RESEARCH ARTICLE

EFFECTIVENESS OF DIALECTICAL BEHAVIOUR THERAPY ON DISTRESS TOLERANCE AMONG PATIENTS WITH ALCOHOL DEPENDENCE SYNDROME: A PILOT STUDY

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Short title: DBT and Distress Tolerance in Alcohol Dependence

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ABSTRACT

Background: Alcohol dependence syndrome (ADS) is a chronic, relapsing condition characterised by compulsive alcohol use and significant emotional dysregulation. Low distress tolerance (DT) is a key mechanism underlying relapse in individuals with ADS. Dialectical behaviour therapy (DBT) targets distress tolerance through structured, skill-based modules; however, controlled pilot evidence from Indian de-addiction settings remains limited.

Methods: A quasi-experimental, non-randomised, pre-test/post-test design with a control group was adopted. Twenty male patients with ADS (experimental n=10; control n=10) were recruited from de-addiction centres in Chennai, India. Outcomes were measured with the Distress Tolerance Scale, comprising four subscales: tolerance, appraisal, absorption and regulation. The experimental group received a 12-session DBT programme over four weeks covering mindfulness, distress tolerance skills and emotion regulation, while the control group received routine care. Data were analysed using paired t-tests (within groups) and independent t-tests (between groups).

Results: The experimental group showed significant improvements in all four DT subscales and the total DT score at post-test (p=0.0001). Tolerance scores improved from a pre-test mean of 6.5 (SD=0.97) to 10.2 (SD=0.92); appraisal from 15.0 (SD=2.26) to 21.0 (SD=1.56); absorption from 7.0 (SD=1.15) to 10.4 (SD=0.84); regulation from 5.5 (SD=1.51) to 10.5 (SD=1.58); and total DT from 34.0 (SD=3.65) to 52.1 (SD=2.77). No significant changes were observed in the control group. Between-group comparisons showed significantly higher post-test DT scores in the experimental group across all subscales (p=0.0001). Educational status and smoking history were significantly associated with post-test DT scores in the experimental group.

Conclusion: DBT significantly improved distress tolerance among male patients with ADS. Structured DBT programmes merit integration into routine de-addiction care to address the emotional dysregulation underlying relapse. Larger randomised controlled trials are warranted to confirm and extend these pilot findings.

Keywords: Dialectical behaviour therapy, Distress tolerance, Alcohol dependence syndrome, Mindfulness, Emotion regulation, De-addiction, Pilot study.

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INTRODUCTION

Alcohol dependence syndrome (ADS) is a chronic, relapsing neurobiological disorder characterised by compulsive alcohol consumption, loss of control over intake, and continued use despite adverse consequences. Globally, alcohol use disorders affect an estimated 280 million individuals, contributing substantially to morbidity, mortality and socioeconomic burden.[1] In India, ADS is among the most prevalent substance use disorders, and high rates of relapse following treatment discharge remain a persistent clinical challenge, underscoring the need for targeted psychosocial interventions.[2]

A central construct implicated in relapse vulnerability is distress tolerance (DT), defined as the perceived and actual capacity of an individual to withstand aversive emotional, cognitive and physiological states.[1] Individuals with ADS commonly exhibit impaired DT, rendering them susceptible to affective dysregulation during periods of abstinence. When confronted with negative internal states, those with

low DT are more likely to use alcohol as a form of emotional relief, thereby perpetuating the cycle of dependence.[3] Carpenter et al.[1] proposed a conceptual framework linking low DT to the maintenance of alcohol use disorder (AUD), arguing that interventions specifically targeting DT may interrupt relapse pathways by reducing affective vulnerability.

Dialectical behaviour therapy (DBT), originally developed by Linehan,[4] is a comprehensive, evidence-based psychotherapy grounded in cognitive-behavioural principles and enriched by dialectical philosophy and mindfulness practices. DBT was initially formulated for borderline personality disorder but has since demonstrated efficacy across multiple conditions characterised by emotional dysregulation, including substance use disorders.[5] The therapy comprises four skill modules (mindfulness, distress tolerance, emotion regulation and interpersonal effectiveness), each targeting specific mechanisms of emotional and behavioural dysfunction.[3]

A growing body of recent research supports the application of DBT in AUD. Using daily diary methodology, Cludius and Kröger[3] found that DBT skills use was significantly associated with reduced urges to drink, with distress tolerance skills demonstrating the strongest buffering effect. In an ecological momentary assessment study, Cludius et al.[6] further reported that DBT skill use was inversely associated with same-day alcohol consumption in outpatient treatment. Chavooshi et al.[7] demonstrated that structured emotion regulation interventions yielded significant improvements in DT and craving among patients with ADS in a controlled trial. In a stage II randomised controlled trial, Carpenter et al.[2] confirmed that an emotion regulation treatment targeting DT significantly reduced drinking days compared with a control condition in individuals with AUD.

In a systematic review, Rodrigues et al.[5] reported that emotion regulation-based therapies, including DBT, produced medium-to-large effect sizes in reducing substance use and enhancing coping capacity. Rahimi et al.[8] demonstrated that group-based DBT combined with structured matrix training effectively reduced substance use and improved psychological functioning in a controlled sample. Cludius et al.[9] conducted multilevel analyses confirming longitudinal associations between DBT skill use and treatment outcomes in alcohol-dependent samples, lending further support to the skills-based mechanism of change.

Despite this growing evidence, the application of structured DBT programmes in Indian de-addiction settings remains limited, and studies examining the effect of DBT on DT as a subscale-level outcome alongside a controlled comparison group are scarce in this context. This pilot study was therefore designed to evaluate the effectiveness of a 12-session DBT programme on distress tolerance, across the subscales of tolerance, appraisal, absorption and regulation, among male patients with ADS admitted to de-addiction centres in Chennai, India.

Need for the Study

Alcohol dependence syndrome is associated with high rates of relapse, and emotional dysregulation, particularly impaired distress tolerance, has been identified as a proximal mechanism driving relapse behaviour.[1] Individuals with ADS frequently lack the skills to tolerate and regulate negative affect, and this deficit is exacerbated during early abstinence, when emotional reactivity is heightened.[3] While pharmacological management is the mainstay of inpatient de-addiction treatment, it does not adequately address the cognitive and emotional antecedents of alcohol use. Psychosocial interventions targeting DT and emotion regulation are therefore essential for sustainable recovery.[5] Although DBT has demonstrated efficacy in Western clinical settings, its systematic implementation and evaluation within Indian de-addiction centres, particularly using validated DT-specific outcome measures and controlled comparison groups, remain limited.[7,8] There is, therefore, a pressing need for pilot evidence to inform the development of culturally contextualised, scalable DBT programmes for patients with ADS in India.

Aim and Objectives

The aim of this study was to evaluate the effectiveness of DBT on distress tolerance among patients with ADS admitted to de-addiction centres in Chennai, India. The objectives were:

1. To assess the pre- and post-intervention distress tolerance scores, across the subscales of tolerance, appraisal, absorption and regulation and the total score, in both the experimental and control groups.
2. To compare the post-intervention distress tolerance scores between the experimental and control groups across all subscales and the total score.
3. To determine the association between selected socio-demographic and clinical variables and the post-intervention distress tolerance scores in both groups.

MATERIALS AND METHODS

Research Design

A quasi-experimental, non-randomised, pre-test/post-test design with a control group was adopted for the pilot study. Participants were allocated to the experimental or control group on the basis of their admission to the designated de-addiction facility, with the experimental group recruited from one centre and the control group from another to minimise the risk of contamination. This design was selected given the logistical constraints of conducting randomised controlled trials within residential de-addiction settings in India.

Setting

The pilot study was conducted at Helping Hearts Rehabilitation Centre, Chennai, Tamil Nadu, India. The main study was subsequently conducted at selected de-addiction centres across Chennai. These centres provide comprehensive inpatient treatment for individuals with substance use disorders, including detoxification, pharmacological management and supportive counselling.

Sample and Sampling Technique

A purposive sampling technique was employed. Twenty male patients with a confirmed diagnosis of ADS according to the International Classification of Diseases (ICD-10) criteria were recruited and assigned to the experimental group (n=10) or the control group (n=10). Inclusion criteria

were male gender; age 18–60 years; confirmed ADS diagnosis per ICD-10; current admission to a de-addiction centre; and ability to communicate in Tamil or English. Patients with severe psychiatric comorbidities, significant cognitive impairment or an inability to participate in group sessions were excluded.

Instrument

Distress tolerance was assessed using the Distress Tolerance Scale (DTS),[10] a 15-item self-report instrument that measures an individual's capacity to tolerate negative emotional states. The DTS comprises four subscales: tolerance (3 items; range 3–15), which assesses the ability to withstand distress; appraisal (6 items; range 6–30), which measures the subjective evaluation of distress; absorption (3 items; range 3–15), which captures the degree to which attention is consumed by distress; and regulation (3 items; range 3–15), which reflects beliefs about one's ability to regulate distress. Total DT scores range from 15 to 75, with higher scores indicating greater distress tolerance. The instrument has demonstrated adequate internal consistency and construct validity in clinical and non-clinical populations.

Intervention

The DBT programme was delivered in 12 structured group sessions over four weeks (three sessions per week), each lasting approximately 60–90 minutes. The programme was facilitated by a trained clinical psychologist or psychiatric nurse with competency in DBT principles. The session-wise content was as follows:

- **Session 1, psychoeducation:** Participants were introduced to the concept of ADS, its neurobiological basis, the relapse cycle and the rationale for developing distress tolerance skills. The goals and structure of the DBT programme were explained.
- **Sessions 2–5, mindfulness skills:** Core mindfulness principles were introduced, including the 'what' skills (observe, describe, participate) and the 'how' skills (non-judgementally, one-mindfully, effectively). Practical exercises included grounding techniques, diaphragmatic breathing and progressive muscle relaxation to cultivate present-moment awareness.
- **Sessions 6–8, distress tolerance skills:** Skills for tolerating acute emotional crises without resorting to alcohol were taught, including the TIPP technique (Temperature, Intense exercise, Paced breathing, Paired muscle relaxation) for physiological regulation and the ACCEPTS strategy (Activities, Contributing, Comparisons, Emotions, Pushing away, Thoughts, Sensations) for cognitive distraction and crisis survival.
- **Session 9, psychoeducation (relapse prevention):** This session focused on identifying early warning signs of relapse, the role of emotional triggers and the application of acquired DT skills in high-risk situations.
- **Sessions 10–12, emotion regulation skills:** Participants were taught to identify and label primary emotions, understand the function of emotions, apply the 'opposite action' technique for reducing unwanted emotional responses and practise self-validation. Skills for reducing emotional vulnerability (PLEASE skills: treating PhysicaL illness, balanced Eating, avoiding mood-Altering substances, balanced Sleep and Exercise) were also introduced.

Statistical Analysis

Data were entered and analysed using the Statistical Package for the Social Sciences (SPSS) version 21.0. Descriptive statistics (frequency, percentage, mean and standard deviation) were used to summarise demographic and clinical characteristics. The chi-square test for homogeneity was used to confirm the comparability of the experimental and control groups at baseline. Within-group changes in DT scores from pre-test to post-test were examined using the paired samples t-test, and between-group differences in post-test DT scores were assessed using Student's independent samples t-test. Associations between selected socio-demographic and clinical variables and post-test DT scores were evaluated using one-way analysis of variance (ANOVA) or Student's independent t-test, as appropriate. Statistical significance was set at $p<0.05$.

RESULTS

The results are presented in four sections: (i) the demographic profile of the sample; (ii) within-group pre-test/post-test comparisons using paired t-tests; (iii) between-group comparisons at pre-test and post-test using independent samples t-tests; and (iv) associations between post-test distress tolerance scores and selected demographic variables.

Table 1: Frequency and percentage distribution of demographic variables of patients with alcohol dependence syndrome (N = 20; 10 + 10)

Demographic Variables	Experimental Group		Control Group		Chi-Square for Homogeneity
	F	%	F	%	
Age in years					χ^2=3.111, p=0.375, N.S
18 – 30	2	20.0	1	10.0	
31 – 40	4	40.0	5	50.0	
41 – 50	4	40.0	2	20.0	
>50	0	0	2	20.0	
Marital status					χ^2=2.891, p=0.236, N.S
Single	4	40.0	1	10.0	
Married	5	50.0	6	60.0	

Demographic Variables	Experimental Group		Control Group		Chi-Square for Homogeneity
	F	%	F	%	
Divorced	1	10.0	3	30.0	
Domicile					χ^2=0.291, p=0.865, N.S
Urban	6	60.0	5	50.0	
Rural	2	20.0	3	30.0	
Sub urban	2	20.0	2	20.0	
Religion					χ^2=0.000, p=1.000, N.S
Hindu	7	70.0	7	70.0	
Muslim	1	10.0	1	10.0	
Christian	2	20.0	2	20.0	
Others	-	-	-	-	
Educational status					χ^2=2.222, p=0.528, N.S
No formal education	1	10.0	0	0	
School education	4	40.0	5	50.0	
Undergraduate	4	40.0	5	50.0	
Postgraduate	1	10.0	0	0	
Employment status					χ^2=3.877, p=0.144, N.S
Self employed	1	10.0	4	40.0	
Public sector	2	20.0	0	0	
Private sector	7	70.0	6	60.0	
Unemployed	-	-	-	-	
Family monthly income					χ^2=4.067, p=0.131, N.S
<10000	1	10.0	5	50.0	
10001 – 20000	3	30.0	1	10.0	
>20000	6	60.0	4	40.0	
Type of family					χ^2=2.400, p=0.301, N.S
Nuclear	3	30.0	6	60.0	
Joint	6	60.0	4	40.0	
Broken	1	10.0	0	0	
Age at first use					χ^2=0.202, p=0.663, N.S
≤20	5	50.0	4	40.0	
21 – 30	5	50.0	6	60.0	
>30	-	-	-	-	
Duration of alcohol intake in years					χ^2=0.000, p=1.000, N.S
0 – 5	1	10.0	1	10.0	
6 – 10	1	10.0	1	10.0	
>10	8	80.0	8	80.0	
History of smoking					χ^2=0.000, p=1.000, N.S
Yes	5	50.0	5	50.0	
No	5	50.0	5	50.0	
Presence of any other family member addict					χ^2=0.952, p=0.329, N.S
Yes	8	80.0	6	60.0	
No	2	20.0	4	40.0	
Prior attempt quit					χ^2=0.220, p=0.639, N.S
Yes	6	60.0	7	70.0	
No	4	40.0	3	30.0	
Number of relapse					χ^2=7.098, p=0.069, N.S

Demographic Variables	Experimental Group		Control Group		Chi-Square for Homogeneity
	F	%	F	%	
1	4	66.7	0	0	
2	1	16.7	4	57.1	
3	1	16.7	2	28.6	
>3	0	0	1	14.3	
Reasons for failure					χ^2=0.627, p=0.429, N.S
Lack of support	3	50.0	5	71.4	
Physical / Medical problems	-	-	-	-	
Peer pressure	3	50.0	2	28.6	
Easy availability of substance	-	-	-	-	
Brought to facility by					χ^2=1.053, p=0.305, N.S
Family / Friends	10	100.0	9	90.0	
Self-Intent	0	0	1	10.0	
Government	-	-	-	-	
Referred by doctors	-	-	-	-	
Preexisting medical condition					χ^2=0.392, p=0.531, N.S
Yes	2	20.0	1	10.0	
No	8	80.0	9	90.0	

F: frequency; N.S: not significant.

Table 1 presents the socio-demographic and clinical characteristics of the 20 participants in the experimental (n=10) and control (n=10) groups. The majority of participants were aged 31–50 years, employed in the private sector and had a duration of alcohol intake exceeding 10 years. All participants in the experimental group and 90% of those in the control group were brought to the facility by family members or friends. Chi-square values for all demographic variables were non-significant (p>0.05), indicating that the two groups were comparable at baseline.

Within-Group Comparison (Paired t-Test)

Table 2: Comparison of pre-test and post-test scores of distress tolerance (tolerance) among patients with alcohol dependence in the experimental and control groups (N = 20; 10 + 10)

Tolerance	Pretest		Post Test		Mean diff.	Paired t	p-value
	M	SD	M	SD			
Experimental group	6.5	0.97	10.2	0.92	3.7	8.748	0.0001, S*
Control Group	6.6	1.78	6.4	1.84	0.20	0.264	0.798, N.S

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 2 and Figure 1 show the within-group comparison of tolerance subscale scores. The experimental group recorded a statistically significant increase from a pre-test mean of 6.5 (SD=0.97) to a post-test mean of 10.2 (SD=0.92) (mean difference=3.7; t=8.748; p=0.0001). In contrast, the control group showed no significant change (pre-test M=6.6, SD=1.78; post-test M=6.4, SD=1.84; t=0.264; p=0.798), indicating that the DBT intervention specifically improved the ability to tolerate distress.

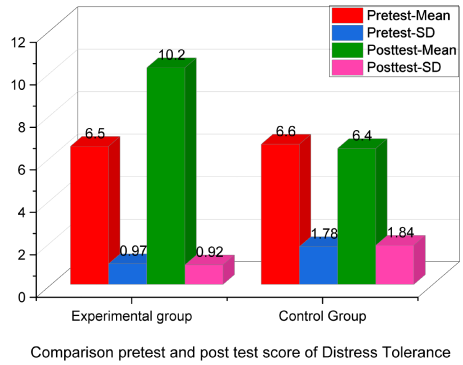


Figure 1: Comparison of pre-test and post-test scores of distress tolerance (tolerance) in the experimental and control groups

Table 3: Comparison of pre-test and post-test scores of distress tolerance (appraisal) among patients with alcohol dependence in the experimental and control groups (N = 20; 10 + 10)

Appraisal	Pretest		Post Test		Mean diff.	Paired t	p-value
	M	SD	M	SD			
Experimental group	15.0	2.26	21.0	1.56	6.0	9.762	0.0001, S*
Control Group	15.8	2.29	16.5	2.72	0.70	1.561	0.153, N.S

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 3 presents the within-group comparison for the appraisal subscale, which measures how individuals evaluate distress. The experimental group showed a highly significant improvement from pre-test (M=15.0, SD=2.26) to post-test (M=21.0, SD=1.56; mean difference=6.0; t=9.762; p=0.0001). The control group showed a marginal, non-significant change (M=15.8 to 16.5; t=1.561;

p=0.153), indicating that DBT skills training improved cognitive appraisal of distressing situations.

Table 4: Comparison of pre-test and post-test scores of distress tolerance (absorption) among patients with alcohol dependence in the experimental and control groups (N = 20; 10 + 10)

Absorption	Pretest		Post Test		Mean diff.	Paired t	p-value
	M	SD	M	SD			
Experimental group	7.0	1.15	10.4	0.84	3.4	7.141	0.0001, S*
Control Group	6.3	1.16	6.8	1.23	0.50	1.000	0.343, N.S

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 4 and Figure 2 depict the within-group changes in absorption, which reflects the degree to which a person is absorbed by or preoccupied with distress. The experimental group demonstrated a significant increase (M=7.0, SD=1.15 to M=10.4, SD=0.84; mean difference=3.4; t=7.141; p=0.0001), whereas the control group showed only a small, non-significant improvement (M=6.3 to 6.8; t=1.000; p=0.343), suggesting that DBT reduced preoccupation with distressing stimuli.

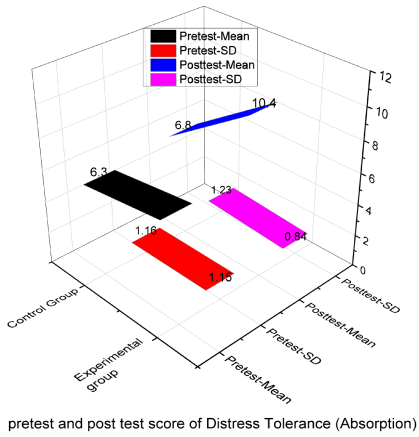


Figure 2: Comparison of pre-test and post-test scores of distress tolerance (absorption) in the experimental and control groups

Table 5: Comparison of pre-test and post-test scores of distress tolerance (regulation) among patients with alcohol dependence in the experimental and control groups (N = 20; 10 + 10)

Regulation	Pretest		Post Test		Mean diff.	Paired t	p-value
	M	SD	M	SD			
Experimental group	5.5	1.51	10.5	1.58	5.0	7.50	0.0001, S*
Control Group	5.5	1.27	6.7	1.34	1.2	2.092	0.066, N.S

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 5 presents the regulation subscale comparison, which assesses an individual's belief in their ability to regulate emotions during distress. A significant improvement was observed in the experimental group (M=5.5, SD=1.51 to M=10.5, SD=1.58; mean difference=5.0; t=7.50; p=0.0001). The control group showed a non-significant trend towards improvement (M=5.5 to 6.7; t=2.092; p=0.066).

Table 6: Comparison of pre-test and post-test scores of overall distress tolerance among patients with alcohol dependence in the experimental and control groups (N = 20; 10 + 10)

Overall DT	Pretest		Post Test		Mean diff.	Paired t	p-value
	M	SD	M	SD			
Experimental group	34.0	3.65	52.1	2.77	18.1	12.493	0.0001, S*
Control Group	34.2	3.43	36.4	2.72	2.2	1.754	0.113, N.S

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 6 and Figure 3 summarise the overall distress tolerance scores. The experimental group demonstrated a large and statistically significant improvement from pre-test (M=34.0, SD=3.65) to post-test (M=52.1, SD=2.77), with a mean difference of 18.1 (t=12.493; p=0.0001). The control group showed a minimal, non-significant increase (M=34.2 to 36.4; mean difference=2.2; t=1.754; p=0.113). These findings indicate that the 12-session DBT programme significantly enhanced distress tolerance among patients with ADS.

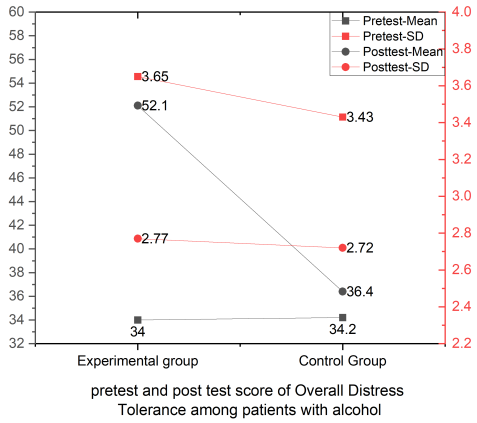


Figure 3: Comparison of pre-test and post-test scores of overall distress tolerance in the experimental and control groups

Between-Group Comparison (Independent Samples t-Test)

Between-group comparisons were conducted using Student's independent samples t-test to determine whether the experimental and control groups differed in distress tolerance scores at pre-test and post-test. A significant between-group difference at post-test, in the absence of a pre-test difference, would provide evidence of the intervention's effectiveness.

Table 7: Comparison of pre-test and post-test scores of distress tolerance (tolerance) between the experimental and control groups (N = 20; 10 + 10)

Tolerance	Experimental		Control		Mean diff.	Indep. t	p-value
	M	SD	M	SD			
Pretest	6.5	0.97	6.6	1.78	0.10	10.56	0.878, N.S
Post Test	10.2	0.92	6.4	1.84	3.8	5.848	0.0001, S*

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 7 presents the between-group comparison on the tolerance subscale. At pre-test, the experimental and control groups had comparable mean scores (experimental M=6.5, SD=0.97; control M=6.6, SD=1.78; t=10.56; p=0.878), confirming baseline equivalence. At post-test, the experimental group demonstrated a significantly higher

mean score (M=10.2, SD=0.92) than the control group (M=6.4, SD=1.84), with a mean difference of 3.8 (t=5.848; p=0.0001), indicating a significant effect of the DBT intervention on the ability to tolerate distress.

Table 8: Comparison of pre-test and post-test scores of distress tolerance (appraisal) between the experimental and control groups (N = 20; 10 + 10)

Appraisal	Experimental		Control		Mean diff.	Indep. t	p-value
	M	SD	M	SD			
Pretest	15.0	2.26	15.8	2.29	0.80	0.784	0.443, N.S
Post Test	21.0	1.56	16.5	2.72	4.5	4.538	0.0001, S*

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 8 and Figure 4 show the between-group comparison for the appraisal subscale, which reflects cognitive evaluation of distress. No significant baseline difference was found (experimental M=15.0, SD=2.26; control M=15.8, SD=2.29; t=0.784; p=0.443). At post-test, the experimental group scored significantly higher (M=21.0, SD=1.56) than the control group (M=16.5, SD=2.72), with a mean difference of 4.5 (t=4.538; p=0.0001), demonstrating that the DBT programme substantially improved cognitive appraisal of distressing situations.

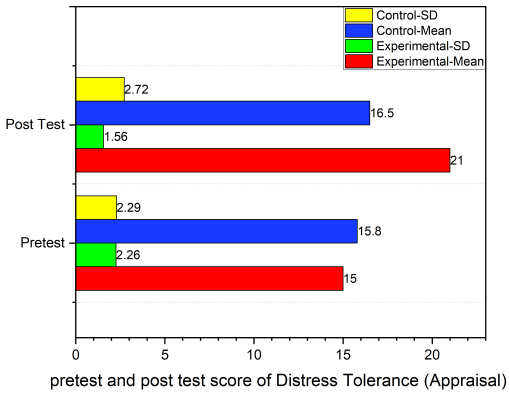


Figure 4: Comparison of pre-test and post-test scores of distress tolerance (appraisal) between the experimental and control groups

Table 9: Comparison of pre-test and post-test scores of distress tolerance (absorption) between the experimental and control groups (N = 20; 10 + 10)

Absorption	Experimental		Control		Mean diff.	Indep. t	p-value
	M	SD	M	SD			
Pretest	7.0	1.15	6.3	1.16	0.7	1.353	0.193, N.S
Post Test	10.4	0.84	6.8	1.23	3.6	7.637	0.0001, S*

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 9 presents between-group differences in the absorption subscale, which measures the extent to which distress dominates attention. The groups were equivalent at pre-test (experimental M=7.0, SD=1.15; control M=6.3, SD=1.16; t=1.353; p=0.193). After the intervention, the experimental group showed a significantly higher mean (M=10.4, SD=0.84) than the control group (M=6.8, SD=1.23), with a mean difference of 3.6 (t=7.637; p=0.0001), indicating that DBT skills training reduced preoccupation with distressing stimuli.

Table 10: Comparison of pre-test and post-test scores of distress tolerance (regulation) between the experimental and control groups (N = 20; 10 + 10)

Regulation	Experimental		Control		Mean diff.	Indep. t	p-value
	M	SD	M	SD			
Pretest	5.5	1.51	5.5	1.27	0.00	0.000	1.000, N.S
Post Test	10.5	1.58	6.7	1.34	3.8	5.802	0.0001, S*

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 10 displays between-group comparisons on the regulation subscale, which assesses belief in one's ability to regulate emotions. The groups were matched at baseline (experimental M=5.5, SD=1.51; control M=5.5, SD=1.27; t=0.000; p=1.000). At post-test, the experimental group demonstrated a significantly higher score (M=10.5, SD=1.58) than the control group (M=6.7, SD=1.34), with a mean difference of 3.8 (t=5.802; p=0.0001), indicating that the intervention strengthened emotion regulation capacity.

Table 11: Comparison of pre-test and post-test scores of overall distress tolerance between the experimental and control groups (N = 20; 10 + 10)

Overall DT	Experimental		Control		Mean diff.	Indep. t	p-value
	M	SD	M	SD			
Pretest	34.0	3.65	34.2	3.43	0.2	0.126	0.901, N.S
Post Test	52.1	2.77	36.4	2.72	15.7	12.81	0.0001, S*

*M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

Table 11 summarises the between-group comparison for overall distress tolerance. At pre-test, both groups were comparable (experimental M=34.0, SD=3.65; control M=34.2, SD=3.43; t=0.126; p=0.901). After the 12-session DBT intervention, the experimental group recorded a substantially higher overall DT score (M=52.1, SD=2.77) than the control group (M=36.4, SD=2.72), with a mean difference of 15.7 (t=12.81; p=0.0001).

Association of Post-Test Distress Tolerance with Demographic Variables

Table 12: Association of post-test distress tolerance scores of patients with alcohol dependence in the experimental group with selected demographic variables (N = 10)

Demographic Variables	F	Mean	S.D	One Way ANOVA/ Student Independent "t" test & p-value
Age in years				F=0.343, p=0.721, N.S
18 – 30	2	51.00	0.00	
31 – 40	4	51.75	4.19	
41 – 50	4	53.00	1.83	

Demographic Variables	F	Mean	S.D	One Way ANOVA/ Student Independent "t" test & p-value
>50	0	-	-	
Marital status				F=0.157, p=0.858, N.S
Single	4	52.75	2.36	
Married	5	51.60	3.51	
Divorced	1	52.00	-	
Domicile				F=3.107, p=0.108, N.S
Urban	6	53.00	2.09	
Rural	2	48.50	3.54	
Sub urban	2	53.00	1.41	
Religion				F=0.563, p=0.593, N.S
Hindu	7	51.86	3.13	
Muslim	1	55.00	-	
Christian	2	51.50	0.71	
Others	-	-	-	
Educational status				F=12.505, p=0.005, S*
No formal education	1	53.00	-	
School education	4	54.25	1.71	
Undergraduate	4	51.25	0.50	
Postgraduate	1	46.00	-	
Employment status				F=0.186, p=0.834, N.S
Self employed	1	53.00	-	
Public sector	2	53.00	1.41	
Private sector	7	51.71	3.25	
Unemployed	-	-	-	
Family monthly income				F=2.605, p=0.143, N.S
<10000	1	56.00	-	
10001 – 20000	3	53.33	1.53	
>20000	6	50.83	2.64	
Type of family				F=0.145, p=0.868, N.S
Nuclear	3	51.33	5.03	
Joint	6	52.50	1.76	
Broken	1	52.00	-	
Age at first use				t=0.325, p=0.755, N.S
≤20	5	52.40	2.07	
21 – 30	5	51.80	3.56	
>30	-	-	-	
Duration of alcohol intake in years				F=0.106, p=0.901, N.S
0 – 5	1	51.00	-	
6 – 10	1	53.00	-	
>10	8	52.13	3.09	
History of smoking				t=2.404, p=0.045, S*
Yes	5	50.40	2.51	
No	5	53.80	1.92	
Presence of any other family member addict				t=1.741, p=0.308, N.S
Yes	8	53.00	1.85	
No	2	48.50	3.54	
Prior attempt quit				t=0.421, p=0.687, N.S

Demographic Variables	F	Mean	S.D	One Way ANOVA/ Student Independent "t" test & p-value
Yes	6	51.83	3.54	
No	4	52.50	1.29	
Number of relapse				F=0.744, p=0.546, N.S
1	4	51.00	3.74	
2	1	51.00	-	
3	1	56.00	-	
>3	0	-	-	
Reasons for failure				t=0.533, p=0.635, N.S
Lack of support	3	51.00	5.00	
Physical / Medical problems	-	-	-	
Peer pressure	3	52.67	2.08	
Easy availability of substance	-	-	-	
Brought to facility by				-
Family / Friends	10	52.10	2.77	
Self-Intent	0	-	-	
Government	-	-	-	
Referred by doctors	-	-	-	
Preexisting medical condition				t=1.488, p=0.178, N.S
Yes	2	53.50	0.71	
No	8	51.75	3.01	

*F: frequency; M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

In the experimental group (Table 12), educational status (F=12.505; p=0.005) and history of smoking (t=2.404; p=0.045) were significantly associated with post-test distress tolerance scores. Among educational categories, patients with school-level education achieved the highest mean DT score (M=54.25, SD=1.71), followed by those with no formal education (M=53.00), undergraduate education (M=51.25, SD=0.50) and postgraduate education (M=46.00). This inverse relationship between educational level and post-test DT may reflect differential engagement with the cognitive components of the DBT programme, as patients with higher education may have had greater pre-existing coping resources that reduced the marginal benefit of structured skills training. Participants without a history of smoking achieved higher post-test DT scores (M=53.80, SD=1.92) than those with a smoking history (M=50.40, SD=2.51), suggesting that shared vulnerability factors between tobacco and alcohol use may attenuate the response to distress tolerance training. All other demographic variables were not significantly associated with post-test DT scores (p>0.05).

Table 13: Association of post-test distress tolerance scores of patients with alcohol dependence in the control group with selected demographic variables (N = 10)

Demographic Variables	F	Mean	S.D	One Way ANOVA/ Student Independent "t" test & p-value
Age in years				F=1.883, p=0.233, N.S
18 – 30	1	38.00	-	
31 – 40	5	35.60	1.52	
41 – 50	2	34.50	3.54	
>50	2	39.50	3.54	
Marital status				F=0.320, p=0.736, N.S
Single	1	38.00	-	
Married	6	35.83	2.14	
Divorced	3	37.00	4.36	
Domicile				F=0.623, p=0.564, N.S
Urban	5	36.60	1.67	
Rural	3	37.33	4.04	
Sub urban	2	34.50	3.54	

Demographic Variables	F	Mean	S.D	One Way ANOVA/ Student Independent "t" test & p-value
Religion				F=6.212, p=0.028, S*
Hindu	7	35.29	1.98	
Muslim	1	42.00	-	
Christian	2	37.50	0.71	
Others	-	-	-	
Educational status				t=0.444, p=0.669, N.S
No formal education	0	-	-	
School education	5	36.00	2.55	
Undergraduate	5	36.80	3.11	
Postgraduate	0	-	-	
Employment status				t=1.554, p=0.179, N.S
Self employed	4	38.00	2.94	
Public sector	0	-	-	
Private sector	6	35.33	2.16	
Unemployed	-	-	-	
Family monthly income				F=0.157, p=0.858, N.S
<10000	5	36.80	3.70	
10001 – 20000	1	35.00	-	
>20000	4	36.25	1.71	
Type of family				t=1.880, p=0.121, N.S
Nuclear	6	35.17	1.94	
Joint	4	38.25	2.87	
Broken	0	-	-	
Age at first use				t=0.407, p=0.695, N.S
≤20	4	36.00	1.83	
21 – 30	6	36.67	3.33	
>30	-	-	-	
Duration of alcohol intake in years				F=0.256, p=0.781, N.S
0 – 5	1	38.00	-	
6 – 10	1	35.00	-	
>10	8	36.38	2.97	
History of smoking				t=0.444, p=0.669, N.S
Yes	5	36.80	3.11	
No	5	36.00	2.55	
Presence of any other family member addict				t=0.407, p=0.695, N.S
Yes	6	36.67	3.33	
No	4	36.00	1.83	
Prior attempt quit				t=0.630, p=0.553, N.S
Yes	7	36.71	3.04	
No	3	35.67	2.08	
Number of relapse				F=2.873, p=0.168, N.S
1	0	-	-	
2	4	35.75	2.63	
3	2	36.00	1.41	
>3	1	42.00	-	
Reasons for failure				t=0.645, p=0.550, N.S
Lack of support	5	36.40	3.65	

Demographic Variables	F	Mean	S.D	One Way ANOVA/ Student Independent "t" test & p-value
Physical / Medical problems	-	-	-	
Peer pressure	2	37.50	0.71	
Easy availability of substance	-	-	-	
Brought to facility by				-
Family / Friends	9	36.44	2.88	
Self-Intent	1	36.00	-	
Government	-	-	-	
Referred by doctors	-	-	-	
Preexisting medical condition				-
Yes	1	37.00	-	
No	9	36.33	2.87	

*F: frequency; M: mean; SD: standard deviation; *p<0.05; S: significant; N.S: not significant (p>0.05).*

In the control group (Table 13), religious affiliation was the only demographic variable significantly associated with post-test distress tolerance scores (F=6.212; p=0.028). Muslim participants recorded the highest mean DT score (M=42.00), followed by Christian (M=37.50, SD=0.71) and Hindu participants (M=35.29, SD=1.98). This finding may reflect the role of faith-based coping as a source of psychological resilience in the absence of a structured intervention. The remaining demographic variables were not significantly associated with post-test DT scores in the control group (p>0.05).

DISCUSSION

The findings of this pilot study provide preliminary evidence that a structured 12-session DBT-based skills training programme significantly improves distress tolerance (DT) among patients with ADS. The experimental group demonstrated a statistically significant increase in overall DT scores from pre-test (M=34.0, SD=3.65) to post-test (M=52.1, SD=2.77), while the control group receiving routine care showed minimal change (M=34.2 to M=36.4). The significant between-group difference at post-test (t=12.81, p=0.0001, mean difference=15.7), with no pre-test difference (t=0.126, p=0.901), suggests that the observed improvement was attributable to the DBT intervention rather than to natural recovery or non-specific treatment factors.

These findings align with the growing body of evidence supporting the central role of DT in the maintenance and treatment of AUD. Carpenter et al.[1] described the theoretical mechanism by which low DT contributes to alcohol use: individuals with an impaired ability to tolerate negative emotional states use alcohol as a coping strategy, creating a reinforcement cycle that sustains dependence. The DBT skills programme in the present study addressed this cycle directly through structured training in mindfulness, distress tolerance and emotion regulation. A subsequent randomised trial by Carpenter and colleagues[2] provided further evidence that emotion regulation is an active mechanism of change in AUD treatment, reinforcing the theoretical basis of the present intervention.

At the subscale level, all four dimensions of DT improved significantly in the experimental group following the intervention. The tolerance subscale (ability to withstand aversive internal states) improved from M=6.5 to M=10.2, while the control group remained essentially unchanged (M=6.6 to M=6.4; between-group t=5.848, p=0.0001). These findings are consistent with those of Cludius and Kröger[3] and Cludius et al.,[6] who demonstrated that active use of DBT skills was associated with reduced urges to drink and improved emotional regulation in individuals with alcohol-related problems, indicating that the skills are applied in real-world situations and not merely learned in session.

The appraisal (M=15.0 to M=21.0) and absorption (M=7.0 to M=10.4) subscales also improved significantly in the experimental group. These dimensions reflect the cognitive evaluation of distress and the degree to which distress dominates attention, respectively. Rodrigues et al.[5] identified emotion dysregulation as a transdiagnostic mechanism in substance use disorders, emphasising that interventions targeting cognitive appraisal and attentional processes may have broad therapeutic benefit across substances and comorbidities. The pattern of improvement across all four DT subscales in the present study supports this transdiagnostic perspective.

The regulation subscale demonstrated the largest proportional improvement, increasing from M=5.5 to M=10.5 in the experimental group (between-group t=5.802, p=0.0001). This subscale assesses participants' beliefs in their capacity to regulate emotions, a construct closely linked to self-efficacy. Chavooshi et al.[7] reported significant improvements in emotion regulation following structured psychological interventions for individuals with ADS, while Rahimi et al.[8] demonstrated the effectiveness of group-based DBT combined with structured matrix training in reducing substance use and improving psychological functioning. The present findings extend this evidence base to the Indian clinical context, where culturally adapted DBT programmes for alcohol dependence remain scarce.

The association analyses revealed that educational status (F=12.505, p=0.005) and history of smoking (t=2.404, p=0.045) were significantly associated with post-test DT scores in the experimental group. Patients with school-level education achieved the highest mean scores (M=54.25), while postgraduate patients scored lowest (M=46.00), possibly reflecting differential engagement with the

cognitive components of DBT. The negative association between smoking history and DT may indicate shared neurobiological vulnerability factors. In the control group, religious affiliation was the only significant variable (F=6.212, p=0.028), with Muslim patients scoring highest (M=42.00), possibly reflecting faith-based coping resources. Given the very small cell sizes, these associations are exploratory; they have not been extensively examined in the literature and represent an avenue for future research, as highlighted by Cludius et al.[9] in their multilevel examination of DBT skills use across patient populations.

Limitations

Several limitations should be considered when interpreting these findings. First, the small sample size (N=20; ten per group) limits statistical power and generalisability, and the demographic associations should be interpreted with caution given the limited cell sizes. The findings should therefore be regarded as preliminary evidence supporting the feasibility of the full-scale randomised controlled trial (RCT; N=120) rather than definitive proof of efficacy. Second, allocation was non-randomised and based on the centre of admission, so unmeasured differences between centres cannot be excluded. Third, participants were recruited from residential de-addiction settings in a single city, which may limit generalisability to community or primary care contexts. Fourth, the four-week intervention period and immediate post-test assessment do not permit conclusions about the long-term maintenance of DT improvements, relapse prevention or sustained reductions in alcohol consumption. Fifth, the outcome was measured using a self-report scale, which may be subject to social desirability effects in a residential treatment setting, and the absence of assessor blinding introduces the potential for detection bias. These limitations are being addressed in the planned full-scale RCT, which incorporates a larger sample, longer follow-up, independent outcome assessors and objective biomarkers of alcohol use.

CONCLUSION

This pilot study demonstrates that a structured 12-session DBT-based skills training programme significantly enhances distress tolerance among patients with ADS. Significant improvements were observed across all four dimensions of distress tolerance (tolerance, appraisal, absorption and regulation) in the experimental group compared with the control group receiving routine care. The significant between-group differences at post-test, with no differences at baseline, indicate that the improvements were attributable to the DBT intervention. Educational status, smoking history and religious affiliation were associated with DT outcomes, suggesting the importance of tailoring interventions to individual patient profiles. These findings provide preliminary evidence to inform the full-scale RCT and support the integration of DBT-based distress tolerance training into routine treatment programmes for ADS. Establishing empirically validated, culturally appropriate psychological interventions for alcohol dependence in India has important implications for reducing alcohol-related harm and improving long-term recovery.

IMPLICATIONS FOR NURSING PRACTICE AND RESEARCH

Nurses working in psychiatric and de-addiction settings are uniquely positioned to deliver structured psychosocial interventions as part of the multidisciplinary care team. The DBT skills training programme evaluated in this study is protocol-driven and can feasibly be incorporated into the nursing care plan for inpatients with ADS, supplementing pharmacological management with evidence-based psychological strategies. With appropriate training and clinical supervision, qualified nurses can deliver the intervention effectively, expanding the reach of DBT beyond specialist mental health teams and reducing the burden on the specialist workforce.

For nursing research, this study provides a protocol and standardised outcome measures for a full-scale RCT that will generate higher-level evidence for the efficacy of nurse-led DBT interventions in alcohol dependence. Future research should investigate the longitudinal effects of DBT skills training on alcohol consumption, relapse rates and quality of life, as well as the mediating role of distress tolerance in treatment outcomes. The identification of socio-demographic predictors of DT improvement provides a basis for personalised intervention strategies, and qualitative methods exploring patients' experiences of the programme would inform culturally sensitive adaptations for diverse Indian clinical settings.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee prior to commencement. All procedures were conducted in accordance with the ethical standards of the institutional and national research committees and with the 1964 Declaration of Helsinki and its later amendments. Written informed consent was obtained from all participants prior to enrolment.

CONFLICT OF INTEREST

The authors declare no competing interests.

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