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ANALYZING THE MEDIATING ROLE OF MARITAL STATUS IN THE RELATIONSHIP BETWEEN COGNITIVE BEHAVIORAL THERAPY AND PSYCHOLOGICAL ADAPTATION AMONG PATIENTS SUFFERING FROM NEUROPSYCHIATRIC DISORDERS

Esha Qudrat[1], Dr. Salbia Abbas[*2], Isha Sikander[3]

[1]*MS Student, Department of Psychology, GC Women University Sialkot*
[*2]*Lecturer (Associate), Department of Psychology, GC Women University Sialkot*
[3]*Department of Psychology, GC Women University Sialkot*

[*2]salbia.abbas@gcwus.edu.pk

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Corresponding Author: *
Dr. Salbia Abbas

Abstract

This study examined the effectiveness of Cognitive Behavioral Therapy (CBT) in improving mental health outcomes and psychological adaptation among individuals with neuropsychiatric disorders. The objectives were to assess the prevalence of anxiety and depression, evaluate changes in resilience, life satisfaction, life adjustment, and psychological well-being following CBT, and explore relationships among these variables. A sample of 35 participants was recruited through purposive sampling from government and private hospitals, as well as psychiatric clinics across Pakistan. A one-group pretest–posttest design with a mixed-methods approach was employed. Quantitative measures included the Aga Khan University Anxiety and Depression Scale (AKUADS), Mental Health Continuum–Short Form (MHC-SF), Brief Resilience Scale (BRS), Satisfaction with Life Scale (SWLS), and Brief Adjustment Scale. Data were analyzed using Wilcoxon signed-rank tests and nonparametric correlation analyses. Results indicated significant reductions in anxiety ($Z = -4.12$, $p < .001$) and depression ($Z = -4.03$, $p < .001$) following the intervention. Significant improvements were also observed in resilience, life satisfaction, life adjustment, and overall psychological well-being. Post-intervention correlations revealed that resilience was positively associated with life satisfaction ($r = .42$, $p = .011$) and life adjustment ($r = .41$, $p = .013$). Qualitative findings from therapist notes and clinical observations further supported improvements in emotional regulation, coping strategies, self-awareness, and problem-solving skills. The findings suggest that culturally adapted CBT is effective in reducing psychological distress and enhancing adaptive functioning among individuals with neuropsychiatric disorders. Future research should incorporate control groups, larger sample sizes, and longitudinal follow-up to strengthen generalizability.

INTRODUCTION

Neuropsychiatric disorders include a wide range of conditions characterized by the co-occurrence of neurological and psychiatric symptoms, affecting cognition, emotional regulation, behavior, and overall functioning. These disorders arise from structural and functional abnormalities in the

brain and include depression, anxiety, schizophrenia spectrum disorders, bipolar disorder, epilepsy, dementia, substance use disorders, and neurocognitive impairments (Sachdev et al., 2014). Their overlapping symptoms and multifactorial etiology make diagnosis and treatment complex.

Globally, neuropsychiatric disorders account for approximately 13–15% of the total disease burden (GBD 2019 Mental Disorders Collaborators, 2022). Depression affects over 280 million people, while anxiety disorders impact more than 300 million worldwide (WHO, 2023). These conditions impair functioning and quality of life, with nearly one in four individuals affected during their lifetime (Kessler et al., 2007).

In Pakistan, prevalence ranges from 10% to 34%, with depression and anxiety particularly common, especially among women and socioeconomically disadvantaged groups (Mirza & Jenkins, 2004; Husain et al., 2016). Despite this burden, access to mental health services remains limited due to stigma and lack of resources (WHO, 2022).

Assessment involves multidisciplinary approaches using tools such as MMSE, MoCA, HADS, and AKUADS, with diagnoses based on DSM-5-TR and ICD-10 criteria. However, diagnostic accuracy is often challenged by symptom overlap and comorbidity (Sachdev et al., 2014).

Research highlights that resilience, life satisfaction, and psychological well-being are associated with better outcomes, whereas deficits increase vulnerability to mental health problems (Southwick et al., 2014; Pavot & Diener, 2008). Although DSM-5-TR does not define neuropsychiatric disorders explicitly, it includes related categories such as mood, anxiety, neurocognitive, and schizophrenia spectrum disorders.

Mental Health Issues

Mental health refers to a state in which individuals can realize their abilities, cope with stress, and function effectively in society (WHO). Mental health issues include disturbances in cognition, emotion, and behavior, ranging from mild stress to severe disorders.

Neuropsychiatric disorders and mental health issues are closely related but distinct. Mental health issues are broader and influenced by psychosocial factors, whereas neuropsychiatric disorders are rooted in biological dysfunctions affecting brain processes.

Neuropsychiatric disorders are strongly associated with depression and anxiety, which frequently co-occur and have bidirectional relationships (Patel et al., 2018). Depression involves persistent low mood and functional impairment, while anxiety includes excessive fear and physiological arousal (APA, 2022; WHO, 2022).

Depression is the most prevalent condition, characterized by low mood, fatigue, and hopelessness, significantly impairing functioning (Mirza & Jenkins, 2004). Anxiety is also common, presenting with persistent worry and physical symptoms such as restlessness and sleep disturbance (WHO, 2022). Both conditions are highly prevalent in Pakistan and often co-occur, increasing psychological distress.

Psychological adaptation plays a key role in managing these conditions. It refers to the process of adjusting cognitively, emotionally, and behaviorally to stress (Lazarus & Folkman, 1984). Core components include resilience, life adjustment, life satisfaction, and psychological well-being (Masten, 2001; Ryff, 1989).

Theoretical Perspectives on Psychological Adaptation and Mental Health Issues

Psychological adaptation is explained through multiple theoretical frameworks.

Self-Regulation Theory (Carver & Scheier, 1982) describes adaptation as a goal-directed process involving monitoring and adjusting behavior. Resilience Theory (Masten, 2001) emphasizes the ability to maintain functioning despite adversity.

The Biopsychosocial Model (Engel, 1977) highlights the interaction of biological, psychological, and social factors. The Cognitive-Behavioral Model (Beck, 1976) explains how maladaptive thoughts influence emotions and behavior, forming the basis of CBT. The

Transactional Model (Lazarus & Folkman, 1984) describes adaptation as a result of cognitive appraisal and coping resources.

The Developmental Perspective suggests that adaptation evolves across the lifespan, influenced by early experiences and environmental factors. Self-Determination Theory (SDT) emphasizes autonomy, competence, and relatedness as essential for psychological well-being and adaptation.

Correlation between Psychological Adaptation and Neuropsychiatric Disorders

Psychological adaptation enables individuals to cope with stress and maintain functioning through resilience, life adjustment, life satisfaction, and well-being (Masten, 2001; Ryff, 1989).

Neuropsychiatric disorders impair cognition, emotional regulation, and social functioning, making adaptation more difficult. However, individuals with higher resilience and life satisfaction experience better outcomes and reduced symptom severity (Southwick et al., 2014).

Mechanisms of Interaction

Cognitive Functioning: Disorders impair decision-making and memory, while adaptation supports compensatory strategies.

Emotional Regulation: Adaptive mechanisms help manage emotional distress.

Behavioral and Social Adjustment: Adaptation improves daily functioning and social engagement. Interventions such as CBT enhance adaptive capacities, improve coping, and promote recovery.

Techniques Used in Cognitive Behavioral Therapy (CBT)

CBT employs evidence-based techniques targeting cognition, behavior, and emotional regulation (Beck, 2011). Techniques in Cognitive Behavioral Therapy (CBT) include cognitive restructuring, which focuses on identifying and modifying distorted thought patterns; behavioral activation, which increases engagement in meaningful activities; and exposure therapy, which reduces fear and avoidance through gradual confrontation of anxiety-provoking stimuli. Additionally, relaxation techniques help decrease physiological arousal, while problem-solving training enhances coping skills. Psychoeducation improves individuals' understanding of their condition and treatment, and thought monitoring increases self-awareness of cognitive patterns. Techniques such as activity scheduling and graded task assignments support improved daily functioning, whereas relapse prevention strategies aim to maintain treatment gains. Mindfulness techniques further assist in reducing rumination and promoting present-moment awareness. Collectively, these interventions enhance coping abilities, functional outcomes, and overall psychological adaptation.

Relationship Between Cognitive Behavioral Therapy (CBT) and Mental Health Issues

CBT is an evidence-based intervention for depression and anxiety, based on the principle that maladaptive thoughts contribute to emotional distress (Beck, 1976).

It reduces symptoms through cognitive restructuring and behavioral techniques such as activation and exposure. CBT also enhances resilience, emotional regulation, and self-efficacy, supporting long-term recovery (Dobson & Dozois, 2019).

Thus, CBT serves both therapeutic and preventive roles in mental health care.

Relevance of CBT to Psychological Adaptation

CBT is central to improving psychological adaptation by modifying maladaptive thoughts and behaviors. It enhances resilience, coping strategies, and emotional regulation, contributing to better mental health outcomes.

In Pakistan, although CBT use is increasing, research on its broader impact on adaptation remains limited. This study addresses this gap by examining its effects on both symptoms and adaptive functioning.

Theoretical Background

This study is grounded in the Cognitive Behavioral Model and Beck's Cognitive Theory of Depression. These frameworks propose that maladaptive cognitions lead to emotional distress and dysfunctional behaviors, creating a self-reinforcing cycle (Beck, 2011).

Supporting theories include Self-Regulation Theory, Resilience Theory, the Biopsychosocial Model, and the Transactional Model, all of which explain how individuals adapt to psychological stress. Together, these frameworks provide a comprehensive basis for understanding neuropsychiatric disorders, psychological adaptation, and the role of CBT in improving mental health outcomes.

Conceptual Framework

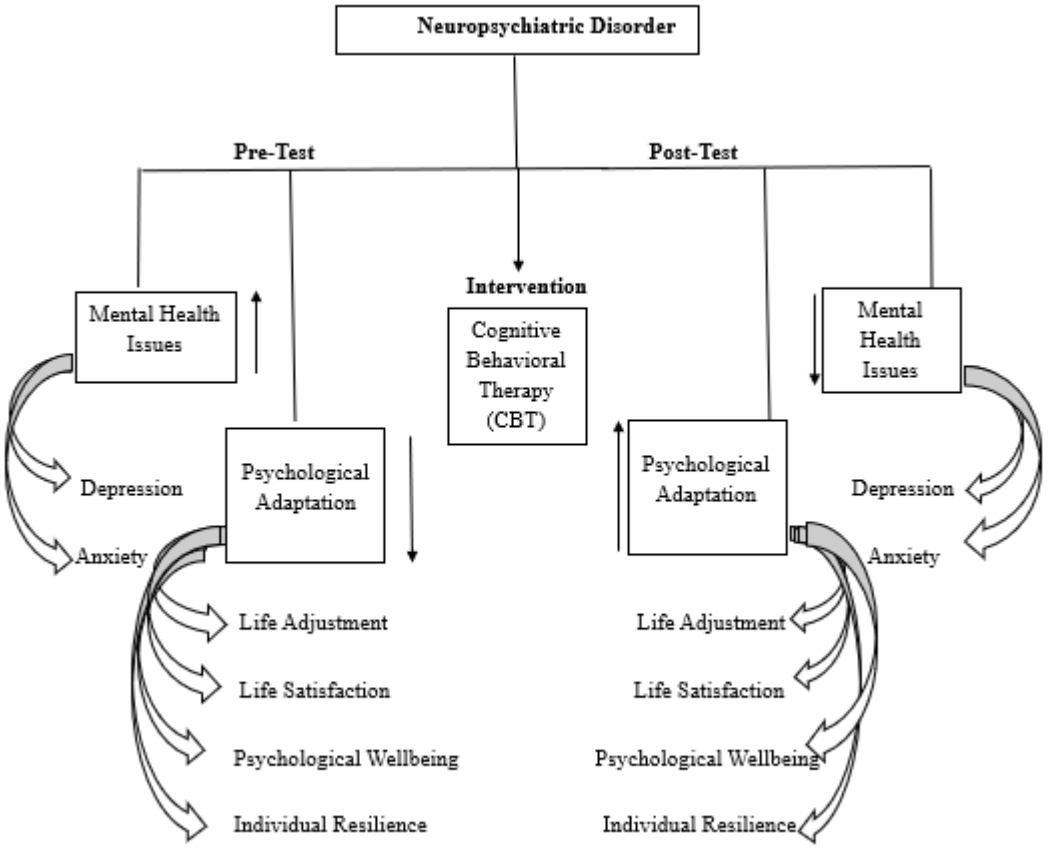


Figure 1.6

The research presents its proposed conceptual framework through Figure 1.6. The framework shows the pre-test/post-test design which tests neuropsychiatric disorder patients for essential mental health factors of depression and anxiety with psychological adaptation assessment tests that measure life adjustment and life satisfaction and psychological well-being and individual resilience.The study introduces Cognitive Behavioral Therapy (CBT) as its intervention which takes place between its pre-test and post-test evaluations.

Rationale of the study

The practice of cognitive behavioral therapy remains limited in Pakistan because medical doctors handle most neuropsychiatric cases without making referrals to psychologists or psychiatrists. While CBT is increasingly recognized as a first-line treatment for common affective and stress-related disorders (ScienceDirect, 2023), researchers still need to investigate how it affects psychological adaptation through coping mechanisms, resilience development, life satisfaction, and total well-being. The current study investigates how cognitive behavioral therapy enables Pakistani neuropsychiatric patients to achieve mental health improvements and better adaptive capabilities. The study results will provide guidance for clinical practice while leading to better treatment methods through interdisciplinary cooperation and development of culturally appropriate solutions to improve life quality for this particular group.

Method

General methodology for all studies in the current research

The researchers employed a single-group pretest–posttest design to test the intervention's effectiveness in a clinical environment. The researchers conducted pre- and post-intervention assessments to evaluate participant progress through the study which did not use a control group. The study used a mixed-methods approach which combined quantitative data from standardized psychological assessments with qualitative data from feedback forms and session notes and observations. The researchers collected baseline data from 100 participants to achieve adequate representation which established stable descriptive estimates (Creswell, 2014; Tabachnick & Fidell, 2019), while 35 participants completed the intervention phase, meeting the recommended minimum sample size for clinical research (Johanson & Brooks, 2010). The researchers used this integration method to achieve complete understanding of both measurable results and participants' therapeutic experiences.

Rationale for not using G*Power analysis

The study required no G*Power analysis because its exploratory design and use of diverse clinical subjects and its insufficient local data made power less reliable (Hertzog, 2008).

Measures

Aga Khan University Anxiety and Depression Scale (AKUADS)

Anxiety and depression were assessed using the Aga Khan University Anxiety and Depression Scale (AKUADS) developed by Ali, Reza, Khan, and Jehan (1998). The scale contains 25 items which show strong internal consistency through a Cronbach's alpha value of .84.

Brief Adjustment Scale-6 (BASE-6)

The Brief Adjustment Scale-6 (BASE-6) measured life adjustment in the study. The present study used the Urdu version which Rehman Tasleem and Asghar developed in 2024. The scale consists of 6 items which achieved reliable results through testing that showed a Cronbach's alpha value of about .80.

Mental Health Continuum – Short Form (MHC-SF) (Urdu Version)

Psychological well-being was assessed using the Mental Health Continuum developed by Faran et al. (2015). The scale contains 14 items and demonstrates strong internal consistency with a reported Cronbach's alpha of approximately .90.

Satisfaction with Life Scale (SWLS)

The Satisfaction with Life Scale (SWLS) developed by Diener et al. (1985) serves as the instrument for measuring life satisfaction in this study. The researchers used the Urdu translation which Butt, Ghani, and Khan created in 2014 for this study. The scale includes 5 items and has demonstrated good reliability with a reported Cronbach's alpha of approximately .87.

Brief Resilience Scale (BRS)

The Brief Resilience Scale (BRS) which Smith et al. developed in 2008 serves as the assessment tool for measuring resilience. The researchers used the

Urdu translation which Khan and Batool created in 2020. The scale consists of 6 items and shows acceptable internal consistency with a reported Cronbach's alpha of approximately .80.

Baseline phase

Research Design

The baseline phase employed a one-group pre-test design to assess initial levels of depression, anxiety, and psychological adaptation variables, including life adjustment, life satisfaction, psychological well-being, and individual resilience. Standardized and validated instruments were used to obtain baseline measurements prior to the intervention. Informal observations and participant feedback were also recorded to supplement quantitative data.

Setting and Target Population

The study was conducted in clinical mental health settings in Sialkot, Pakistan, including government, private, and psychiatric facilities. The target population comprised adult individuals diagnosed with neuropsychiatric disorders who presented with symptoms of depression and anxiety and consented to participate.

Sampling Size and Technique

Purposive sampling was used to recruit participants who met the inclusion criteria. A total of 100 participants were selected from various clinical settings in Sialkot.

Intervention Phase

Research Design

The intervention phase utilized a single-group pre-test/post-test design to evaluate the effectiveness of Cognitive Behavioral Therapy (CBT). Assessments were conducted before and after the intervention to examine changes in depression, anxiety, and psychological adaptation variables. A mixed-methods approach was adopted, combining standardized assessments with qualitative observations and participant feedback. No control group was included, as the study focused on within-subject change.

Participants and Setting

Participants were screened to identify clinically significant symptoms of depression and anxiety. Individuals who did not meet inclusion criteria were excluded. The intervention was delivered in both public and private healthcare settings in Sialkot, including psychiatric and neurological clinics. Participants included individuals with mood disorders, anxiety disorders, obsessive-compulsive disorder, and somatic symptom disorders, with inclusion of all genders meeting study criteria.

Sampling Size and Technique

Purposive sampling was again used for the intervention phase. A total of 35 participants who met the screening criteria for depression and anxiety were included. The sample size was informed by comparable prior studies.

Intervention Procedure

The CBT intervention was structured to target maladaptive cognitions and behaviors while promoting resilience, life satisfaction, and psychological well-being. Sessions were conducted individually and in small groups using a structured format. Quantitative data were collected through standardized measures at pre- and post-intervention stages, while qualitative data were obtained via therapist notes, observational records, and structured feedback forms. The integration of both data types provided a comprehensive evaluation of treatment outcomes and participants' adaptive responses.

Inclusion/Exclusion Criteria

Inclusion Criteria

- Patients above 18 years old were included in the sample; the age range was based on the severity of symptoms.
- Patients with mild symptoms were included.
- Patients only diagnosed with neuropsychiatric illness were included (Mood Disorders, Anxiety Disorders, Obsessive-Compulsive and Related Disorders, Somatic Symptom and Related Disorders).

- Individuals who were capable and willing to participate in the study were included.
- Participants without comorbid issues were included.
- Patients were required not to have any physical disability.
- Patients were required to be in the state of presenting judgments.
- Participants with any caregiver or family member were included.

Exclusion Criteria

- Patients below 18 years of age, or those whose age range did not align with the study requirements, were excluded.
- Patients with moderate to severe symptoms were excluded.
- Patients not diagnosed with a neuropsychiatric illness were excluded.
- Individuals who were unwilling or unable to participate in the study were excluded.
- Participants with comorbid psychological or medical conditions were excluded.
- Patients with physical disabilities were not included.
- Patients who were unable to make judgments or lacked decision-making capacity were excluded.
- Participants without any caregiver or family member support were excluded.

Pilot Study

The researcher conducted a pilot study to evaluate the implementation of Cognitive Behavioral Therapy (CBT) in actual clinical settings by testing ten eligible patients for study inclusion. The pilot study allowed us to identify potential issues with participant comprehension, assessment tool administration, research procedures, and the length and sequencing of intervention sessions. The project enabled researchers to develop better data collection methods while confirming that all instruments used in the study were suitable and understandable and both logistical and methodological problems had been solved. The pilot study results were used to enhance the complete study design, which improved research methods and facilitated efficient execution of the main research experiment.

Results of Pilot Study

Table 2.1

Correlation Matrix among Psychological Variables

Variable	1	2	3	4	5
1. AKUADS	1	.029	–.014	–.380*	–.654**
2. MHC		1	–.884**	.766**	–.118
3. BASE			1	–.757**	.148
4. SWLS				1	.283
5. BRS					1

Note. AKUADS = Aga Khan University Anxiety and Depression Scale, MHC = Mental Health Continuum, BASE = Brief Adjustment Scale, SWLS = Satisfaction with Life Scale, BRS = Behavior Resilience Scale. * $p < .05$, ** $p < .01$.

The correlation analysis showed that depressive symptoms had a strong negative link to resilience with a correlation coefficient of -0.654 and a p-value below 0.01. Mental health showed a strong positive relationship with life satisfaction (r = .766, p < .01) and a strong negative relationship with maladjustment (r = –.884, p < .01). The study found a significant negative relationship between maladjustment and life satisfaction which showed a correlation of r = -0.757 and p-value < 0.01.

Pilot Study Summary:

A pilot study was conducted with a sample of 10 participants, consistent with methodological guidelines recommending small samples for preliminary testing (Johanson & Brooks, 2010). Findings from the pilot study informed refinement of the intervention protocol, leading to an expansion of the CBT program from 6 to 12 sessions based on participant engagement, symptom severity, and therapeutic needs.

Correlation analyses indicated meaningful relationships among the study variables. Depressive symptoms were significantly negatively associated with resilience ($r = -.654$, $p < .01$). Mental health showed a strong positive association with life satisfaction ($r = .766$, $p < .01$) and a strong negative association with maladjustment ($r = -.884$, $p < .01$). Additionally, maladjustment was significantly negatively related to life satisfaction ($r = -.757$, $p < .01$).

Overall, the pilot study supported the conceptual framework, demonstrated the relevance and reliability of the selected instruments, and provided necessary refinements to the intervention procedures. It also strengthened confidence in the methodological design and outcome measurement approach for the main study.

Main Study

Procedure

The primary research began after the pilot study finished and all required modifications were completed. The researchers obtained institutional approvals through consultations with hospital administrators and ethical review boards. The psychologists and psychiatrists who provided consulting services chose study participants who matched the inclusion requirements. The study team obtained informed consent after they explained the study objectives to the participants. A single-group pre-test post-test design was used in this investigation. The researchers conducted baseline evaluations with participants who then completed 12 sessions of structured CBT before their post-test assessments. Two studies used in data analysis. The researchers assessed CBT effectiveness through thematic analysis in Study II, which used qualitative methods, while Study I employed quantitative data analysis. The researchers maintained strict protection of participants' rights and their confidential information, which included their right to remain anonymous.

Study I

Quantitative Analysis

Study I's main goal was to measure psychological adaptation and mental health changes which occurred in participants who completed the 12-session Cognitive Behavioral Therapy program. The assessment evaluated how effectively Cognitive Behavioral Therapy reduced depression and anxiety symptoms while improving life adjustment and life satisfaction and resilience and psychological well-being in people who had neuropsychiatric conditions. The research team assessed quantitative information by conducting pre-test and post-test score comparisons through statistical methods that included both descriptive and inferential analysis to determine within-group differences. The research focused on two main outcomes which included decreased depression and anxiety rates together with enhanced life adjustment and life satisfaction and resilience and psychological well-being improvements. The analysis results established CBT as an effective treatment method which helps patients with neuropsychiatric disorders achieve psychological adaptation and experience fewer mental health symptoms. The findings of this study helped the research team select participants for Study II who showed measurable behavioral changes and had the ability to share important experiential data for the upcoming qualitative study.

Procedure

Participants completed standardized psychological assessment instruments at two time points: pre-test (before the intervention) and post-test (upon completion of the 12-session CBT program).The researchers used a single-group pre-test and post-test design to test whether CBT treatment leads to improved psychological

adaptation outcomes. Participants completed baseline assessments before the intervention and post-assessments after the CBT sessions ended. The study design allowed researchers to track changes that occurred within the participants throughout the study period. All participants received comprehensive assessments which were conducted before their therapy sessions started. The data served as a benchmark for assessing results.

Assessment tools were re-administered to assess progress in psychological adaptation. The researchers compared post-test results to baseline results. Participants provided feedback on their therapy experience and self-reported changes.

Study II

Qualitative Analysis

The study used qualitative research methods to study how participants experienced cognitive behavioral therapy and what they thought about their results. A thematic analysis (Braun & Clarke, 2006) was conducted on therapist session notes, structured feedback forms, and participant reflections to identify recurring patterns, themes, and meaningful changes in psychological adaptation, coping, and emotional well-being. The approach enabled researchers to gather detailed descriptive information which helped them better comprehend how the intervention impacted participants' mental health results.

Therapeutic Intervention Plan

Table 2.3

Session-wise Structure of the Cognitive Behavioral Therapy (CBT) Intervention

Session	Agenda
Session 1	The first step in therapy requires the creation of a collaborative therapeutic relationship. The team delivered psychoeducational content about the CBT framework and neuropsychiatric disorders, which they used to develop personalized treatment objectives through mutual agreement.
Session 2	The assessment process requires testing to evaluate both symptoms and their associated triggering situations. Thought diaries were introduced to enhance awareness of the interaction between thoughts, emotions, and behaviors.
Session 3	The study used two behavioral activation techniques to help participants who suffered from low motivation and social withdrawal. The participants created a weekly timetable which included enjoyable activities that held personal significance to them.
Session 4	Mindfulness, training in anxiety management, emotion regulation, and basic meditation would be done through body scanning and deep breathing exercises.
Session 5	The process of cognitive distortion identification includes the use of cognitive restructuring techniques together with Socratic questioning methods to address specific distortions such as catastrophizing and all-or-nothing thinking.
Session 6	The downward arrow technique and the three-question method serve as methods to explore core beliefs which help in replacing harmful beliefs with more reasonable thoughts.
Session 7	The introduction of various emotion regulation strategies which include journaling and progressive muscle relaxation and grounding techniques helps to decrease stress reactivity.
Session 8	To increase interpersonal relations via social abilities training and confidence training involving role-playing, modeling, and feedback.
Session 9	The process of teaching structured problem-solving methods helps students learn to manage their daily stress and handle decision-making challenges.
Session 10	The program uses strengths identification and positive self-talk to help participants increase their self-esteem through self-compassion exercises and positive affirmations.

Session	Agenda
Session 11	The project requires the creation of a relapse prevention plan which includes two main components. The first component involves the recognition of early warning signs which will be used to identify impending relapses. The second component requires the development of methods that will help the person manage their relapses.
Session 12	The therapist will assess all the cognitive-behavioral therapy techniques which we have learned throughout the therapy process. The team conducted a post-intervention assessment which was followed by a discussion about strategies to maintain results over an extended period.

Therapeutic Protocols

Developed a twelve-session Cognitive Behavioral Therapy (CBT) program to fulfill the psychosocial and emotional and adaptive requirements of people who have neuropsychiatric disorders which include mood disorders and anxiety disorders and obsessive-compulsive disorders with related conditions and somatic symptom disorders (Beck 2011 Dobson Dozois 2019). The sessions occurred on a weekly basis and each session lasted between 60 and 75 minutes. The intervention required a flexible design which enabled systematic implementation throughout all stages of the program according to each participant's cognitive abilities and emotional state and symptom progression (Hofmann et al. 2012 Lincoln et al. 2012).

Thematic analysis

The intervention used a structured design which maintained its essential elements while enabling therapists to customize treatment according to the specific needs of each participant. The combined domains established a complete framework which helped study participants develop psychological skills while decreasing their depression and anxiety symptoms and enhancing their total mental health and well-being (Masten 2001 Carver Scheier 1982 Hofmann Gómez 2017). The qualitative analysis identified key themes that emerged throughout the analytical process.

Thematic analysis of semi-structured interviews from the CBT intervention

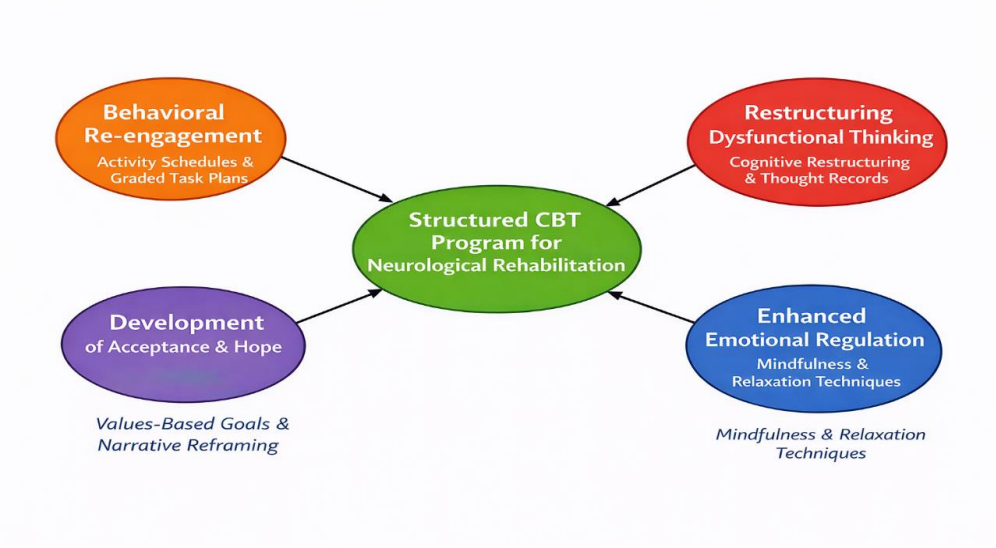


Figure 2.1

Figure 2.1 illustrate hematic analysis of semi-structured interviews from the CBT intervention. The intervention used established CBT models as its foundation which included the work of Beck

2011 and Dobson and Dozois 2019. The therapists used a session-by-session manual which they followed to maintain treatment fidelity while they made personalized changes based on neurocognitive limits that people with neurological disorders experience (Lincoln et al., 2012). The initial treatment sessions concentrated on changing dysfunctional thought patterns through the application of thought monitoring cognitive restructuring and Socratic questioning methods. The participants used these strategies to find and dispute their harmful beliefs which linked their disability to their lost independence and damaged self-esteem and their feeling of being powerless. Between-session assignments were integrated into the therapy process to help patients maintain their therapeutic progress. The therapy program included scheduling activities together with scheduled tasks and maintaining thought records and practicing relaxation techniques. The techniques helped people restore their regular activities by first gaining back their daily activities and then bringing back their normal life patterns and finally engaging more with others and their work activities even when facing physical or mental challenges. The therapy sessions occurred within a peaceful and welcoming space which made it easy for people to participate in their treatment by selecting personal objectives that focused on their recovery process. The mid-phase of the treatment introduced emotion regulation and mindfulness techniques because research shows that mindfulness-based therapies achieve positive results in neurorehabilitation (Hofmann & Gómez, 2017). The program included breathing exercises together with body scans and guided imagery which existed to help people lower their emotional distress and control their frustration while they developed psychological flexibility.

The therapeutic process started to develop acceptance through hope-based treatment methods. The program helped participants to realize their neurological condition's permanent and ongoing symptoms while they learned to build realistic future expectations and self-compassionate. The program used three different therapeutic approaches which included values-based exercises and narrative reframing and meaning-focused interventions to help participants discover their life purpose and personal identity which exists beyond their medical condition.

The researchers conducted the entire study by following ethical standards which the American Psychological Association established in its Ethical Principles of Psychologists and Code of Conduct (APA, 2017). The study selected participants through purposive sampling who matched the required inclusion standards which included confirmed neurological diagnoses and sufficient cognitive abilities for psychotherapy and their choice to take part in the research. The researchers presented both verbal study details and written study details to the participants who then signed informed consent documents before they started the study. The researchers informed participants about their option to end their participation in the research at any moment without facing any consequences. The researchers maintained complete control over participant confidentiality and their right to remain unidentified. The primary researcher maintained exclusive access to securely stored data which was protected in a secure location. The research team used session content and pacing adjustments to protect participants from cognitive overload and emotional distress and fatigue which followed ethical guidelines. The participants who displayed extreme depressive symptoms with suicidal thoughts and severe cognitive impairment needed immediate psychiatric and neurorehabilitation treatment to maintain their safety and ongoing medical treatment (Turner-Stokes et al., 2015).

The intervention maintained respect for cultural and religious sensitivities throughout its duration. The program adapted its therapeutic language and mindfulness practices to match the participants' cultural background while integrating their spiritual coping mechanisms (Koenig, 2018). The culturally responsive approach of the program increased therapeutic engagement while maintaining ethical standards and contextual suitability of the intervention.

CBT Techniques Used in the Intervention

The researchers used Cognitive Behavioral Therapy (CBT) techniques during the intervention phase to treat depression and anxiety while treating maladjustment and psychological adaptation difficulties in neuropsychiatric disorder patients. The researchers chose these techniques because they had scientific backing and they were relevant for clinical practice.

Table 2.2
CBT Techniques Applied During the Intervention

Technique	Purpose	Description
Psycho Education	Enhance insight and engagement	The participants received training about the CBT model which explained how thoughts and emotions and behaviors are interconnected and described neuropsychiatric disorders.
Thought Monitoring	Increase cognitive awareness	Using thought diaries can identify automatic thoughts, emotional reactions, and behaviors.
Cognitive Restructuring	Modify maladaptive thinking	Identification and questioning of cognitive distortions through examining evidence and engaging in a balanced thinking process.
Socratic Questioning	Promote cognitive flexibility	Guiding Questions for Evaluating the Justice and Validity of Maladaptive Beliefs.
Downward Arrow Technique	Identify core beliefs	The exploration of dysfunctional core beliefs underlying psychopathology would be worthwhile.
Behavioral Activation	Reduce avoidance and withdrawal	Scheduling of pleasurable and satisfactory activities is very useful to increase motivation as well as mood.
Activity Scheduling	Restore daily functioning	The structured daily routine has been developed to enhance the engagement level and productivity level.
Mindfulness Techniques	Improve emotional regulation	Body scans, breathing practices, and focusing on the present time belong to the exercises.
Relaxation Exercises	Reduce physiological arousal	Some techniques could be deep breathing, as well as progressive muscle relaxation.
Emotion Regulation Skills	Manage emotional distress	Journaling, grounding exercises and emotional labeling strategies represent three different methods of emotional regulation.
Problem-Solving Training	Enhance coping skills	The process of solving problems needs to follow specific structured steps which help people manage their daily stress.

Technique	Purpose	Description
Social Skills Training	Improve interpersonal functioning	The use of role-play and modeling techniques together with feedback helps people develop their assertiveness skills and communication abilities.
Self-Compassion Exercises	Enhance self-esteem	Affirmations of spiritual positivity are possible to say while using self-reassurance, using them while doing it, as the adverse behavior is eradicated enroute to the spiritual path.
Values Clarification	Foster meaning and purpose	Identification of personal values needs to occur because they will help establish targets and modify existing behavioral patterns.
Relapse Prevention Planning	Maintain therapeutic gains	The process requires organizations to discover their initial warning indicators, which will then enable them to create effective response plans.

Descriptive Statistical Analysis

Table

Frequencies and Percentages of the Demographic Variables

Demographics	Categories	Sample		
		M	*SD*	*n*	%
Age		33.66	7.94		
Gender	Male			23	65.7
	Female			12	34.3
Marital Status	Single			6	17.1
	Married			26	74.3
	Divorced			3	8.6
Educational Level	No formal education			7	20.0
	Primary			9	25.7
	Secondary			19	54.3
Occupation	Employed			23	65.7
	Unemployed			12	34.3
Habitat	Rural			32	91.4
	Urban			3	8.6
Monthly Household Income	Unemployed			3	8.6
	<20,000 PKR			3	8.6
	20,000–50,000 PKR			9	25.7
	50,000–100,000 PKR			17	48.6
	>100,000 PKR			3	8.6
Duration of Illness	<1 year			26	74.3
	1–5 years			9	25.7
Previous Psychotherapy	Yes			7	20.0
	No			28	80.0
Any Other Disability	Yes			10	28.6
	No			25	71.4

Living Situation	Alone	3	8.6
	With Family	32	91.4
Primary Caregiver	Spouse	20	57.1
Family History of Neurological Disorder	Yes	10	28.6
	No	25	71.4

The study involved 35 participants who had ages from 20 to 55 years (M = 33.66, SD = 7.94). The study showed that 65.7% (n = 23) of the participants identified as male while 34.3% (n = 12) of the participants identified as female. The participants showed married status with 74.3% (n = 26) who were married and 17.1% (n = 6) who remained single and 8.6% (n = 3) who had been divorced. The educational levels of participants showed that 54.3% (n = 19) had completed secondary education and 25.7% (n = 9) had completed primary education and 20.0% (n = 7) had no formal education. The research found that 65.7% (n = 23) of participants held jobs while 34.3% (n = 12) of participants did not have jobs. The majority of participants lived in rural areas (n = 32, 91.4%) while only a small number lived in urban areas (n = 3, 8.6%). The participants showed diverse monthly household income patterns. Nearly half of the participants earned between 50,000 and 100,000 PKR while 25.7% (n = 9) earned between 20,000 and 50,000 PKR and 8.6% (n = 3) earned less than 20,000 PKR and 8.6% (n = 3) earned more than 100,000 PKR and 8.6% (n = 3) did not have a job. The study showed that 74.3% of participants had experienced their illness for less than one year while 25.7% (n = 9) had a duration of 1–5 years. Only 20.0% (n = 7) had previously received psychotherapy. About 28.6% (n = 10) of participants reported having other disabilities. The majority of participants lived with family (n = 32, 91.4%), with only 8.6% (n = 3) living alone. The primary caregivers for participants included spouses who cared for 57.1% of participants (n = 20) and parents and children who each cared for 17.1% (n = 6) of participants and others who cared for 8.6% (n = 3) of participants. 28.6% (n = 10) of participants showed that they had a family history of neurological disorders. Overall, the demographic profile indicates a predominantly male, married, employed, rural sample with secondary education and a majority living with family members. The demographic profile shows that most of the sample population consists of married men who have jobs and live in rural areas while having completed secondary education and most of them residing with their family members.

Table
Shapiro-Wilk Test of Normality

Scale		W	P
AKUADS	Pre	.943	.000
	Post	.865	.001
MHC	Pre	.762	.000
	Post	.949	.001
BASE	Pre	.792	.000
	Post	.788	.000
SWLS	Pre	.874	.001
	Post	.824	.000
BRS	Pre	.910	.000

Scale	W	P
Post	.899	.004

W = Shapiro-Wilk statistic. p < .05 indicates significant deviation from normality.

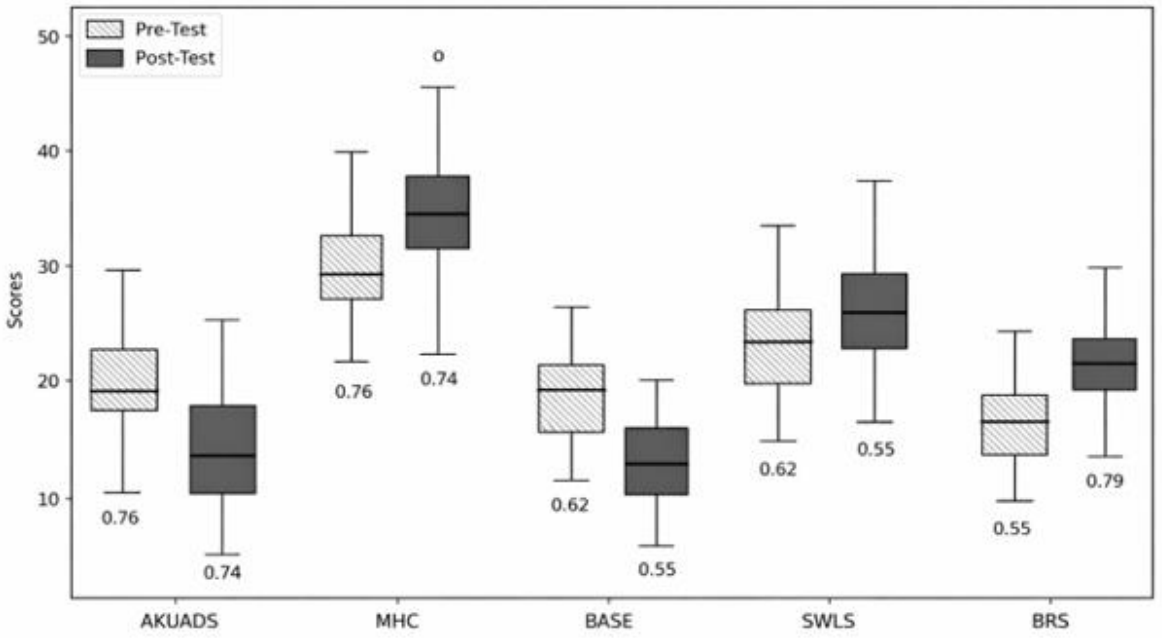
The Shapiro–Wilk test demonstrated that AKUADS scores existed deviation from normal distribution at both pretest (W = .943, p < .001) and posttest (W = .865, p = .001). The MHC scores showed normality violation at both pretest (W = .762, p < .001) and posttest (W = .949, p = .001) assessment. BASE scores demonstrated a distribution pattern that did not follow normal distribution at both pretest (W = .792, p < .001) and posttest (W = .788, p < .001) assessment. The SWLS results showed non-normality at pretest (W = .874, p = .001) and posttest (W = .824, p < .001) assessment. The BRS scores showed a non-normal distribution pattern during pretest (W = .910, p = .000) and posttest (W = .899, p = .004) assessment. The results demonstrated that normality assumptions were not met which led to the application of non-parametric statistical tests.

Table
Wilcoxon Signed-Rank Test

Scale	Z	P	R
AKUADS	-4.533	.000	0.76
MHC	-4.371	.000	0.74
BASE	-3.668	.000	0.62
SWLS	-3.250	.001	0.55
BRS	-4.653	.000	0.79

Note. Negative Z indicates post-test scores lower than pre-test for that measure; r = effect size.

The Wilcoxon signed-rank test showed that all measured outcomes showed significant changes from before the intervention to after it. The participants' anxiety and depression levels decreased according to AKUADS measurements which showed a significant decrease (Z = -4.533, p < .001, r = 0.76) that indicated lower psychological distress. The mental health scores (MHC) showed a significant increase (Z = -4.371, p < .001, r = 0.74) which indicated better mental health results. The BASE assessment showed that maladaptive behaviors decreased significantly (Z = -3.668, p < .001, r = 0.62) while life satisfaction (SWLS) showed an increase (Z = -3.250, p = .001, r = 0.55) which indicated better psychological adjustment. The BRS resilience scores showed significant changes (Z = -4.653, p < .001, r = 0.79) which indicated that participants developed better coping skills after the intervention. The results demonstrate that cognitive behavioral therapy treatment produced positive outcomes for participants in terms of their psychological development and adaptability to challenges.



Figure

Figure 3.3 depicts pre-test and post-test scores across five psychological measures (AKUADS, MHC, BASE, SWLS, BRS). The numbers below each box represent the effect sizes (Cohen's d) for the observed changes between pre- and post-test.

Table 3.9
Mann-Whitney U Test Comparing Outcome Variables by Gender

Scale	Gender	N	Mean Rank	Sum Ranks	U	Z	P	Mean Rank	Sum Ranks	U	Z	p
			Pre					Post				
AKUADS	Male	23	16.11	370.50	94.50	-1.525	.127	14.61	336.00	60.00	-2.759	.006*
	Female	12	21.63	259.50				24.50	294.00			
MHC	Male	23	20.61	474.00	78.00	-2.104	.035*	17.22	396.00	120.00	-0.632	.527
	Female	12	13.00	156.00				19.50	234.00			
BASE	Male	23	16.37	376.50	100.50	-1.311	.190	17.74	408.00	132.00	-0.224	.822
	Female	12	21.13	253.50				18.50	222.00			
SWLS	Male	23	19.30	444.00	108.00	-1.073	.283	15.13	348.00	72.00	-2.430	.015*

Scale	Gender	N	Mean Rank	Sum Ranks	U	Z	P	Mean Rank	Sum Ranks	U	Z	p
	Female	12	15.50	186.00				23.50	282.00			
BRS	Male	23	16.37	376.50	100.50	-1.329	.184	16.96	390.00	114.00	-0.856	.392
	Female	12	21.13	253.50				20.00	240.00			

Results indicated that at pre-test, there were no significant differences between male and female participants on AKUADS, BASE, SWLS, or BRS, although MHCpre showed a small significant difference (U = 78.00, Z = -2.104, p = .035), with males reporting slightly higher mental health scores. The post-test results showed that the gender groups performed differently on both AKUADS (U = 60.00, Z = -2.759, p = .006) and SWLS (U = 72.00, Z = -2.430, p = .015), which showed that female participants experienced more distress and reported higher life satisfaction than male participants after the treatment. The study found no gender differences for MHCpost, BASEpost, or BRSpost, which suggests that the treatment program succeeded in diminishing gender-related differences for psychological adjustment and resilience. The research shows that although mental health and adjustment assessments showed baseline differences between genders, the post-intervention results showed equivalent outcomes across both genders, which demonstrates that the intervention successfully enhanced psychological well-being for all participants.

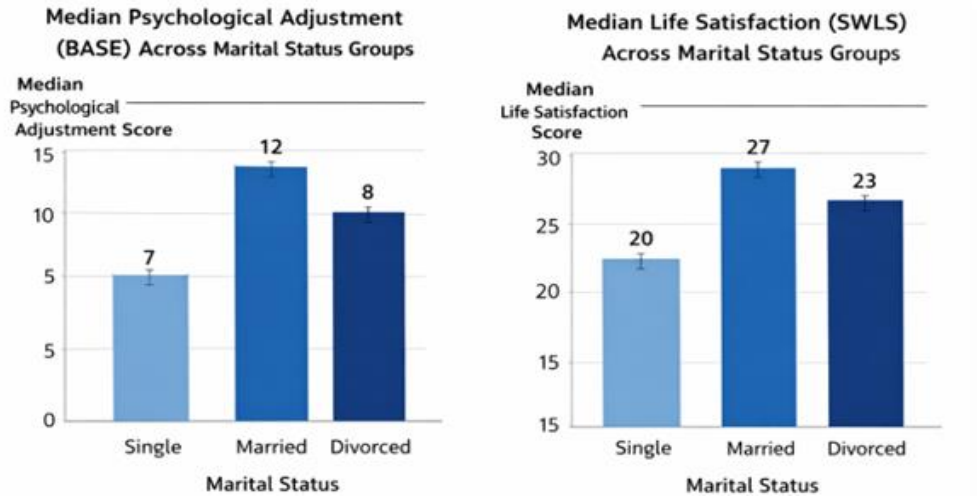
Table 3.10
Kruskal–Wallis Test Comparing Psychological Variables Across Marital Status Groups

Variable	H	Df	P	Cohen's d	H	Df	P	Cohen's d
	Pre-test				Post-test			
AKUADS	5.90	2	.052	.12	5.58	2	.061	.11
MHC	5.48	2	.065	.11	5.90	2	.052	.12
BASE	6.50	2	.039*	.14	3.43	2	.180	.06
SWLS	8.64	2	.013*	.21	7.74	2	.021*	.18
BRS	0.53	2	.767	.00	0.41	2	.816	.00

Note. $p < .05$. AKUADS = Anxiety and Depression Scale, MHC = Mental Health Continuum, BASE = Psychological Adjustment, SWLS = Satisfaction with Life Scale, BRS = Brief Resilience Scale.

The Kruskal–Wallis test examined differences in psychological variables across marital status groups (single, married, divorced). At pre-test, significant differences were observed for psychological adjustment (BASE; H = 6.50, p = .039) and life satisfaction (SWLS; H = 8.64, p = .013), indicating

that marital status influenced these outcomes, while anxiety and depression (AKUADS), mental health (MHC), and resilience (BRS) did not differ significantly. At post-test, most differences by marital status were no longer significant, suggesting that the intervention improved psychological outcomes across groups. However, life satisfaction (SWLS; H = 7.74, p = .021) remained significantly different, implying that marital factors may continue to affect life satisfaction even after the intervention.



Figure

Figure 3.4 shows the pre-test psychological adaptation and life satisfaction outcomes across marital status groups.

Table

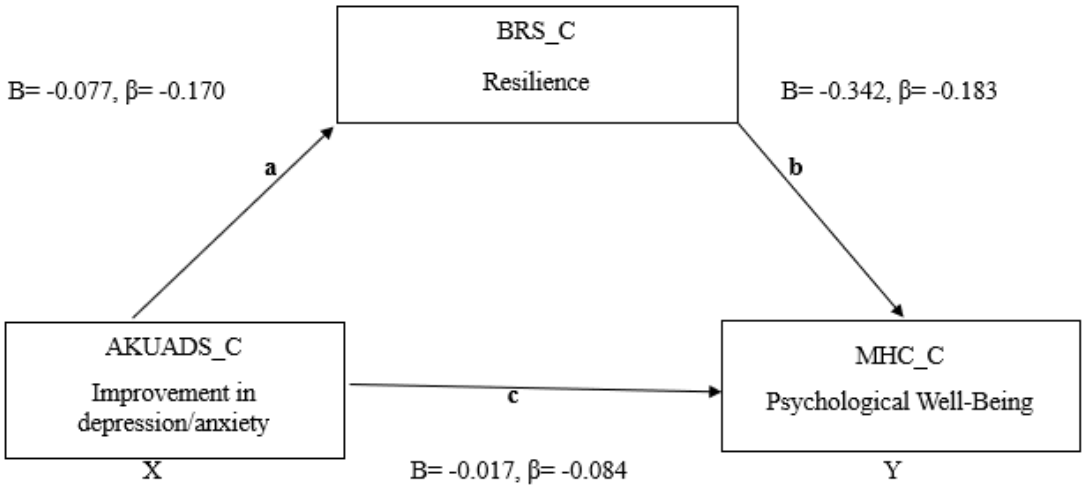
Mediation of resilience (BRS_C) in the relationship between improvement in depression/anxiety (AKUADS_C) and psychological well-being (MHC_C)

Path	B	SE	β	T	P	95%CI	
						LL	UL
Constant (BRS_C)	8.380	1.505	–	5.566	<.001	5.317	11.443
X → M (AKUADS_C → BRS_C)	-0.077	0.078	-0.170	-0.991	.329	-0.236,	0.081
Constant (MHC_C)	21.311	3.971	–	5.367	<.001	13.222	29.400
M → Y (BRS_C → MHC_C)	-0.342	0.330	-0.183	-1.037	.308	-1.014	0.330
X → Y Direct (AKUADS_C → MHC_C)	-0.071	0.150	-0.084	-0.475	.638	-0.376	0.234
X → Y Indirect (via BRS_C)	0.026	0.040	0.031	–	–	-0.039	0.122

Notes: B = unstandardized coefficient, β = standardized coefficient, SE = standard error, CI = 95% confidence interval based on PROCESS, LL= Lower Limit, UL= Upper Limit

A mediation analysis was conducted using the PROCESS macro (Hayes, 2022) to examine whether resilience (BRS_C) to test whether resilience (BRS_C) functioned as a mediator between depression/anxiety improvement (AKUADS_C) and psychological well-being (MHC_C). The BRS_C model showed a significant constant value (B = 8.380, SE = 1.505, t = 5.566, p < .001) but AKUADS_C did not show any significant effect on BRS_C (B = -0.077, SE = 0.078, t = -0.991, p = .329, β = -0.170, 95% CI [-0.236, 0.081]). The MHC_C outcome model showed a significant constant value (B = 21.311, SE = 3.971, t = 5.367, p < .001) but BRS_C (B = -0.342, SE = 0.330, t = -1.037, p = .308, β = -0.183, 95% CI [-1.014, 0.330]) and AKUADS_C (direct effect: B = -0.071, SE = 0.150, t = -0.475, p = .638, β = -0.084, 95% CI [-0.376, 0.234]) did not function as valid predictors of the outcome. The indirect effect of AKUADS_C on MHC_C through BRS_C was also non-significant (B = 0.026, Boot SE = 0.040, 95% CI [-0.039, 0.122]) which showed that resilience did not mediate the relationship between improvement in depression/anxiety and psychological well-being in this sample.

Mediation Model of Resilience between Improvement in Depression/Anxiety and Psychological Well-Being



Figure

Table

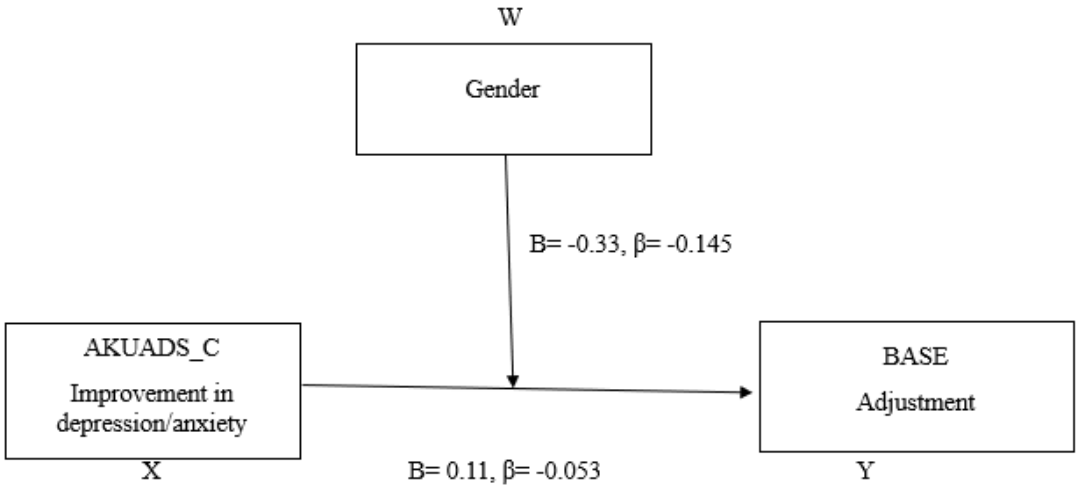
Moderation Effect of Gender on the Relationship Between AKUADS-C and BASE_C

	B	SE	B	T	p	95%CI	
						LL	UL
Constant	12.23	4.27	–	2.87	.007	3.53	20.94
AKUADS-C	0.11	0.21	0.053	0.49	.625	-0.33	0.54
Gender	7.00	5.75	0.135	1.22	.233	-4.73	18.72
AKUADS-C x Gender	-0.33	0.30	-0.145	-1.09	.284	-0.95	0.29

Notes: B = unstandardized regression coefficient, β = standardized coefficient, SE = standard error, CI = 95% confidence interval based on PROCESS, LL= Lower Limit, UL= Upper Limit, and Interaction term (AKUADS_C × Gender) tests moderation.

A moderation analysis using the PROCESS macro (Hayes, 2017) was conducted to examine whether gender moderated the relationship between improvement in depression (AKUADS_C) and adjustment (BASE_C). The overall model was not statistically significant, R^2 = 0.054, F(3, 31) = 0.59, p = .624, which showed that the predictors could only account for 5.4% of the adjustment variance. The individual predictors AKUADS_C (B = 0.11, SE = 0.21, t = 0.49, p = .625) and gender (B = 6.996, SE = 5.75, t = 1.22, p = .233) did not show significant predictive power. The interaction term (AKUADS_C × Gender) was also non-significant (B = -0.33, SE = 0.30, t = -1.09, p = .284, 95% CI [-0.95, 0.29]), which indicates that depression improvement affected adjustment similarly for both males and females in this sample.

Moderation Model of Gender on the Relationship Between Improvement in Depression/Anxiety and Adjustment



Figure

Summary of Quantitative and Qualitative Analysis

The integrated analysis of quantitative and qualitative findings showed that Cognitive Behavioral Therapy (CBT) effectively helped people with neuropsychiatric disorders achieve better psychological adaptation and mental health results. The study found that anxiety and depression decreased while psychological well-being and life adjustment skills and resilience and life satisfaction improved through the quantitative research.

The qualitative research confirmed the findings because it showed how participants developed better coping methods and improved their ability to control emotions and their engagement in activities and their ability to develop hope and self-compassion. The research findings demonstrate that a structured CBT program which uses culturally appropriate methods and combines mindfulness and values-based techniques functions as an effective treatment that helps people with neuropsychiatric disorders improve their adaptive skills and emotional resilience and recovery process.

Discussion

The present study aimed to examine the effectiveness of Cognitive Behavioral Therapy (CBT) in improving mental health outcomes and psychological adaptation among patients with neuropsychiatric disorders. The findings demonstrated significant improvements following the intervention. Specifically, post-test results

indicated a notable reduction in anxiety and depression, along with significant improvements in mental health, psychological adjustment, resilience, and life satisfaction. These results support the effectiveness of CBT in addressing the psychological difficulties commonly experienced by individuals with neuropsychiatric conditions. The observed reduction in psychological distress is consistent with previous research suggesting that CBT is effective in modifying maladaptive thought patterns and improving emotional regulation (Hofmann et al., 2012; Dobson & Dozois, 2019). In addition, the improvement in psychological adaptation suggests that participants developed better coping strategies and increased ability to manage stress associated with their condition. The significant increase in resilience and life satisfaction further highlights the role of CBT in strengthening adaptive functioning and enhancing overall well-being. These findings are in line with cognitive-behavioral theory, which emphasizes the relationship between thoughts, emotions, and behaviors, and supports the idea that restructuring negative cognitions leads to improved psychological outcomes (Lazarus & Folkman, 1984). Furthermore, the weakening of negative relationships between mental health variables after the intervention suggests that CBT helped participants break maladaptive patterns and develop more adaptive responses to stress.

The results also indicate that demographic variables such as gender and marital status had limited influence on post-intervention outcomes. Although some differences were observed at baseline, these differences largely diminished after the intervention, suggesting that CBT was effective across different demographic groups. The reduction in gender-based differences in psychological outcomes is consistent with previous studies indicating that CBT produces comparable benefits for both males and females (Hofmann et al., 2012). However, marital status continued to show some influence on life satisfaction, indicating that social and relational factors may still play a role in subjective well-being even after psychological intervention.

The mediation analysis revealed that resilience did not significantly mediate the relationship between improvements in anxiety/depression and psychological well-being. This suggests that the improvement in mental health outcomes following CBT was not dependent on resilience as an intermediate mechanism in this sample. Similarly, the moderation analysis showed that gender did not significantly influence the relationship between symptom improvement and psychological adjustment, indicating that the therapeutic effects of CBT were consistent across male and female participants.

These findings illustrate the importance of integrating structured psychological interventions such as CBT into the management of neuropsychiatric disorders. Given the chronic nature of these conditions, providing patients with effective tools to manage distress and improve functioning is essential for enhancing quality of life. Future research should consider longitudinal designs to assess the long-term sustainability of treatment effects and include larger and more diverse samples to improve generalizability of the findings.

Conclusion

In conclusion, the study provides strong empirical evidence for the effectiveness of Cognitive Behavioral Therapy in reducing psychological distress and improving mental health outcomes among individuals with neuropsychiatric disorders. The intervention significantly enhanced psychological adjustment, resilience, and life satisfaction while reducing anxiety and depression. These findings highlight the potential of CBT as an effective, evidence-based therapeutic approach for improving emotional and psychological functioning in clinical populations. Overall, CBT offers a practical and scalable intervention that can be incorporated into standard care to support the psychological well-being and adaptive capacity of individuals with neuropsychiatric conditions.

Implications

Theoretical Implications

The findings support cognitive-behavioral theory, which posits that psychological distress is primarily driven by maladaptive thought patterns (Beck, 1976; Beck, 2011). The observed high levels of anxiety and depression, along with their association with poorer psychological adaptation, reinforce the idea that dysfunctional cognitions negatively influence emotional and behavioral functioning. The results also align with CBT principles, suggesting that modifying negative automatic thoughts and core beliefs leads to improved emotional regulation and adaptive behavior (Hofmann et al., 2012). Furthermore, the findings support resilience theory, which conceptualizes resilience as a protective factor that facilitates coping with adversity (Masten, 2001). Overall, the study contributes to theoretical understanding by highlighting the role of cognition and resilience in psychological adjustment among individuals with neuropsychiatric disorders.

Practical Implications

The study has important implications for clinical practice. The high prevalence of anxiety and depression underscores the need for routine psychological screening in neuropsychiatric populations. Early identification and intervention are consistent with stepped-care and integrated care models that emphasize timely treatment to improve outcomes (Kazdin, 2008). The significant improvements observed following CBT indicate that it is an effective and feasible intervention for addressing psychological distress and maladaptive thinking in this population (Hofmann et al., 2012). The applicability of CBT in the local context further suggests that culturally adapted, evidence-based interventions can be successfully implemented in Pakistan (Naeem et al., 2015). In addition, the findings support a biopsychosocial approach to care, emphasizing the integration of psychological, biological, and social factors in treatment planning (Engel, 1977).

Recommendations

It is recommended that clinicians incorporate routine assessment of anxiety and depression and adopt CBT as a core intervention for neuropsychiatric patients. Intervention programs should also include components aimed at strengthening resilience, given its role in coping and recovery (Masten, 2001). Future research should employ larger randomized controlled trials and longitudinal designs to examine long-term effectiveness and causal relationships (Kazdin, 2008). Additionally, further studies should explore the influence of socioeconomic, educational, and urban–rural factors on treatment engagement and outcomes. At the policy level, there is a need to develop structured CBT training programs and integrate evidence-based psychological services into healthcare systems, alongside efforts to reduce stigma and promote early help-seeking behavior (World Health Organization, 2013).

Limitations

This study is limited by its small sample size and single-group pretest–posttest design, which restrict generalizability and causal inference (Kazdin, 2008). The inclusion of participants with heterogeneous neuropsychiatric conditions may have introduced variability in responses. The reliance on self-report measures may also have resulted in response and social desirability biases. Furthermore, the absence of follow-up assessment limits conclusions regarding the long-term sustainability of treatment effects. The study also did not account for contextual variables such as socioeconomic status and urban–rural differences, which may influence access to care and outcomes. Future research should address these limitations through larger, controlled, and longitudinal designs.

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