducing craving and substance use behaviors through promoting emotional awareness and self-regulation. Likewise, Sancho et al. (2020) discovered that mindfulness-based therapies played an important role in minimizing craving and risk of relapse in people with substance use disorders. Other studies that specifically studied the disorder of stimulant use have also noted similar results. Grant et al. (2022) have discovered that mindfulness-based relapse prevention was effective in minimizing psychological distress and craving in people who were being treated to stimulant dependence. Similarly, Chmiel et al. (2024) found that mindfulness-based intervention enhanced stress management and lessened craving among methamphetamine users by augmenting cognitive control and emotional awareness. Moreover, Machado et al. (2024) discovered that mindfulness-based programs enhanced psychological wellbeing and minimized substance use tendencies in people who are disposed to substance use disorder treatment. On the same note, Li et al. (2023) established that mindfulness training had a significant impact in reducing craving and emotional distress in stimulant addicts. A different randomized clinical trial by Bowen et al. (2021) showed that mindfulness-based relapse prevention has a significant reduction in craving, and substance use when compared to traditional relapse prevention interventions. Collectively, these results imply that mindfulness-based cognitive behavioral therapies have the potential to be effective in alleviating psychological distress and drug craving through enhancing emotional awareness, improving coping skills and interrupting automatic reactions to drug stimuli.

Improvement in Emotional Regulation, Mindfulness, and Quality of Life

The second hypothesis was that MiCBT would have a significant impact in enhancing emotional regulation, mindfulness, and quality of life in the experimental group compared to Treatment as Usual in the methamphetamine-type stimulant users. This hypothesis was approved by the results of the current research. The findings showed that there were some significant changes on emotional regulation in the participants who were exposed to MiCBT. Mean Difficulties in Emotion Regulation Scale (DERS) in the experimental group at pre-test was and the mean score in the control group is which was found to differ significantly The emotional regulation in the experimental group was also better than the control group after the intervention and the difference was statistically significant. On the same note, the levels of mindfulness improved much higher in participants who were exposed to MiCBT. At pre-test, the experimental group scored lower on mindfulness than the control group and the difference was significant. Nevertheless, the mean level of mindfulness in the experimental group was significantly higher than

in the control group after the intervention which is a significant difference. Moreover, the quality of life was also high after the intervention. Although the difference of the groups during the pre-test was not significant, the difference between the participants who received MiCBT and those who received TAU in the post-test was large and the difference was significant. This is the result of mindfulness of MiCBT that promotes the participants to become more aware and forgiving of their inner experiences. The practice of mindfulness helps people to control their feelings, minimize impulsive responses, and improve their mental health.

These results are in line with other researches that mindfulness-based interventions enhance emotional regulation and psychological functioning. The findings of Guendelman et al. (2020) revealed that mindfulness-based interventions were shown to be of significant help in emotion regulation and also minimized emotion reactivity in psychologically distraught individuals. Likewise, Tang et al. (2022) found that emotional regulation is improved through mindfulness training, which provides a boost of neural systems related to attention and self-regulation. These findings are also supported by research based on addiction treatment. Garland et al. (2022) established that mindfulness-oriented recovery enhancement was very effective in enhancing emotional regulation and decreasing substance misuse. Similarly, Bowen et al. (2021) said that mindfulness-based relapse prevention had a significant positive effect on increasing mindfulness skills and decreasing the risk of relapse in people with substance use disorders. The rise in the level of mindfulness that is revealed in the current study can be also complemented by Creswell (2021) who emphasized that mindfulness-based interventions have a great effect on the awareness of the moment and cognitive flexibility. Also, Machado et al. (2024) found that mindfulness-based interventions positively affected the psychological wellbeing and emotional regulation among addicts receiving treatment. The quality of life improvement that was witnessed in the current study is in line with the literature on the same study (Li et al., 2023) who conducted research and discovered that mindfulness-based therapy was very effective in improving life satisfaction and the overall wellbeing of individuals with substance use disorders. On the same note, Chmiel et al. (2024) explained that mindfulness-based interventions enhanced quality of life through the minimization of psychological distress and increase in emotional resilience. On the whole, these results suggest that MiCBT is a promising tool in enhancing the emotional control, mindfulness, and quality of life of patients with methamphetamine-type stimulant use disorder. Covering various psychological processes that cause addiction, MiCBT offers an integrated treatment formula that promotes the long-term recovery and psychological wellbeing.

Limitations and Recommendations

Although the present study has found significant results, it is important to note that there were a number of limitations when interpreting the findings. To begin with, the study sample was rather small ($N = 40$), which might not allow generalizing the findings to the general population of people having a methamphetamine-type stimulant use disorder. Though randomized controlled trials using small samples can still bring useful information as to the effectiveness of the treatment, larger samples would be more statistically powered and would give more accurate information on treatment effects. Second, males were the only participants of the study, which limited the generalization of the results to female substance users. The previous studies have reported gender variations in addiction patterns, emotional control, and response to treatment, and thus, the efficacy of MiCBT among female methamphetamine users is not clear. Third, the research was based mainly on self-report psychological assessment including DASS, DERS, mindfulness, craving and quality of life scales. Although these measures showed a good degree of reliability and validity, self-report data could be deformed by the bias of responses, the social desirability, or the false perception about self-perception. The other weakness is the lack of a follow-up assessment in the long term. The intervention assessed the impact of MiCBT soon after the intervention was over; the reason being that it has not been determined how well these effects of treatment are long-term. Substance use disorders are progressive and relapse ones and follow-up evaluation would be required with the passage of time to establish whether the distress, craving, emotional regulation, and quality of life are improved throughout. Also, the researchers were interested in a particular group of users of methamphetamine-type stimulants under the care of a treatment facility, which could restrict the applicability of the study findings to other users and those not under formal treatment programs. Such limitations imply that one needs to approach the results very carefully and that further studies are necessary to consolidate the evidence on the effectiveness of MiCBT in the treatment of addicts.

According to the results and restrictions of the current research, it is possible to make a number of proposals that should be made in the future research. To begin with, the research should be expanded in terms of samples to make

the results more objective and to focus on the possibility of the same research results working in different demographic groups. More specifically, incorporating female subjects and people with various socioeconomic and cultural orientations would offer a greater idea of the effectiveness of the intervention. Second, the long-term efficacy of MiCBT in terms of sustaining the decrease in craving and psychological distress and the further continuation of the enhancement of the emotional regulation and mindfulness and quality of life should be investigated with longitudinal research designs, with follow-up assessment. Third, it might be possible to compare MiCBT with other evidence-based interventions of substance use disorders, including standard cognitive behavioral therapy, motivational interviewing, or mindfulness-based relapse prevention, to establish how effective these modalities are in comparison to each other. Fourth, the researchers can also investigate the therapeutic effect of MiCBT and the mechanisms behind this therapeutic effect by studying the mediating variables including self-compassion, cognitive flexibility, stress tolerance, and neurocognitive functioning. Alternatively, objective self-report data can be supplemented by using biological drugs screening or behavioral measures to improve the methodological rigor of the future research. Lastly, the possibility of applying MiCBT to community-based addiction treatment centers and rehabilitation facilities should be further studied, which, hopefully, will yield some useful information on its applicability in practice.

Theoretical and Practical / Clinical Implications

The results of the current research are added to the ever-growing list of theoretical research that focuses on highlighting the importance of mindfulness and cognitive-behavioral mechanisms in the treatment of substance use disorders. Theoretically, the findings are in line with addiction models that emphasize the relevance of emotional dysregulation, dysfunctional ways of thinking, and automatic reaction to situations in sustaining addictive behavior. The observed dramatic decrease in psychological sufferings and craving in the current study is an empirical validation of the theoretical supposition that mindfulness-based cognitive interventions may disrupt the negative affect, craving, and substance use cycle. Moreover, the enhancement of emotional regulation and mindfulness adds to the theoretical basis of Mindfulness-Integrated Cognitive Behavior Therapy that postulates that, the more the person is aware of sensations, thoughts, and emotions, he/she can discontinue the habitual reactive patterns that individuals with addiction are used to. The results also support transdiagnostic models of psychological interventions that indicate that mindfulness-based therapies have the potential to stimulate several psychological processes, such as stress, emotional dysregulation, and impaired wellbeing. As such, the current research paper would add to the theoretical knowledge by establishing how mindfulness-based interventions combined with cognitive behavioral concepts can be successfully used to address the main psychological processes underlying stimulant addiction.

The practical and clinical implications of the current study to the areas of addiction treatment and mental health services are also significant. The evidence indicates that the Mindfulness-Integrated Cognitive Behavior Therapy is potentially an efficient therapeutic method that can be used to decrease the levels of psychological distress and craving in patients with the methamphetamine-type stimulant use disorder. Since relapse rates are high when it comes to the process of addiction to stimulants, the incorporation of mindfulness-based cognitive behavioral techniques into the rehabilitation process can equip the patients with various practical skills that could allow them to better address cravings, emotions, and stress. Structured MiCBT programs can be implemented in the form of specific therapeutic services in the treatment centers and rehabilitation facilities. Moreover, when mental health professionals, psychologists, and other professionals working with addicts are trained on mindfulness-based methods of therapy, the effectiveness of the current treatment programs can be increased. This enhancement of emotional control, mindfulness, and life quality in the context of this study also implies that MiCBT could be used as part of general psychosocial rehabilitation to assist people in recovering functional coping skills and enhancing wellbeing. In addition, the intervention is comparatively organized and could be administered in groups or as an individual intervention, which is why it is a relatively cheap and readily available means of treatment within an addiction recovery program. This could be an option of policymakers and healthcare providers to include mindfulness-based strategies as part of public health to manage substance use disorders especially in areas where the use of stimulants is on the rise.

V. CONCLUSION

The current randomized controlled trial was to test the effectiveness of Mindfulness-Integrated Cognitive Behavior Therapy (MiCBT) in terms of psychological distress reduction, craving, and emotional regulation, mindfulness, and quality of life in people with methamphetamine-type stimulant use disorder. The results of the research were quite convincing in regard to the two hypotheses. Contributors who were exposed to MiCBT experienced a tremendous decrease in psychological misery and demand than those who received the Treatment as Usual. Moreover, the intervention needed a significant change in emotional regulation, mindfulness, and the quality of life. These findings demonstrate the possibility of using MiCBT as a powerful and integrated treatment option to deal with the psychological and behavioral aspects of stimulant addiction. MiCBT allows people to be more mindful of what is going on inside and to better control emotions and cravings through a combination of mindfulness techniques with cognitive behavioral interventions. On balance, the research provides important evidence on why mindfulness-based cognitive behavioral treatments should be applied to address addiction and the need to focus on regulating emotions and developing psychological wellbeing as a component of the recovery process.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Funding

The author received no funding from any organizations.

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