A COMPARATIVE STUDY OF COGNITIVE BEHAVIOR THERAPY AND COGNITIVE RETRAINING TREATMENT IN DEPRESSIVE DISORDER

A THESIS

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Declaration

I hereby declare that this thesis titled "A comparative study of cognitive behavior therapy and cognitive retraining treatment in depressive disorder" is an original piece of work done by me for the award of the degree of Doctor of Philosophy in Psychology. I also declare that this thesis or any part of it has not been submitted by me for the award of any degree, diploma, title or recognition before.

Patiala Aarzoo

Certificate

I hereby certify that this thesis titled "A comparative study of cognitive behavior therapy and cognitive retraining treatment in depressive disorder" is a record of bonafide study and research carried out by Aarzoo under my supervision and guidance for the partial fulfillment of the requirements for the degree of Doctor of Philosophy in Psychology. The results embodied in the thesis have not been submitted to any other University or Institute for the award of any degree, diploma, title or recognition.

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Abstract

Mood disorders are recurrent or episodic with significant cognitive deficits and incomplete recovery. Cognitive behavior therapy (CBT) has been the gold standard delivered by a specialist and is usually more appropriate for patients who display psychological sophistication and are literate to maintain dysfunctional thought record. Cognitive retraining treatment (CRT) on the other hand maybe a convenient option if its effectiveness is comparable to CBT. The study employed pre-post intervention and experimental research design controlled by having four groups 4 groups namely; Cognitive Behavior Therapy (CBT), CBT along with pharmacological treatment (CBTM), Cognitive Retraining Treatment (CRT), and CRT along with pharmacological treatment (CRTM). Each group had 20 participants; participants in the corresponding groups received either CBT or CRT, and the outcome measures were: Beck Depression Inventory (BDI-II), to assess severity of depression; Metacognitive Questionnaire (MCQ30), to assess dysfunctional metacognitive beliefs; World Health Organization Quality of Life- Brief (WHOQOLBref), to assess quality of life in four domains; and Global Assessment of Functioning (GAF), to assess global level of functioning.There were significant differences among the four groups on the outcome measures. CRTM group showed the least severity of depression and highest psychological QOL. While the CBT group had the highest QOL supported by the environment and the highest global functioning scores. The change in the mean scores on outcome measure was greater for CRT and CRTM groups, though not statistically significant.CRTM augmentation was superior in addressing metacognitive beliefs. Augmentation to CBT did not produce any supplementary effect and CBT continued to be superior in producing greater functional outcome

Keywords:cognitive behavior therapy, cognitive retraining, depression, metacognitive beliefs, quality of life

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CHAPTER 1

INTRODUCTION

Health has been of paramount importance to humankind for centuries, it was believed that the absence of illness or disease is a sign of good health but this belief had the flaw of absolutism, which was unreal for the 20th century, an era where many lifestyle diseases started emerging. The economic and industrial reforms lead to urbanization and consumerism causing alteration in psycho-socio, and cultural norms, therefore, redefining personal aspects of life including occupation, income, and related lifestyle. World Health Organization (WHO) defined health as an overall sense of physical, social, and mental well-being (Sartorius, 2006). This expanded the scope of health to subjectivity and flexibility considering the diversity and dynamicity of human behavior. Human behavior is the core of Psychology, and the factors determining a certain behavior automatically become its subject matter. Behavior is usually pronounced by how one feels or/and thinks as well as multiple pre-determined beliefs, ideas, concepts, etc. that play a role in processing that goes on between stimulus and reaction. The range of behaviors is too vast to label any of them as normal or abnormal, and it's the cluster of cognitive, affective, and behavioral signs that characterize a mental illness/disorder. There are classification systems that have defined criteria for mental and behavioral disorders, The International Classification of Diseases (ICD) by World Health Organization (WHO) and the Diagnostic and Statistical Manual of Mental Disorders (DSM) by American Psychiatric Association (APA) most commonly referred to by the global community of mental health professionals. There are nearly 300 mental and behavioral disorders categorized under different headings in the International Classification of Diseases Classification of Mental and Behavioral Disorders: Clinical Descriptions and diagnostic guidelines (ICD-10 CDDG) as well as in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM*5*). The classification systems

have been time-to-time under revision aligned to various sociocultural and psychological changes as well as variations. ICD-10 has been in use since 1992 and its chapter V identifies mental and behavioral disorders with assigned alphanumeric codes (F01.1, F20.1, etc.). The code F30-F39 recognizes mood disorders, and further sub-divisions of F32 and F33 correspond to depressive episodes and recurrent depressive disorder respectively. The current area of research focuses on these two categories of mood disorders, that is, depressive episodes and recurrent depressive disorder. The Eleventh Revision of the International Classification of Diseases (ICD-11) was released in 2019 and has come into effect since 2022. The chapter on Mental, Behavioral, or Neurodevelopmental Disorders (MBND) has new structures, categories, and changes in diagnostic criteria for mental disorders. ICD-11 MBND contains 21 disorder groupings while ICD10 had 11 disorder groupings based on etiology, pathophysiology, and phenomenology (Gaebel et al., 2020). Mood disorders are presented with alphanumeric codes from 6A60-6A8Z; depressive or bipolar disorders are identified with specific symptom qualifiers such as the melancholic features qualifier, the anxiety symptoms qualifier; the panic attacks qualifiers, and the seasonal pattern qualifier. The present study used the criteria of ICD-10.

1.1. Mood disorders

Mood disorders are recurrent or episodic and individual episodes are often triggered by stressors. The diagnostic criteria have been chosen to identify the episodes as manic or depressive. Depending upon the symptom's severity, persistence, and dysfunction caused by the illness, the episode can be labeled and severity can be identified. Single episodes of illness/depression have been distinguished from bipolar and other multiple-episode disorders. The terms "mania" and "severe depression" are used in this classification to denote the opposite ends of the affective spectrum; "hypomania" is used to denote an intermediate state without delusions, hallucinations, or complete disruption of normal activities, which is often

(but not exclusively) seen as patients develop or recover from mania. Distinguishing between different grades of severity in depression; the three grades of mild, moderate, and severe have been specified. But it rests upon clinical judgment where grade/severity is determined by the number, type, and severity of symptoms present in the patient. These categories are independently used only for the first episode of depression, any further episode of depression is classified under recurrent depressive disorder mentioning the severity of the current episode as mild, moderate, or severe.

The cardinal features of depression include sadness, anhedonia, and fatiguability; associated symptoms are decreased attention/concentration, reduced self-esteem and self-confidence; ideas of guilt and unworthiness, bleak and pessimistic views of the future, ideas or acts of self-harm or suicide, disturbed sleep and appetite. The severity of depression is categorized as mild, moderate, or severe depending upon the number of symptoms present. In addition, mild to moderate episodes of depression first or recurrent can be presented with or without somatic symptoms. Whereas psychotic symptoms if presented along with depression are classified under only the severe grade of the episode, both first or/and recurrent. Bipolar affective disorder is another entity where mania and depression are two ends of a continuum and the patient lies at extremes or in between. It is characterized by repeated (i.e. at least two) episodes in which the patient's mood and activity levels are significantly disturbed, this disturbance consisting on some occasions of an elevation of mood and increased energy and activity (mania or hypomania), and on others of a lowering of mood and decreased energy and activity(depression). Characteristically, recovery is usually complete between episodes, and the incidence in the two sexes is nearly equal to that in other mood disorders (WHO, 1982). Although the most typical form of bipolar disorder consists of alternating manic and depressive episodes separated by periods of normal mood, it is not uncommon for a depressive mood to be accompanied for days or weeks on end by over activity and pressure

of speech, or for a manic mood and grandiosity to be accompanied by agitation and loss of energy and libido. Depressive symptoms and symptoms of hypomania or mania may also alternate rapidly, from day to day or even from hour to hour. A diagnosis of mixed bipolar affective disorder is made only if the two sets of symptoms are both prominent for the greater part of the current episode of illness, and if that episode has lasted for at least 2 weeks (ICD 10). The patient has had at least one manic, hypomanic, or mixed affective episode in the past and in addition at least one other affective episode of hypomanic, manic, depressive, or mixed type, but is not currently suffering from any significant mood disturbance, and has not done so for several months still the patient may, however, be receiving treatment to reduce the risk of future episodes.

1.2. Prevalence

Lifetime prevalence estimates of mood disorders are 20.8% while for depression lifetime prevalence is 10.8% (Kessler et al., 2005; Lim et al., 2018). An Indian study reported overall prevalence of depression was 15.1%. The prevalence of depression was higher in females (16.3%), in the low-income group (19.3%), among divorced (26.5%) and widowed (20%) (Poongothai et al., 2009). The 2017 survey report by WHO reported that depression is estimated to affect 322 million people globally and 57 million in India diagnosed with a depressive disorder (WHO, 2017). A more recent National Survey on Drug Use and Health (NSDUH) of United States adolescents and adults (N = 611,880) assessed rates of major depressive episodes in the last year increased 52% 2005–2017 (from 8.7% to 13.2%) among 12 to 17 year age-group and 63% 2009–2017 (from 8.1% to 13.2%) among 18–25 year age-group in the last year also increased among young adults 18–25 from 2008–2017 (with a 71% increase in serious psychological distress), with less consistent and weaker increases among adults ages 26 and over (Twenge et al., 2019).

Mood disorders are high in young and elderly men, particularly. Among a sample of 300 elderly over 65 years of age, 10% living in the community had signs of depression, and 30-50% living in residential facilities for the elderly (Joseph et al., 2020). Further, this study revealed that 52.0% had mild depression, 40.0% had severe depression and 8.0% of the elderly had no depression. At its worst, depression can lead to suicide. Over 700 000 people die due to suicide every year. Suicide is the fourth leading cause of death in 15-29-year-olds. Depression is a common illness worldwide, with an estimated 3.8% of the population affected, including 5.0% among adults and 5.7% among adults older than 60 years (Institute of Health Metrics and Evaluation [IHME], 2019).

Approximately 280 million people in the world have depression. More than 75% of people in low- and middle-income countries receive no treatment (Evans-Lacko et al., 2018). Depression is the most prevalent mental disorder and the third most disabling health condition at least one in every ten people suffer from unipolar depression (approximately 676 million), (WHO, 2017). Global estimations from WHO's Mental Health Action Plan 2013-2030 highlight the steps required to provide appropriate interventions for people with mental disorders including depression. Though 10-15% of the general population tend to suffer from depression only .38% receive any kind of intervention (Sierra et al., 2018). There are studies highlighting prevalence of depression secondary to physical illness affecting the day-to-day functioning in chronic illnesses (Myoshi, 2001; Rajan & Subramania, 2016).

Depression is one of the priority conditions covered by WHO’s Mental Health Gap Action Programme (mhGAP). The Programme aims to help countries increase services for people with mental, neurological, and substance use disorders through care provided by health workers who are not specialists in mental health.

1.3. Treatment

Treatment of mood disorders comprise interventions for acute, continuation, and maintenance phase. Each phase has a different treatment approach as the objectives of every phase of treatment vary. Acute treatment aims at the alleviation of symptoms and restoration of day-to-day functioning. The continuation treatment aims to sustain the gains achieved by the initiation of treatment, thereby, preventing the return of the index episode. The intervention in the maintenance phase aims to prevent the recurrence of a new episode. The treatment may be delivered in any best setting, for example, inpatient, outpatient, or day hospital as decided by the concerned clinician(s). The factors influencing a clinician's decision usually involve suicidal risk, adherence, support system, psychosocial stress, and functional impairment. The choice of treatment is either medication or psychotherapy delivered independently/discretely as well as in combination. In addition, electroconvulsive therapy (ECT), and light therapy may also be advised depending upon the severity, chronicity, or type of mood disorder. Psychological treatment is the first and most recommendable intervention for depression, and its early implementation shows greater efficacy and significantly prevents chronicity and/or relapse (Cuijpers et al., 2013; Breedvelt et al., 2021).

The roots of psychotherapy in depression are buried in the psychoanalytical model, where internal conflicts are believed to determine phenomenology. Psychoanalytical therapies tend to develop insight to resolve these conflicts through the identification and interpretation of historical experiences (de Maat et al., 2009). Klerman and colleagues developed interpersonal psychotherapy based on their research in attachment theory and earlier interpersonal psychodynamic models of psychotherapy. Interpersonal psychotherapy conceptualizes depression as arising from problematic patterns in relationships that stem from early development and establishment of attachment. It involves non-directive questioning, interpersonal skills training, psychoeducation, and role-playing. Interventions are chosen to

address one or more of four interpersonal domains (grief, interpersonal disputes, role transitions, and interpersonal deficits) that are relevant to the patient's current depressive episode (Markowitz & Weissman, 2012). Later in the 1950s, behavioral therapists conceptualized depressive disorders resulting from loss or decreased access to positive reinforcement. The intervention based on learning theories emphasized rewarding adaptive behaviors enhancing the level of functioning and symptomatic improvement (Shinohara et al., 2013).

The earliest cognitive model was rational-emotive therapy, developed by Albert Ellis., who attributed the development of depression to the presence of absolute, rigid rules as a way of life. The failure to live up to these expectations leads to depression. Ellis used logical arguments to modify dysfunctional beliefs. Beck noted that depressed patients tend to have skewed and negative thoughts about self, future, and world, a cluster he termed as a cognitive triad. The cognitive theory explored that distortions are characteristic of the content of thinking in depressed patients. Depressed individuals tend to engage in "all or nothing," dichotomous thinking, make arbitrary (negative) inferences about events, selectively abstract negative details out of context, over-generalize (concluding negative rules from single instances), magnify (the negative) and minimize (the positive), and take personally events that may not be directly about them. Beck emphasized the standardization of the treatment by combining the cognitive model with behavioral approaches and the submission of the intervention to scientific evaluation. CT and variants are now the most researched form of psychotherapy in the world (Gaudiano, 2008; Hunot et al., 2010). CT is now commonly known as cognitive behavioral therapy (CBT).

1.3.1. Cognitive behavior therapy (CBT)

CBT is a form of talk therapy that utilizes certain cognitive and behavioral techniques to alter the cognition, affect, and action of the individual. Ellis (1962) and Beck (1970) were the

pioneers who developed and structured this treatment approach (Hofmann et al., 2012). CBT conceptualizes the problems from a multi-factorial perspective including genetic predispositions, childhood experiences, and current environmental triggers that contribute to NATs, assumptions, or/and cognitive distortions. The cognitions usually result in dysregulated or negative emotional states either leading to or reinforcing the maladaptive behaviors or dysfunction (Blackburn, 2006, p. 115). A comprehensive assessment of cognition, affect, and behavior lays the foundation for CBT delivery. The cognition in CBT refers to the negative automatic thoughts, assumptions, distortions, and beliefs that tend to trigger these NATs time-to-time. CBT focuses on cognitive restructuring and uses certain behavioral and cognitive techniques to produce changes in thinking, emotional states, and behaviors. The techniques to challenge and restructure the cognitions include guided discovery, understanding idiosyncratic meaning, examining the evidence, challenging absolutes, considering the odds, reattribution, turning adversity to advantage, direct disputation; labeling of distortions, catastrophizing, challenging dichotomous thinking; writing the alternative assumption, etc. The techniques to enhance and alter mood states include exposure, relaxation, behavioral experiments, role reversal, etc. (Freeman et al., 1990, p. 49). Further, the techniques for behavior change include graded tasks, activity scheduling, behavior rehearsal, social skill training, and assertiveness training. The above techniques are used in combination depending on the clinical and environmental variables. The meta-analysis assessed the delivery of CBT in more than 17 psychological conditions, in most of the conditions CBT showed a higher response rate than other interventions. CBT has the highest response rate for anxiety and depressive disorders (Høifødt et al., 2011), and proved to be effective when delivered using contemporary modes such as internet (Christ et al., 2020) as well as depression or anxiety secondary to intellectual disability (Unwin et al., 2016). Though limitations observed in meta-analyses included small sample sizes, lack of

control groups, etc. Despite all this, evidence-base is enormous to conclude that CBT is an effective intervention, but CBT is still not globally adopted as a first-line treatment for mental disorders (Hofmann et al., 2012). The delivery of CBT has been extended to non-psychiatric conditions such as spinal cord injury (Mehta et al., 2011), coronary heart disease (Li et al., 2021), terminal cancer (Greer et al., 2012).

In particular, the evolution of treatments in CBT has proceeded in two directions, one being the integration of mindfulness and acceptance-based interventions and the other being behavioral in nature. The systematic reviews have proved these interventions to be effective for various age groups as well as their delivery through online mode (Hetrick et al., 2016; Hunot et al., 2010; Shore et al., 2017; Sierra et al., 2018). The meta-analysis showed significant correlations between depression severity and cognitive performance, although results concerning the affected cognitive domains are inconclusive (Bora et al., 2012). The cognitive domains reported to be involved include episodic memory, executive function, and processing speed (Bora et al., 2012; Hammar & Årdal, 2009; McDermott & Ebmeier, 2009). Multiple studies have proclaimed improvements in measures of functional capacity or functional outcome after cognitive retraining (Woolf et al., 2022).

1.3.2. Cognitive retraining (CR)

The process of CR and the mechanisms for change can be explained by different theoretical models. The descriptive model is based on Luria's work on brain plasticity, conceptualized as the potential of the brain to change and adapt to help restore lost functions. Brain plasticity is mediated by the re-organization and re-establishment of brain functions using cognitive retraining or remediation. Diller's descriptive model of cognition explains cognitive retraining precludes diagnosing the defect of a particular ability and choosing a task that appeals to the respective ability adequately (Diamant & Hakkaart, 1986). The ability and the task are then evaluated based on activities of daily life (ADL). The CR, therefore, improves ADL and

functioning outcomes; and holds a rehabilitative role. CR approaches involve high levels of stimulation and new learning tasks at the appropriate times leading to an increase in the density of neural connections which facilitate rapid recovery in patients with neurological as well as psychiatric conditions. However, findings from the meta-analysis (McGurk et al., 2007; Wykes et al., 2011) showed that CR in conjunction with other psychiatric rehabilitation programs improved psychosocial functioning measures more than just CR alone.

Cognitive retraining or cognitive remediation are interchangeably used in literature. CR is a type of treatment that aims at improving attention, memory, language, and/or executive functions utilizing a variety of manual or computerized exercises or programs. The primary aim of cognitive retraining is to reduce cognitive deficits. It is these difficulties with attention or memory that often interfere with a person's ability to carry out day-to-day activities; for example, to recall peoples' names, faces, missing bits of conversation, or use household appliances. The CR involves the application of techniques and procedures that supports to allow individuals with cognitive impairment to function productively and independently. Thus, a comprehensive definition of cognitive retraining can be understood as intervention to improve brain functions that are affected due to injury, shock, trauma, mental disorders or psychological stress using principles of compensation and restoration (Afsar et al., 2021). A meta-analysis noted large effect sizes ($d \geq 0.8$) for aspects of executive function and verbal learning. Medium effect sizes ($0.5 \leq$ to $d < 0.8$) were found for aspects of immediate and delayed verbal memory, abstraction and set-shifting, sustained attention, response inhibition, and psychomotor speed. Small effect sizes ($0.2 \leq$ to $d < 0.5$) were reported for verbal fluency by letter, immediate memory, and sustained attention (Robinson et al., 2006). The conclusions revealed that euthymic bipolar patients demonstrate relatively marked impairment in aspects of executive function and verbal memory. The pattern was different for deficits in theory of mind, both bipolar-depressed and bipolar-manic patients

displayed impaired performance but no impairment was observed in the remitted patients (Kerr et al., 2003). The cognitive deficit is associated with poor functional outcomes as well as clinical outcomes in terms of relapses, hospitalizations, and suicide attempts. Thus, intervention addressing the cognitive deficit may improve overall functioning (Atre-Vaidya et al., 1998; Martínez-Arán et al., 2004).

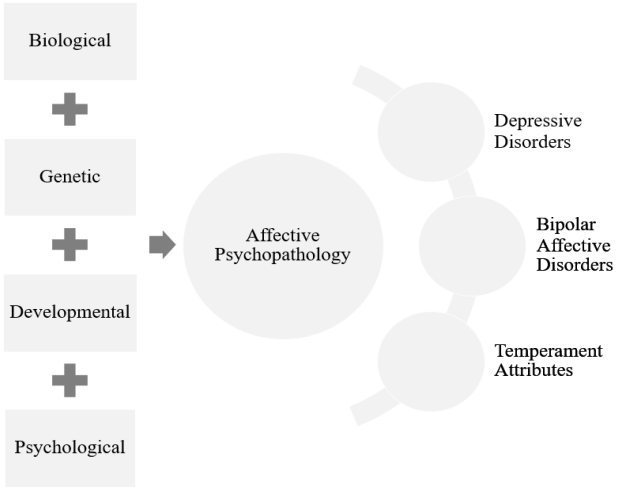
Cognitive retraining or remediation programs demonstrated efficiency in patients with brain lesions, and gradually these were extended to patients with schizophrenia, yielding significant improvements in cognitive performance, psychosocial functioning, and symptoms (Penadés & Catalán, 2012). However, there is research that does not support evidence of significant improvement as a result of cognitive retraining (Ashwini et al., 2016). Cognitive retraining therapies have produced propitious developments in attention deficit hyperactivity disorder (Stevenson et al., 2002), learning disabilities, obsessive-compulsive disorders, brain lesion patients, and many more (Buhlmann et al., 2006). Attempts have been made to enhance cognitive functioning in bipolar affective disorders, major depressive disorders, obsessive-compulsive disorders, anorexia nervosa, and substance use disorders (Lee et al., 2013). These trials imply that the performance of cognitive exercises or newly learned strategies could be practiced and generalized in ordinary behaviors. The need to develop cognitive retraining-based interventions in depressive disorders has been highlighted in the existing literature with favorable denouements.

1.4. Theoretical Framework

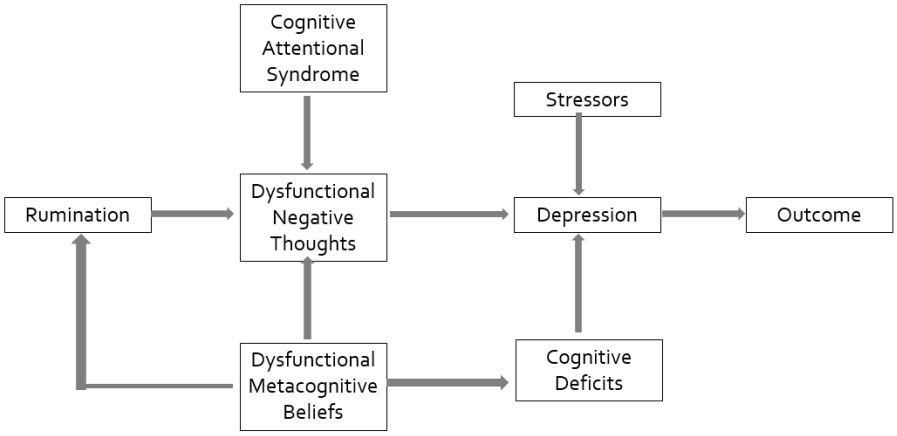
Many theoretical models have been proposed that define the underlying mechanism or predisposition of an individual to morbid affective experiences (Sadock et al., 2015, p. 339). The psychoanalytical theory of Sigmund Freud considers the loss of an object which causes disruption of an attachment bond leading to affective symptoms. The cognitive theory of Aaron Beck (1967) suggests its negative cognitive schemas that intermediate between

proximate and actual causes. According to Martin Seligman's learned helplessness model (1975), it's the belief that efforts or actions made by an individual will not bring relief from undesired circumstances, which predicts phenomenology. Lewinsohn (1974) says it’s the reinforcement that is not contingent and hence social deficits persist as a response to potentially rewarding events, though undesirable and maladaptive (MacPhillamy & Lewinsohn, 1974). The biogenic amine describes symptoms resulting due to impairment or dysregulation of aminergic transmission, which also determines opposite episodes in mood disorder and treatment. Finally, stress-diathesis interaction is the most common and final pathway which explains the phenomenology of affective symptoms and suggests treatment.

The affective syndromes are the final common pathway of various psychological and biological processes. There is strong evidence of a genetic role in the causation of bipolar and recurrent major depressive disorders. It can be said that heredity often determines the type of environment into which the child is born predisposed to mood disorder. Developmental factors like parents with mood disorders, or conflict between parents which may lead to separation, divorce, and suicide make one more vulnerable to depressive disorders. Certain temperamental attributes subsumed under cyclothymic, dysthymic, and anxious-inhibited temperaments, as well as the traits of high neuroticism describing emotionality have been prone to mania and melancholia. Every individual who faces adversity does not develop clinical depression, but these adversities seem to play a pathogenic role primarily in those with an affective diathesis. Women have higher concentrations of monoamine oxidase (the enzyme that breaks down monoamine transmitters) in the brain and a more precarious thyroid status.

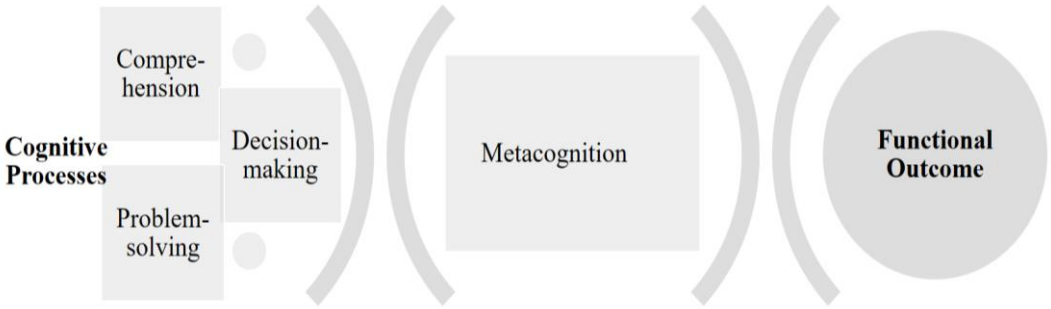


Beck's cognitive triad is a cardinal cognitive feature of depressive disorders (Freeman et al., 1990, p. 7), it is the dysfunctional thoughts about self, others, and the future that worsen the course and recovery from a depressive episode. Any stressor can activate dysfunctional thoughts during the recovery making complete remission rare (Halvorsen et al., 2014). According to the metacognitive belief model, it is not the thinking per se but the way an individual relates to these thoughts that cause or maintain depression. Metacognitive beliefs tend to operate through cognitive attentional syndrome (CAS), where attention is concentrated on negative automatic thoughts (NATs) fostering rumination; and rumination supplements NATs (Halvorsen et al., 2014; Normann et al., 2014), worsening the depressive state. Wells classified these dysfunctional metacognitive beliefs as positive beliefs about worry, negative beliefs about uncontrollability and danger of worry, cognitive confidence, need for control, and cognitive self-consciousness (Wells, 2009, p. 1). The positive metacognitive beliefs breed rumination evaluating it as a coping mechanism that paramount harmful social and interpersonal consequences. Later, these consequences generate negative metacognitive beliefs about rumination (inducing worry and uncontrollability) inducing decreased cognitive confidence among individuals in depressive states (Halvorsen et al., 2014; Papageorgiou & Wells, 2003).



Cognitive deficits are well known to have a significant role in clinical as well as functional outcomes. It is social metacognition that helps an individual to be aware of self and that of others that forms social interaction influencing interpersonal dealing and social functioning. Cognitive processes like problem-solving and decision-making are mediated by social and meta-cognition. Metacognition means awareness; of self including thought process, strategies, execution, etc. It is thinking about thinking (Flavell, 1979). The use of metacognitive strategies dates back to Simonides (557-468 BCE) who gave a method of loci to improve memory (Dunlosky & Metcalfe, 2009). There is Comte's paradox which denies the existence of metacognition because observing and observing individuals cannot be the same. But this conflict was contradicted by retrospective introspection where only a part of the organ is reflecting and thinking. Also, the neural correlates resolve this conflict by suggesting that its prefrontal cortex is involved in self-reflection whereas the temporal lobe is responsible for memory retrieval. The concept has its roots in cognitive psychology and post-Piagetian developmental psychology, and research in the area has recently advanced in the last 30 years. Some of the concepts are still fuzzy and less defined leading to several research problems. We can now understand that individuals have a higher capacity to understand the illness, its course, outcome, treatment options, compliance, etc.; along with this acquired knowledge, they can also monitor changes in response to treatment and thereby have a better

acceptance of their clinical condition. Thus, metacognitive capacity might help decide upon treatment options, compliance, and improved level of functioning.



Hence, concluded that metacognition mediates cognitive processes like comprehending, problem-solving, decision-making, etc. It is these cognitive processes that play a significant role in carrying out routine activities like reading newspapers, deciding on clothes, and menu, interacting with others, and performing various other tasks of day-to-day functioning, It can be presumed that improvement in cognitive deficits will also improve the clinical and functional outcome.

1.4.1. Metacognitive beliefs

Metacognition can be understood as an information processing system that monitors, interprets, evaluates, and regulates the contents, and processes of its organization (Flavell, 1979; Papageorgiou & Wells, 2003). An individual in a state of depression centres attention on NATs and continues to ruminate about negative experiences, events, or emotions. This perseverative thinking style, inclusive of rumination and worry, devolves into depression (Halvorsen et al., 2014). CBT is an evidence-based therapy (EBT) for NATs and gold standard treatment to address NATs through cognitive restructuring and, consequently reduces relapses and improves functioning (Halvorsen et al., 2014). The third wave therapies namely, metacognitive therapy and acceptance and commitment therapy, manipulate dysfunctional thoughts and metacognitive beliefs using increased attentional flexibility through whereas CBT addresses content of thoughts and not the dysfunctional metacognitive

beliefs about these thoughts mindfulness (Jelinek et al., 2017). Hence, interrogating the effect of CBT on dysfunctional metacognitive beliefs will be pivotal.

These beliefs operated through CAS and were ascertained to be correlated with psychopathology. The positive beliefs about worry-predicting social dysfunction (Bright et al., 2018), and negative beliefs about uncontrollability, and danger of worry are the strongest predictors of depression. Wherein, the need for control and cognitive confidence are markers of poor attention and memory (Nordahl et al., 2019). Positive and negative dysfunctional metacognitive beliefs lead to decreased self-esteem and increased affective symptoms, effectuated by poor executive functioning withering depression (Kraft et al., 2017; Moses-Payne et al., 2019). Social cognition and meta-cognition foster knowledge of the self and others that aid social interaction in boosting socio-interpersonal functioning. Cognitive processes such as thinking, understanding, analyzing, problem-solving, decision-making, etc. are moderated by social cognition and metacognition. Flavell (1979) describes metacognition as 'thinking about thinking.' Insight, compliance, and selection of treatment options may be the ramifications of one's metacognitive capacity; similarly, day-to-day functioning consists of reading newspapers, choosing clothes to wear, deciding the menu of the day, interacting with others, and so on. Multiple studies have proclaimed improvements in measures of functional capacity or functional outcome after cognitive retraining.

Certain mental illnesses are characterized by specific cognitive deficits in attention, executive function, memory, etc. (Bora & Murray, 2013; Fioravanti et al., 2005; Nehra et al., 2006; Robinson et al., 2006); along with deficits in social cognition (Fett et al., 2011; Kerr et al., 2003) and metacognition (David et al., 2012; Lysaker et al., 2015; O'Driscoll et al., 2014). These deficits are associated with poor functional outcomes and clinical outcomes in terms of relapses, hospitalizations, and suicide attempts. Therefore, interventions addressing these cognitive deficits may improve overall functioning.

1.5. Research gap

It was conceptualized that CBT altered the content while third-wave therapies alter the cognitive process and CR mediates both content and process through enhancing cognitive functions. There has been enough literature comparing the traditional BT and CBT with third-wave therapies but there is no study in Indian literature that has compared CBT with CR. Though delivery of CBT is ever-expanding even with the advent of third-wave therapies. Still, there are barriers to CBT delivery and many times clinicians are looking for convenient options to substitute CBT. The researcher with clinical experience of more than 10 years had experimented with certain cognitive tasks such as vowel cancellation, colouring, Sudoku, jumbled word games, etc. in the clinical population and got good treatment outcomes. This inspired me to think of delivering cognitive retraining as an intervention and study its effectiveness. This led to discussions with experts in the field and consequently the topic of the current research emerged. CBT was taken as a comparison group, and metacognitive beliefs was selected as an outcome measures keeping in view emergence of third-wave therapies. Enormous studies are studying the effectiveness of CBT using quality of life or functioning as an outcome measure. The researcher had been interested in metacognition as well as metacognitive beliefs as a mental health professional and chose to use it as an outcome measure as there was not much literature from India on metacognition or metacognitive beliefs. The current piece of research, therefore, attempted to deliver cognitive retraining in patients with unipolar depression and compare its effect with CBT. The study will have expansive clinical implications as it will reckon futuristic insights into the treatment of depressive disorders. The need has also been highlighted in literature where the drawback of CBT is the prerequisites like intelligence, sophistication, delivery by a specialist, etc. The following research gaps had been identified to the best my knowledge:

1. Cognitive deficits in depressive disorders had been recognized in the last decade and the role of cognitive retraining is well-proven in schizophrenia but no rigorous attempt made to establish its effectiveness in mood disorders.
2. CBT and other talk therapies have had a high drop-out rate due to respective patient, therapist, and environmental variables; and CR-based interventions could be culture-free interventions but have not been considered as alternatives in Indian setting.
3. With the advancement of third-wave therapies, the focus is on metacognition, but no Indian study highlighted the effectiveness of CBT in altering dysfunctional metacognitive beliefs.
4. The CR-based interventions are expected to be more effective in altering dysfunctional metacognitive beliefs as cognitive enhancement acted as a mediator, but no study has investigated it discretely or in comparison to CBT.

1.6. Significance of the study

CBT is a well-proven treatment for mild to moderate depressive disorder. The patients who benefit the most from CBT are those with a certain level of higher intellectual and certain psychological sophistication. The intervention requires maintaining a dysfunctional thought record and identifying and disputing the erroneous cognitions. This requires introspection, reflection, and many other cognitive thought processes whereas cognitive retaining involves performing certain cognitive tasks. The cognitive tasks may range from digit cancellation to sorting to mazes to puzzles etc. The performance of these tasks involves higher cognitive functions like planning, organization, problem-solving, etc. but does not involve cognitions directly. CRT enhances cognitive functions that lead to changes in cognitive processing and improve overall functioning. If CRT proves to be as effective in comparison to CBT then those patients who do not meet the prerequisites of CBT can opt for CRT as a mode of treatment. In addition, CRT is a more structured and systematic program, therefore, can be

delivered by a non-specialist or even a self-practice manual can be given to the patient with minimal monitoring. This will also help those who have to rely on pharmacological treatment alone due to lack of availability of specialists, distance, cost of travel, etc. This will allow more persons with a depressive disorder to avail the benefit of intervention and thereby better treatment outcomes.

1.7.1 Objective 1

To study the effectiveness of CRT in comparison to CBT in depressive disorder.

The cognitive deficits are known to appear as a result of psychotropic drugs even during the remission phase and improvement in cognitive deficits is expected to improve functioning as well as decreasing relapses in patients with mood disorders. Thus, the following hypothesis was formulated to compare the outcome in both the treatment groups (CRT vs CBT).

1.7.1.1. Hypotheses (H_1): The participants in the CRT group would show greater improvement in *symptoms* as compared to those in the CBT group.

1.7.1.2. Hypotheses (H_2): The participants in the CRT group would show a greater reduction in *metacognition (dysfunctional beliefs)* scores as compared to those in the CBT group.

1.7.1.3. Hypotheses (H_3): The participants in the CRT group would show greater improvement in *quality of life* as compared to those in the CBT group.

1.7.1.4. Hypotheses (H_4): The participants in the CRT group would show greater improvement in global *functioning* as compared to those in the CBT group.

1.7.2. Objective 2

To study the effectiveness of CRT with pharmacological treatment in comparison to CBT with pharmacological treatment in depressive disorder.

CRT might prove an effective treatment for deficits in attention and executive function and visuospatial learning and memory (Kennedy et al., 2007) emphasizing full functional recovery as cognitive deficits tend to persist in the form of residual symptoms. To meet this objective the following hypotheses were formulated.

1.7.2.1. Hypotheses (H_5): The participants in CRT with medicine (CRTM) group would show greater improvement in *symptoms* as compared to those in CBT with medicine (CBTM) group.

1.7.2.2. Hypotheses (H_6): The participants in CRT with medicine (CRTM) group would show a greater reduction in *metacognition (dysfunctional beliefs) scores* as compared to those in CBT with medicine (CBTM) group.

1.7.2.3. Hypotheses (H_7): The participants in CRT with medicine (CRTM) group would show greater improvement in *quality of life* as compared to those in CBT with medicine (CBTM) group.

1.7.2.4. Hypotheses (H_8): The participants in CRT with medicine (CRTM) group would show greater improvement in global *functioning* as compared to those in CBT with medicine (CBTM) group.

1.7.3. Objective 3

To study the effectiveness of CRT in comparison to CRT with pharmacological treatment in depressive disorder.

Luria, an eminent Russian neuropsychologist, pioneered work in cognitive remediation in patients with brain lesions and cognitive remediation emerged associated with significant improvements in cognitive performance, psychosocial functioning, and symptoms (Delahunty et al., 1993; 2001). The meta-analysis findings flourished more considerable improvement in psychosocial functioning when cognitive retraining was combined with other

mental rehabilitation programs in contrast to cognitive retraining alone (McGurk et al., 2007; Wykes et al., 2011). The following objectives were formed to observe if CRT alone was as effective as CRT combined with pharmacological treatment.

1.7.3.1. Hypotheses (H_9): The participants in the CRT group would show greater improvement in *symptoms* as compared to those in CRT with medicine (CRTM) group.

1.7.3.2. Hypotheses (H_{10}): The participants in the CRT group would show a greater reduction in *metacognition (dysfunctional beliefs) scores* as compared to those in CRT with medicine (CRTM) group.

1.7.3.3. Hypotheses (H_{11}): The participants in the CRT group would show greater improvement in *quality of life* as compared to those in CRT with medicine (CRTM) group.

1.7.3.4. Hypotheses (H_{12}): The participants in the CRT group would show greater improvement in global *functioning* as compared to those in CRT with medicine (CRTM) group.

1.7.4. Objective 4

To study the effectiveness of Cognitive Behavior Therapy (CBT) alone in comparison to Cognitive Behavior Therapy combined with pharmacological treatment (CBTM) on metacognition (dysfunctional beliefs) in depressive disorders.

CBT is an evidence-based practice known for cognitive restructuring by alerting content of cognitive assumptions and negative automatic thoughts. However, the effect of CBT has not been explored in Indian studies. Therefore, the following hypothesis was formulated to observe if CBT altered dysfunctional metacognitive beliefs.

1.7.4.1. Hypotheses (H_{13}): The participants in the CBT group would show a greater reduction in *metacognition (dysfunctional beliefs) scores* as compared to those in CBT with medicine (CBTM) group.

The present study aimed at testing the above-mentioned hypotheses.

1.8.Organization of Thesis

The thesis is presented in six chapters. Chapter 1, *Introduction*, introduces the clinical disorder that constitutes the population of this study. The relevance of the study objectives emerged in this chapter based on aspects of the clinical disorder and its theoretical background. After a clear delineation of the objectives, the thesis progressed to chapter two.

Chapter 2, *Review of Literature*, explained the existing research related to the study objectives. The research gap paved the path for the need for this study.

Chapter 3, *Methodology*, highlighted the method followed to conduct the present study including design, procedure, and analysis. It followed a step-by-step explanation of the entire process from approaching the patient to thanking the participant till the study came to an end.

Chapter 4, *Results*, explained the findings of the study explained theoretically supported by tables and graphs. The summary is provided related to each objective based on the statistical level of significance.

Chapter 5, *Discussion*, discusses the findings of the study with contrasting and supporting views from global literature. *Conclusion*, summarizes the findings of the study with explicit details on limitations, strengths, implications, and future directions.

The last segment of the thesis has a list of references, and appendices that submit its completion.

CHAPTER 2

REVIEW OF LITERATURE

The present study aimed to compare the effectiveness of different treatment modalities namely; cognitive behavior therapy alone (CBT), cognitive behavior therapy combined with medicine (CBTM), cognitive retraining treatment alone (CRT), and cognitive retraining treatment combined with medicine (CRTM). The participants were patients having a diagnosis of depressive disorder (MDD or RD) randomly assigned to one of the four groups. The outcome measures were: severity of symptoms (BDI-II), dysfunctional metacognitive beliefs (MCQ30), quality of life (WHOQOL-Bref), and level of functioning (GAF). The previous chapter has highlighted the conceptualization, objectives, and significance of the study.

This chapter would feature the studies citing cognitive deficits in mood disorders with specific mention of depressive disorders, the impact, and role of cognitive deficits on multiple domains of functioning, and quality of life. In addition, studies related to a higher cognitive function as well as the cognitive process of metacognition as a mediator and moderator in psychiatric disorders as well as in depressive disorders. Further, cognitive-behavioral and cognitive retraining approaches have been implemented in the management of cognitive deficits, and treatment outcomes. Lastly, synthesizing the review of studies to highlight the need for the current study.

2.1. Cognitive deficits in mood disorders

Mood disorders comprise depressive as well as manic episodes manifesting either discretely or in combination that impairs day-to-day functioning. Both depressive and manic episodes are known to bring about changes in cognition; content, process, and functioning.

2.1.1. Cognitive deficits of Bipolar affective disorder (BPAD)

The cognitive deficits were first identified in schizophrenia and later research expanded to mood disorders starting with bipolar disorders given the dysfunction and disability associated with mood disorders. The authors compared and systematically reviewed the cognitive dysfunction in both SZ and BD (Bortolato et al., 2015). The articles, published in English, were selected from the PubMed database (since its inception on 10th August 2015) using combinations of certain terms. The population criteria were individuals having a diagnosis of SZ or BD as per the Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Classification of Diseases (ICD), those with a first episode of mania or psychosis, unaffected relatives, those at risk to develop SZ or BD (Presence of parent or sibling with SZ or at least 2 relatives with SZ; or Prodromal state progressing to a full-blown illness within 3 years of presentation). Findings revealed a significant overlap in the domains of cognitive impairment between SZ and BD. Cognitive deficits became evident during the first episode of illnesses and early neurodevelopmental factors contributed to the emergence of cognitive deficits in both illnesses.

Bipolar Disorders Program of Barcelona compared the cognitive performance of patients having Bipolar I disorder (38) and Bipolar II disorder (33) with healthy controls (35) (Torrent et al., 2006). Patients were recruited in the euthymic state who had been in remission for the last 6 months; confirmed by a score of 8 or less on the Hamilton Rating Scale and 6 or less on the Young Mania Rating scale, and who had not received any ECT in last one year. The tests used to assess the neuropsychological performance included; Vocabulary sub-test from the Wechsler Adult Intelligence Scale (WAIS), Wisconsin Card Sorting Test (WCST), Stroop Colour-Word Interference test, FAS task of the Controlled Oral Word Association (COWA) Test, Digit Span sub-test from the WAIS, Trail Making Test, and California Verbal Learning Test (CVLT) along with Global Assessment of Functioning

(GAF). The deficits in frontal executive functions (WCST, Stroop, and COWA test), specifically related to working memory impairment, tend to predict poorer psychosocial functioning (GAF) in bipolar II disorder while verbal retaining and memory (CVLT) may be more relevant in bipolar I disorder. Therefore, neurocognitive processes perhaps played a significant role in the psychosocial difficulties of the two bipolar subtypes.

Although patients having Bipolar disorder are regarded to have a better functional outcome than those with schizophrenia still bipolar illness contributed to the long-term disability affecting the interpersonal, social, and occupational functioning as well as the medication compliance and treatment adherence (Pradip et al., 2019). This study from southern India assessed 50 euthymic individuals with bipolar illness and compared them with 50 healthy controls (HC). The participants were assessed on tests of attention, set shifting, verbal learning and memory, short-term memory, and verbal fluency. The clinical factors analyzed included; age of onset, number of episodes, and duration of illness. The findings showed that the clinical sample performed poorer than HC. The duration of illness (6.77±4.25 years), age of onset (31.06±9.12 years), and frequency of past episodes (2.98±1.50 for mania, and .60±1.00 for depressive episodes) significantly correlated with the neurocognitive deficits.

Another study hypothesized that psychotic symptoms in bipolar disorder may represent a neuro-biologically distinct subgroup of bipolar affective illness. Therefore, a distinct profile of cognitive deficits may characterize bipolar patients with a history of psychosis. Glahn and colleagues (2007) compared three demographically matched groups; 34 having bipolar I disorder with a history of psychotic symptoms, 35 having bipolar I disorder patients without a history of psychosis, and 35 healthy controls on a comprehensive neurocognitive battery. The findings revealed that the intellectual functions were well-preserved in both groups. Participants with bipolar I disorders showed moderate impairments

on the tests of episodic memory and specific executive measures (average effect size = .58), and moderate to severe deficits on tasks of attention and processing speed (average effect size = .82). Whereas those with a history of psychosis showed significant impairment on measures of executive functioning and spatial working memory. This implied psychotic symptoms might have neural correlates and psychotic bipolar disorder could be associated with differential impairment in frontal/executive processing functioning. However, the deficits in attention, psychomotor speed, and memory appear to be part of the broader disease phenotype in patients with bipolar disorder.

Regardless of the etiology research has highlighted the need for change in the treatment strategy for BPAD (Goodwin et al., 2008; Torres et al., 2012). The patients with bipolar disorder in remission and maintenance phases, with mood stabilizers, have impaired attention memory, and executive functions; which contribute to social and occupational difficulties (Taj & Padmavathi, 2005). Cognitive rehabilitation might be effective in increasing adherence to drugs-mood stabilizers for the prevention of relapse. Thirty-six patients of bipolar mood disorder were assessed using a schedule for affective disorder and schizophrenia, lifetime version (SADS-L), scheduled for the assessment for negative symptoms (SANS), and schedule for the assessment of positive symptoms (SAPS), and psycho-sensory features using the "Profile of Psychomotor Symptoms". In addition, cognitive functions in general intelligence and language, verbal and visual memory, and visuospatial functioning; psychosocial functioning were also assessed. It was found that patients with bipolar disorder showed significant impairment in several cognitive domains even those in an asymptomatic state. Anhedonia and avolition were the best predictors of the outcome of psychosocial functioning, anhedonia was found to be linked to memory deficits (Atre-Vaidya et al., 1998).

Another study compared 30 depressed bipolar patients, 34 manic or hypomanic bipolar patients, and 44 euthymic bipolar patients with 30 healthy subjects on executive function, attention, and verbal and visual memory. Impairment of verbal memory was related to the duration of illness and the number of previous manic episodes, hospitalizations, and suicide attempts. The authors suggested pharmacological treatment and psycho-education for cognitive impairment and posed the question if neuropsychological rehabilitation can play a role in enhancing cognitive functioning which impacted their overall functioning (Martínez-Arán et al., 2004). The role of cognitive difficulties in psychosocial functioning in unipolar depression has not been well established. Overall, it was shown that poor outcomes in long-term social functioning persisted even after the clinical remission from depression; attributable to residual symptomatology. In addition, subtle neurocognitive deficits and co-morbidities also predict a poor psychosocial outcome. Thus, the treatment should be aiming at full functional recovery (Kennedy et al., 2007).

2.1.2. Cognitive deficits of depressive disorders (DDs)

Bipolar disorders and major depressive disorders have distinct pathophysiology supported by neuroimaging studies delineating differences in brain structures and neural activities. The strongest evidence comes from a differential response to treatment that has been ascertained in the DSM5 classification. Another major evidence of distinction comes from the treatment and response to treatment; anti-depressants are effective in MDD but it tends to worsen the course of illness in BD. Though it's well established that cognitive deficits (attention, memory, and executive functions) are a strong predictor of functional outcomes in both disorders but the distinction is still unclear at the neuropsychological level.

The authors (Samame et al., 2017) attempted to explore if BD and MDD could be distinguished by neuropsychological features using meta-analytical procedures as per MOOSE guidelines. The published articles were searched in PsycINFO and PubMed while

unpublished work (theses and congress presentations) as well as articles published in Journals not indexed in above mentioned databases were extensively searched on Google Scholar. The published articles in English, Spanish, Portuguese, French, or Italian from January 1980 to April 2016; assessing neuropsychological domains of euthymic or depressed patients in MDD and BD groups; having more than 10 participants in each group; having ascertained diagnosis, severity, remission measures; estimating between-group effect sizes, were included. Duplicate studies of the same sample population having smaller sample sizes were excluded. The data was meta-analyzed separately for depressed and euthymic patients. The neuropsychological variables identified were processing speed, digit span (forward and backward), digit symbol coding, list learning, spatial span, response inhibition, planning, phonological fluency, and cognitive flexibility. Cognitive deficits were present among the participants of both disorders. Euthymic patients of BD tended to underperform on verbal memory than MDD patients, no significant between-group differences were observed for the other variables. The authors could not ascertain specific neuropsychological profiles for depression and bipolar given the review.

Major depressive disorder (MDD) has a heterogeneous set of symptoms, with the cognitive symptom of poor attention and concentration being identified as one of the diagnostic criteria (ICD10). The cognitive deficits that persist in the euthymic phase of illness tend to be state-related and may determine socio-occupational dysfunction. Whereas cognitive deficits in the euthymic phase of bipolar illness are more likely linked with structural and functional brain abnormalities (Bora et al., 2012). A meta-analysis as per Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines selected the articles published between January'1980 to December'2011 from PubMed, Scopus, and PsycINFO. The articles that were included had neuropsychological data about a euthymic adult (age>17 years), compared an MDD patient group and a healthy control group;

those reported sufficient data to estimate effect sizes (Cohen's d); those used DSM or ICD criteria to diagnose MDD. For those comparing MDD with comorbid physical illnesses, articles from the same study population with a smaller sample size were excluded. The researchers used defined criteria for the 'strict euthymia' category (a score of either < 7 on HAMD or <10 on MADRS, and being remitted for at least 2 months). The final meta-analysis was based on 27 studies with a mixture of unipolar and single-episode of depression. These studies compared 895 (60.7% female) patients with MDD and 993 (60.1% female) healthy controls. HC displayed superior performance than the MDD sample in Stroop Test, Trail Making Tests (parts A and B), digit span forward-backward, tests of list learning, recognition and recall, animal naming, WCST, and effect size ranging from small to medium effect size (Cohen's d). The analysis compared the early age of onset (onset of illness between 18-50 years of age) and later age of onset (mean age of onset was after 60 years). Later age of onset resulted in greater impairment in verbal memory, processing speed, and some aspects of executive functions; while deficits in inhibitory control were more pronounced in adult-onset MDD. To conclude, persistent cognitive deficits might be an important functional marker of some MDD patient groups.

The cognitive deficits in mood disorders in the adult population are well established, and a meta-analysis of the neuropsychological data of children and adolescents (CAD) with MDD was conducted (Wagner et al., 2015). The mean cumulative prevalence of MDD in this population was reported to be 9.5%. A total of 17 studies were identified that compared children and adolescents with MDD (n=447) and healthy controls (n=1347). The assessment measures used were; intelligence, executive functions, verbal memory, and attention. It was found that children and adolescents with MDD performed poorly (0.194–0.772, $p < 0.001$) standard mean differences below) than HC. The deficits in the clinical sample were more evident in inhibition capacity (STD = 0.772; $p = 0.002$), phonemic verbal fluency

(STD = 0.756; p = 0.0001), sustained attention (STD = 0.522; p = 0.000), verbal memory (STD = 0.516; p = 0.0009) and planning (STD = 0.513; p = 0.014). The authors suggested that future studies could examine the long-term effect of these deficits on social and academic or occupational functioning.

The cognitive deficits may range from self-reported complaints (difficulty in concentrating, memory, understanding, and ability to think clearly) to subjective measures (patients' biases and insights into their illness) to objective measures (attention, processing speed, verbal and nonverbal learning, and executive functions). A comprehensive assessment of subjective and objective as well as interventions that can target both simultaneously are still lacking. The authors reviewed studies of cognitive deficits in MDD to examine if cognitive dysfunction acted as a mediator in functional disability in MDD and treatment outcomes (Lam et al., 2014). The studies published from January'2000 to January'2014 were identified from PubMed. The analysis of the effect of anti-depressants on cognitive function revealed that SNRIs appeared superior to SSRIs; sertraline significantly improved verbal learning more than nortriptyline and placebo but no other neuropsychological measure. Duloxetine resulted in improved episodic and working memory in comparison to escitalopram, SSRIs, or venlafaxine; to the extent that those with MDD scored similar to HC on the neurocognitive tests. However, the effect of anti-depressants on cognitive domains remained inconclusive and still is an emerging area of investigation. This is modulated by factors such as severity and type of depression; pharmacologic agents in ADs, and cognitive and functional domains being investigated. The findings further reported that CBT tends to alleviate the subjective cognitive symptoms and socio-occupational dysfunction in patients with acute or remitted MDD. The mechanism of change might underlie the modified cognitive affective bias with CBT that prevented the relapse and remodelled decision making resulting in the functional outcome.

Forty-four patients aged 18-65 years who confirmed a diagnosis of major depressive disorder (single episode or recurrent) were recruited. Those who had been entirely psychotropic-medication-free for at least 6 weeks before participation were included; and those who were taking medication active in the central nervous system (CNS-active) or with a recent history of alcohol/substance misuse were excluded. The severity of depression was assessed using Montgomery-Åsberg Depression Rating Scale, Hamilton Rating Scale for Depression, and Beck Depression Inventory. The Modified Mini-Mental State Examination was administered to screen for dementia. The control group consisted of healthy controls having a BDI score > 7. Both groups were administered pen-and-paper tasks from Lezak and computerized tests from the Cambridge Neuropsychological Test Automated Battery (CANTAB). The findings suggested patients with depression showed significant impairment in attention and executive function and visuospatial learning and memory, compared with controls. Motor and psychomotor functions were intact. Task performance in domains of learning and memory was found to be correlated with the severity of depression (Porter et al., 2013).

The summary based on computerized searches of Medline, PsychINFO, and PsychArticles, exclusively articles published since 2000, revealed that the past decade has mainly focused on cognitive functioning in depression. Attention and memory difficulties are reported to be present during the acute phase whereas reports of difficulties in findings in set-shifting, inhibition, working memory, and fluency as components of executive functions are reported in the chronic phase of illness. It was concluded that depression tends to be associated with cognitive impairment in the acute phase of illness, and this impairment may persist even in the remission phase (Hammar & Årdal, 2009). The review of a systematic search including 11 studies comparing a sample of 500 patients remitted from unipolar depression and 471 healthy controls, it was found in nine of the eleven studies that

performance on neuropsychological tests was poor for the patient group than healthy controls. The need to identify the cognitive difficulties in patients with unipolar was proposed, and also a link between cognitive difficulties and the psychosocial functioning of this population (Hasselbalchet al., 2010). Papakostas et al., (2004) in the study highlighted that MDD was diagnosed only when there was evidence of significant inference with functioning. The candidate studies published between 1970 and recently were identified using Pubmed and Ovid search cross-referencing the terms "quality of life," "psychosocial functioning" with "major depression" and "treatment." to explore the relationship between depression and quality of life. An improvement in quality of life measures was reported in response to treatment with antidepressants and/or psychotherapy.

Cognitive functioning is a vast concept including discrete as well as overlapping subjective and objective measures, hence emerges the heterogeneity among its assessment tools and intervention strategies. Although studies provide evidence for persistent cognitive deficits in attention, processing speed, verbal learning, memory, and executive function in patients of MDE some studies contradict these findings attributing these deficits to various demographic and clinical variables. The most comprehensive synthesis, comprised of English and non-English published studies available on Medline, Embase, PsycArticles, PsycINFO, and the Cochrane Library from 1st January 1972 to 31st January 2018, was carried out by Semkovska and colleagues (2019). The systematic review determined the pattern and severity of persistent cognitive deficits following MDE by examining the moderator effect of ten pre-specified clinical and demographic variables. The search strategy provided 10126 citations from which 252 studies, including 11882 MDE patients and 8533 healthy controls were meta-analyzed. The studies of adults having a diagnosis of Major Depressive Episode (MDE) as per DSM or ICD, defined criteria for remission or recovery from MDE, those computed between-group differences on at least a standardized test of cognitive performance in

euthymic state in comparison to HC, were included. The studies with redundant reports (for multiple publications, the most recent report with the largest sample size was included), case series, subjective cognitive assessment, severe psychiatric comorbidity (e.g., schizophrenia), neurological disorder (e.g., epilepsy), electroconvulsive treatment in the previous six months or assessment occurred following remission from a manic or mixed episode, were excluded. The mean of inter-rater classification agreement was 98.4% (range: 94.8%-99.9%) between the paired investigators who independently reviewed retained articles, and extracted and cross-checked data. The cognitive variables that had appeared in at least three primary studies were analyzed while moderator variables analyzed included age, gender, years of education, depression severity, duration of illness, duration of remission, and number of past episodes. All meta-analyses were conducted with the comprehensive meta-analysis software (v.2.2, Biostat). The findings revealed MDE remitters significantly underperformed than matched controls on 73% of the majority of cognitive variables (73%) with large effect sizes for a few long-term memory variables. However, auditory attention, memory for general personal events, inhibition abilities unconstrained by speed, and intellectual functioning unconstrained by speed, non-timed abstract thinking test performance were preserved. MDE remitters were better than controls in identifying emotional expressions contributed by the depressive realism phenomenon (the accurate attributional style in some emotional social situations relative to the self-serving bias observed in controls). The meta-regression showed the number of past episodes of depression significantly contributed to the variance in global cognitive functioning, processing speed, auditory attention capacity, visual attention accuracy, memory (both verbal and visual), verbal fluency, and set-shifting abilities. The decrease in processing speed and visual attention accuracy resulted in variance in current IQ scores after the first MDE because no difference between MDE remitters and controls on pre-morbid IQ was estimated. It was concluded that MDE remission was associated with

persistent cognitive dysfunction, especially in the domains of processing speed, visual selective/divided attention, and memory. The clinical intervention(s) were required to address these on account of relapse prevention and optimize prognosis.

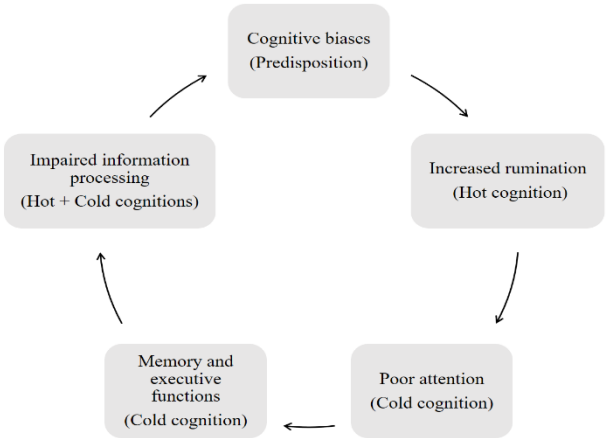
Studies have examined cognitive impairment in patients of depression, though findings have been inconsistent regarding the affected cognitive domains but these were broad in range. The cognitive domains reported to be involved are episodic memory, executive function, and processing speed (McDermott & Ebmeier, 2009). A working model of depression (Mayberg et al., 1999) implicated failure of the coordinated interactions of distributed cortical-limbic pathways in the neuro psychopathology of depression. According to this model, neocortical (prefrontal and parietal regions) and superior limbic elements (dorsal anterior cingulate) were postulated to mediate impaired attention and executive function, whereas ventral limbic regions (ventral anterior cingulate, subcortical structures) postulated to mediate circadian and vegetative aspects of depression. Unipolar depressed patients mainly exhibited cognitive inhibition deficits, problem-solving impairments, and planning deficits (Fossati et al., 2002). It is the inhibition disturbance that leads the patient to process irrelevant information that was normally ignored by the individuals mostly, that too became the focus of attention in depression. The patient in depression perpetuated the distressed ideas and thus prolonged exposure to stress hampered the coping with routine life events.

2.2. Cognitive processes and theories in depressive disorders

The cognitive deficits in mood disorders vis-à-vis depressive disorders are well-researched and their role in clinical and functional impairment is well-known. However, what causes these deficits to develop is still inconclusive.

2.2.1. Cognitive neuropsychological model of depression

One explanation comes from the cognitive neuropsychological model of depression that proposes the interaction of "hot" and "cold" cognitions. Hot cognition (emotional processing) refers to mood-congruent biases in information processing and memory such as perseveration, rumination, negative attribution, negative thinking, etc. whereas cold cognition is emotion-independent and includes attention, memory, and executive functions. Cold cognition is usually preserved and acts as a protective factor in depression; it is the best predictor of treatment. But hot cognitions (negative emotional biases) tend to mediate the relationship between cold cognitions (executive function mechanisms) and depression, therefore, causing cognitive deficits to persist even in the state of remission (Ahern et al., 2019; Nord et al., 2020; Roiser & Sahakian, 2013). Cognitive behavioral interventions are central to understanding and targeting hot cognitions using a ‘‘top-down’’ approach by modifying the negative schemas and attributional style while antidepressant medications follow a "bottom-up" approach that alters the affective biases via alterations in monoamine neurotransmission. The cognitive neuropsychological model of depression demonstrates the interaction between hot and cold cognitions; how cognitive processes



(rumination, perseveration, attribution style, etc.) impair cognitive functions (attention, memory, and executive function) resulting in disrupted monoamine transmission that tends to

maintain the negative schemata. It's a vicious cycle where predisposition becomes the cause of a consequence and the consequence further reinforces the cause (Shown in Figure 1).

Over the years, the perception of a diseased mind in depression has changed to depression being identified as a brain dysfunction related to various neurobiological variables (Kharade et al., 2010). There is evidence of noradrenergic and serotonergic transmission in response to pharmacotherapies alleviating depressive symptomatology. Depression results in functional impairment in multiple domains targeting a vast range of behavioural disruption which indicates networking of different neuro-structural, neuro-anatomical, and neuro-chemical substrates. The catecholamine hypothesis from the 1960s held till this day signaling that deficiency of norepinephrine or noradrenaline was associated with depressed mood. The underlying assumption was that impaired monoaminergic neurotransmission was mediated by pre-post synaptic cellular messenger activity of serotonin, 5-hydroxytryptamin (5-HT), norepinephrine (NA), and dopamine (DA). Monoamines controlled a wide range of functions in depression-like sleep, vigilance, appetite, motivation, motor activity, and reward; imbalance in monoaminergic neurotransmission may lead to aggression, euphoria, and impulsiveness. However, monoamine depletion in healthy controls did not always produce depressive symptoms. The serotonergic transmission arrived frontal cortex, basal ganglia, and hypothalamus regulating mood, emotions, and eating, appetite, weight as well as sex drive, pleasure, and sleep-wake cycle while noradrenergic transmission in the frontal cortex regulates mood, and in limbic hypothalamus regulated eating, appetite, weight, sex drive, and pleasure. The norepinephrine projection to the frontal cortex governed cognition and attention whereas to cerebellum modulated the motor movement. The motor disturbance in depression had been linked with extensive monoaminergic input in the striatum and the cerebellum. Both serotonergic and noradrenergic compounds were useful in treating depressive patients.

2.2.2. Trait, state and scar hypothesis in depression

The trait hypothesis linked depression to personality (Klein et al., 2011). Personality is a dynamic construct combined with biologically determined temperament and socially shaped character. Further, the big three dimensions of personality could be understood as neuroticism/negative emotionality (N/NE), extraversion/positive emotionality (E/PE), and disinhibition (low conscientiousness and low agreeableness). Life circumstances and experiences tend to determine stability or change in personality. The common cause model assumed that personality and depression arose from a similar set of causal factors. The continuum/spectrum model posited that trait and depression were associated with the same etiological influences, hence on the same continuum. The precursor model adopted a developmental sequence that implied escalation from traits to disorder within the individual over time. The predisposition model held that the interplay of certain personality traits might be a risk factor for the onset of depression and other variables played a role in mediating or moderating this transition. The pathoplasticity model postulated that personality determined the manifestation of depression after the onset, in terms of severity or pattern or course of illness, and response to treatment. The state-dependent model posited that personality traits were colored, or distorted by depression and once an individual recovered from the episode of depression, the personality returned to the baseline. In contrast, the scar (or consequences) model held that depressive episodes might change the personality after recovery. The common cause, continuum/spectrum, precursor, and predisposition models could be evaluated by family studies; the trait markers supported by the precursor and predisposition models require an assessment before the onset and after recovery from depressive episodes. The research designs employing prospective longitudinal studies could determine whether particular personality traits predicted the later onset of depressive disorder. The pathoplasticity model can be evaluated in longitudinal studies of persons with depressive

disorders to predict the trait that determined the severity, chronicity, or type of depression; and its impact on the illness directly in terms of the course of illness as well as treatment outcome. The concomitants model could be tested through cross-sectional studies comparing individuals having symptoms with those in remission and healthy controls. The consequences (or scar) hypothesis could be evaluated by assessing the person before and after a first depressive episode. If personality deviance was much greater after the episode had remitted, it would suggest that scarring had occurred. Therefore, it could be summarized that the role of personality was significant and varied in understanding phenomenology, psychopathology, prognosis, and response to treatment both clinical as well as functional.

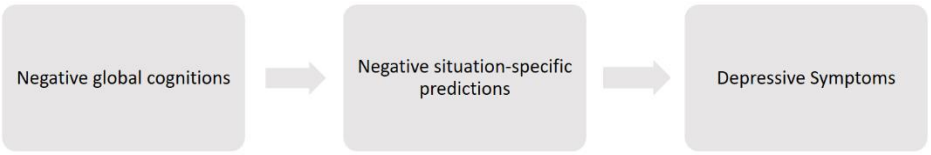
The novel etiological and clinical implications of the state, trait, and scar hypothesis were important to prevent and remediate clinical as well as functional outcomes in depression. The authors reviewed the literature on cognitive functioning in depression, to define the role and origin of the long-term neurocognitive profile in depression through the state, trait, and scar perspective (Hammar et al., 2022). The scar hypothesis suggested depression was neurotoxic and resulting cognitive impairment was irreversible determined by the severity and chronicity of depression including dysphoric mood, reduced motivation, indecisiveness, sleeping problems, loss of energy, and a feeling of hopelessness and attentional burden due to worry and rumination. The trait hypothesis identified a neurocognitive vulnerability (traits), determined by genetic inheritance (biological) or early life experiences (pre, peri, or post-natal as well as early childhood), was a substantial risk of development and recurrence of depression. This implied that the cognitive profile was stable and would not fluctuate in the phases of illness including remission and it's the subjective cognitive dysfunction that was related to functional and clinical outcome. Therefore, cognitive deficits were reversed to pre-morbid level with the help of intervention. The review covered original research articles (both cross-sectional and longitudinal studies), reviews as

well as meta-analyses published between 2010 and 2020 in Medline, PsycINFO, and Embase, constituting 414 abstracts, and 77 finalized papers. The work focused on cognitive functioning (Including domains of memory, executive functioning, attention, and psychomotor processing speed) describing the cognitive profile over time in remitted phases. Memory problems were reported to be experienced in acute and remitted phases influenced by negative cognitive biases (negative self-representations) and rumination (coping) resulting in multifold distress and interpersonal difficulties. The memory deficits were attributed to the tendency to attend to the negative stimuli (overt or covert) and such information processing was strengthened by association and reinforcement influencing the memory consolidation. Therefore, impaired encoding in information processing leads to progressive cognitive deficits with age that could act as a prodromal for Alzheimer's or result in a dementia state effect on reduced memory in late life MDD supporting the state, trait, and scar hypothesis. Patients in acute and remitted phases of MDD report deficits in higher-order functions referring to coordination between thought and action through working memory and these include thinking, evaluating, planning, switching, decision-making, etc. The inhibition response was a hallmark of this coordination and tends to be a trait marker as variation in cognitive and response inhibitions prevailed in the first episode of MDD, in remitted phase as well as in long-term follow-ups. The cognitive performance on certain tasks of problem-solving improved in remitted phase supported the state hypothesis; further improved composite scores on executive functions assessing planning, and impulsivity indicated that these are state-markers of MDD. Attention deficits persisted in the subgroups of MDD, and independent t-test analysis of between (acute vs first episode vs remitted vs HC) and within the group (pre-post treatment) differences observed fluctuation and significant improvement in scores of attention tasks that supported the state hypothesis. The heterogeneity was observed among the measures of assessment using visual or auditory modes. Still, attention

was considered a trait marker in MDD recovery and relapse; while attentional control, deliberated as an executive function, as a trait resilience marker infiltrating information processing. Patients having depression took longer in information processing and reacting to the stimulus whereas those in remission of the first episode of depression showed normalization of latency time, this implied that processing speed was the result of the clinical state. But symptoms of depression did not influence processing speed when controlled for age, sex, race, education, and medical comorbidity; indicating the trait and scarring effect. However, knowledge was required to understand the interaction of state, trait, and scar profiles in the development of new treatments to prevent relapse and facilitate recovery.

2.2.3. Information-processing in depression

Individuals with depression are assumed to have maladaptive information processing comprised of negative appraisal of self, others, and future (negative cognitions); and this dysfunctional cognitive process can be reasoned by the expectation-focused model of depression (Kube et al., 2020). The lack of positive expectations and excess negative expectations predicted and mediated the effect of global negative cognitions on depressive symptoms. The following cycle acted as a reinforcer to hold onto the negative expectations. Expectations had been a dynamic area of research in the cognitive neurosciences but predictive coding and error processing were rarely linked with theoretical models of depression. The



literature on expectation-focused models explained how the brain responded to stimulus or uncertainty by generating a top-down mechanism, that is, predictive processing where the response was not so much driven by the incoming actual sensory data rather it’s the prior

predictions that determined the response. The gap between predicted and actual sensory data is known as prediction error (PE), it's similar to a feedback loop that reduced PE by maximizing the incoming signals (attention in encoding) and updating the predictions (attenuation of stored information). Predictive processing could be explained in terms of interaction between the top-down and bottom-up cortical hierarchies. Therefore, it can be conceptualized that one's response or perception was not determined by the sensory input rather it's determined by the various covert cognitive processes. Similarly, patients with MDD tend to perceive their environment as predominantly negative because they expected it to be predominantly negative, a self-fulfilling prophecy.

Predictive processing, therefore, is an emerging theoretical framework that conceives the brain as a dynamic and hierarchical structure applying top-down and bottom-up transmission mechanisms to keep updating the predictions and minimize prediction errors using a feedback loop (Velasco & Loev, 2022). The expected precision was expressed through the synaptic gain control mechanisms and dysfunction in precision importing a host of psychological disorders. The brain was continuously evaluating and regulating the selection of a particular action adapting to the system flexibly. This required cognitive control over one's attention, and cognitive processes, which involved monitoring and precision modulation mechanisms. The affective experiences transform the subject's action policies in favor of certain behaviors, and the function of the feeling was to model the situation and its link to error dynamics so that the action could emerge in a regulative fashion. Consequently, feelings too being considered as cognition, in addition to, perception, action, attention, etc.; hence a form of metacognition because these feelings were specifically about the cognitive domains having philosophical flavor (i.e. thought, judgment, beliefs, etc.) and psychological flavor (memory, planning, decision-making, cognitive control, etc.).

2.2.4. Self-Regulatory Executive Function (S-REF) model

Metacognition was initially introduced by John Flavell at the beginning of the 1970s. According to Flavell (1979), metacognition is thinking about thinking. Metacognition referred to thoughts about primary cognitions or thought processes. It includes metacognitive knowledge and metacognitive control. Metacognitive knowledge could be understood as awareness and a deeper understanding of one's cognitive processes and products. Metacognitive control referred to the regulation of cognitions, including skills (planning, monitoring, and evaluation) significant for performance (Nordahl et al., 2022; Sandved-Smith et al., 2021). Metacognitive Control System (MCS) model gave central importance to maladaptive metacognition in psychological vulnerability and disorder. The MCS was attenuated by a perseverative thinking style labeled as *Cognitive Attentional Syndrome* (CAS). According to Self-Regulatory Executive Function (S-REF) model, CAS resulted in the reduction of cognitive resources required for information-processing due to worry/rumination, threat monitoring, and unhelpful coping behaviors. The activation and maintenance of the CAS is a function of metacognition that includes maladaptive declarative and procedural knowledge (e.g. beliefs) about cognition. The maladaptive metacognition such as metacognitive beliefs was seen as an underlying cause of psychological disorder. Effective interventions should aim to modify maladaptive metacognitions (dysfunctional beliefs) facilitating flexibility in cognitive control so that the patients could trust their minds to self-regulate.

Metacognition, therefore, could be understood as an information processing system that monitors, interprets, evaluates, and regulates the contents; and processes of its organization (Flavell, 1979; Papageorgiou & Wells, 2003). An individual in a state of depression centered attention on NATs and continued to ruminate about negative experiences, events, or emotions. This perseverative thinking style, inclusive of rumination and worry,

devolved the maladaptive metacognition (dysfunctional beliefs). Based on the SREF model, 5 dimensions of dysfunctional metacognitive had been identified (Cotter et al., 2017). These were; (1) 'positive beliefs about worry, an individual believes that worrying is beneficial for avoiding problems, remaining organized, and helping one to cope; (2) 'negative beliefs about the uncontrollability of thoughts and corresponding danger', emphasized the importance of controlling one's thoughts and potential mental and physical dangers associated with not doing so; (3) ‘cognitive confidence’, was concerned with the perceived lack of self-confidence in one's memory and attention; (4) ‘need for control’, was based on preventing the outcomes; (5) ‘cognitive self-consciousness’, which included items reflecting one's tendency to be aware of and monitor one's thinking.

2.3. Treatment approaches and interventions in depressive disorders

There are several clinical and biological moderators, mediators, and predictors of symptom improvement in MDD. These included; the presence of hopelessness, anxious symptoms, or medical comorbidity; and biologics included gene polymorphisms, brain metabolism, quantitative electroencephalography, loudness dependence of auditory evoked potentials, and functional brain asymmetry (Papakostas & Fava, 2008). Moderator variables were a form of predictors of efficacy outcome determined by the magnitude of certain biological or clinical factors at baseline that impacted the relative outcome in response to one versus agent in treatment. It's the moderator variable that helped to predict differential response, that is, one treatment was better for one type of moderator variable whereas another moderator variable might respond better to another treatment agent. These lead to tailor-made treatment approaches for any subgroup of illness by identifying the risk for treatment resistance and improved treatment outcome.

On the other hand, mediators were referred to as correlates of efficacy outcomes that were measurable changes (mostly biological). These could be categorized as predictive

mediators and simple mediators; the first one precedes while the latter temporally coincides with the treatment outcome. Mediators or correlates of treatment outcomes provided insights into the underlying pathophysiology of MDD. These help in screening for potential new changes in treatment approaches in clinical or preclinical models. Baron and Kenny (1986) defined a moderator variable as "a qualitative (e.g. sex, race, class) or quantitative (e.g. level of reward) variable that *affected* the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" while a mediator variable "accounted for the relation between the predictor and the criterion". Thus, "moderator variables specify when certain effects will hold, mediators speak to how or why such effects occur" (Hoppen & Chalder, 2018). Knowledge and insights into predictor, moderator, and mediator variables could help the clinician to select an intervention that targeted the mechanisms of action, therefore, narrowing the gaps in treatment and outcome.

Cognitive therapy (CT), commonly known as cognitive behavior therapy (CBT), and its variants are now the most researched forms of psychotherapeutic interventions. CBT is consummated to be superior to other forms of psychological interventions, the effect sizes being parallel with pharmacological treatments, but when compared in combination with pharmacological, CBT was inferior to the combined treatment (Hofmann et al., 2012).

The existing literature strongly supports the efficacy of CBT in various psychiatric conditions. The final sample included in a review consisting of 269 meta-analyses categorized into groups across a range of problem areas: substance use disorder, schizophrenia and other psychotic disorders, depression, and dysthymia, bipolar disorder, anxiety disorders, somatoform disorders, eating disorders, insomnia, personality disorders, anger and aggression, criminal behaviors, general stress, distress due to general medical conditions, chronic pain and fatigue, pregnancy complications and female hormonal conditions. The majority (84%) of these studies were published after 2004 to examine the

efficacy of CBT. The strongest evidence was found for CBT in anxiety disorders, somatoform disorders, bulimia, anger control problems, and general stress. Eleven studies compared response rates between CBT and other treatments or control conditions only one review reported that CBT had lower response rates than the comparison treatments (Hofmann et al., 2012).

Traditional cognitive approaches focus on challenging, disputing, or replacing ruminations or depressive cognitions. Wherein third-wave therapies promote the use of mindfulness-based practices accelerating awareness of the here and now. These interventions boost awareness, complement psychosocial functioning, and alleviation of symptoms such as cognitive retraining. The difference is in mechanisms; cognitive-behavioral approaches debate cognitive, affective, and/or conative (CAC) patterns that revamp cerebral structure and neuropsychological functioning whereas third-wave therapies highlight the role of mindfulness and attention training (Batmaz et al., 2021; Ost, 2008). Both these techniques emphasize attention regulation, that is, reducing the focus on internal experiences by being mindful. This detachment then altered the cognitive processes generating symptom curtailment and boosting functioning (Ramel et al., 2004; Sharpe et al., 2004).

Cognitive retraining programs remediate attention, the most elementary cognitive function, plus executive function, visuospatial learning, and memory (Kennedy et al., 2007) crucial to full functional recovery. Attention allows greater cognitive energy for information processing and amplifies metacognitive awareness, contributing to curtailing ruminative thinking and extended cognitive flexibility. Positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) studies have shown that ruminative thinking reduces prefrontal cortex activities that devolve day-to-day functioning due to contrived problem-solving and decision-making (DeRubies et al., 2008). Lowered metacognitive awareness validates dysfunctional metacognitive beliefs and reduces cognitive flexibility.

Therefore, CR is an effective behavioral technique that hones cognitive processing (Porter et al., 2013) and demotes ruminative thinking. Hence, interventions targeting the reduction of ruminations favor enhanced cognitive flexibility, which improves psychosocial functioning.

Cognitive retraining concentrates on underlying neurobiological mechanisms prompting changes in CAC patterns (Fergus & Bardeen, 2016). CRT-based interventions have been aptly used in OCD, anorexia nervosa, bipolar affective disorders, neurotic disorders, etc. (Kim et al., 2018). Cognitive deficits in these disorders include verbal fluency, executive function, working memory, retention, and CRT-based interventions lead to improved cognitive functioning with moderate to large effect size (McGurk et al., 2007). More recently, it has been studied in those with intellectual disabilities to ameliorate self-help skills. The authors' affiliated department is developing a software-based cognitive enhancement program for those with severe mental illnesses.

Miscellaneous versions of cognitive retraining techniques have been examined, yet evidence-based standardized modules are countable. The tasks and length of the program diverge, a multimodal behavioral intervention program of 10 days, 4 hours per day with a post-intervention follow-up at 6, 12, and 18 months induced higher functional abilities in patients with MCI (Amofa et al., 2020). A novel virtual reality (VR)-based program combining aerobic exercise and cognitive training has been evaluated in the elderly population (>65 years) with mild cognitive impairment (MCI) and Alzheimer's disease (AD). No statistical significance was obtained when comparing within and between both groups due to the small sample size. Still, self-perceived improvement performance in real life was fostered in VR-based training of 6 weeks, three sessions/week (18 sessions total) lasting approximately 40–45 min long combining physical and cognitive training (Mrakic-Sposta et al., 2018). The attention training technique (ATT) used by Wells is comparable to any cognitive retraining intervention (Fergus & Bardeen, 2016). Siegel states that ATT is a

neurobiological therapy that bourns biological mechanisms underlying psychological disorders. Cognitive attentional syndrome (CAS), central to S-REF (self-regulatory executive function), breeds excessive processing of threats in the form of worry and rumination, consequently hindering attentional control.

Cognitive retraining interventions modify the focus of attention that mitigates CAS, meaning that discounted cognitive energy in the processing of certain beliefs contributes to cognitive flexibility and improved cognitive functioning. A systematic review of cognitive interventions for depressive disorders disports varied interventions as brief as single-session manipulation to daily online sessions for 10 days as intense as 36 sessions for 12 weeks have laid out anticipated corollaries (Koster et al., 2017). Likewise, refined neurobiological functioning is proclaimed via psychosocial functioning. CRT has been effective in treating mood disorders, neurotic disorders, and trauma. CR in depressive disorders has recently grown after acknowledging the deficits present even in the euthymic state, and the growing prevalence of depression, the associated disability may be prevented using CR-based interventions by increasing cognitive functioning.

However comparing the role of treatment modalities in the acute phase and, in the continuation and maintenance phases of treatment in restoring psychosocial functioning and improving the quality of life in MDD are lacking. Hence, not only evidence-supported cognitive behavior therapy (CBT) but the newer form that is cognitive retraining treatment (CRT) has been attempted to assess its role in symptom alleviation and other outcome measures like level of functioning, quality of life, and metacognition (dysfunctional beliefs). But the drawback of the current study will be not repeating measures in the continuation and maintenance phase as part of the thesis work. To overcome this assessment of outcome measures can be repeated at 6 months or 1 year period and published to add to lacking literature on this.

2.4. Motivation for the study

The cognitive deficits are extensively assessed in patients of schizophrenia and its impact on various clinical and non-clinical aspects. Cognitive remediation in schizophrenia has proved to be very effective in improving the symptoms, functioning, and quality of life of these patients. Depression is considered a chronic mental illness, the course is episodic but the disability caused is well proven in the literature. Even in inter-episodic phases, patients are known to have residual symptoms or cognitive deficits, or disrupted functioning; all contributing to poor quality of life for this population. Still, no rigorous attempt has been made to incorporate cognitive remediation in patients of depression as for those with schizophrenia. Though in the last decade, there has been an increase in several studies, meta-analyses, and reviews that identify the cognitive deficits associated with mood disorders. Thus the current study attempts to deliver cognitive remediation in patients of depression and study if it improves their functioning and quality of life as effectively as CBT. The role of CRT and its outcome is well-proved in recent literature. The newness of the current study is a measure of metacognition (dysfunctional beliefs) changes in response to CBT as well as to CRT. Although metacognitive therapies do alter the metacognitive style but an attempt has been made to explore if intervening thru CBT or CRT brings any alteration in metacognitive (beliefs) style in the participants of the study. Also if these alterations are linked with functioning and quality of life. The study will help clinicians to understand the significance of addressing cognitive deficits in patients with depression. Consequently reducing patient costs and suffering as well as the burden on caregivers. Non-specialists with minimal monitoring can use the evidence-based module. The study will have expansive clinical implications, as it will add new horizons to the treatment of depressive disorders. The need has also been highlighted in literature where the drawback of CBT is the prerequisites like intelligence, sophistication, delivery by specialists, etc.

CHAPTER 3

METHODOLOGY

The present research aimed to assess and compare the effect of cognitive behavior therapy and cognitive retraining as discrete interventions as well as in combination with pharmacotherapy. For this purpose, the participants were divided into four treatment groups namely; cognitive behavior therapy alone (CBT), cognitive behavior therapy with medicine (CBTM), cognitive retraining therapy alone (CRT), and cognitive retraining therapy with medicine (CRTM). The outcome measures were symptom severity, metacognition (dysfunctional metacognitive beliefs), quality of life, and level of functioning.

The chapter explains the methodology followed beginning from the ethical approval (See Appendix A) to completion of the present study under different section labels. Section 3.1 is labeled as *research design and setting*, and 3.2 is labeled as *sample* and explains the inclusion/exclusion criteria applied for recruitment along with the CONSORT diagram (Figure 1). Section 3.3. labeled as *tools,* used for assessment of the outcome measures, explains the details of the four tools that were used in the study namely; BDI-II, MCQ, WHOQOL-Bref, and GAF. Section 3.4. labeled as *intervention* gives a detailed description of 10 sessions of CBT as well as all the tasks of the 6-week CRT module. Section 3.5. labeled as *procedure* explains the step-by-step sequence followed by the researcher to complete this study, starting from the ethical clearance to data analysis. The next section is 3.6. labeled as *statistical analysis* introducing and describing the statistical computations conducted in the study to handle the quantified data.

Further, this chapter also includes three tables. Table 1 comprehensively explains the scheme of weekly sessions of CBT. Table 2 displays the list of cognitive distortions used in CBT delivery. Table 3 summarizes the tasks of the 6-week CRT module that were assigned

weekly to the participants of CRT and CRTM groups. Figures 1 and 2 describe the induction of the participant and the entire procedure of the study respectively.

3.1 Research Design and Setting

The study employed an experimental research design controlled by groups comparing pre-post intervention findings within and between groups (Singh, 1998, p. 380). Eighty participants were recruited from the Behavior Therapy (BT) unit of an outpatient department (OPD) of Psychiatry of a government tertiary care teaching hospital located in an urban area. The non-probability (purposive) sampling method was used to recruit the participants who were randomly (odd-even) assigned to the four groups namely; CBT, CBTM, CRT, CRTM (Singh, 1998, p. 299). The patients with a diagnosis of depressive disorder as per ICD-10 Classification of Mental and Behavioral Disorders: Clinical Descriptions and Diagnostic Guidelines (ICD10 CDDG; WHO, 1982) were referred for psychotherapy by the Psychiatrist to the primary researcher. After entering the BT unit record register, those with odd numbers were assigned to cognitive-behavioral groups (CBT and CBTM) and even-numbered ones were assigned to the cognitive retraining groups (CRT and CRTM). Further, the odd-numbered ones put on medication were assigned to CBTM while those referred only for therapy and were not prescribed any medication were assigned to the CBT group. Similarly, even-numbered patients on medication were assigned to CRTM while those without any prescribed medicine were put into the CRT group.

3.2 Sample

A sample of eighty participants having a depressive disorder were recruited as per the defined criteria in ICD10:CDDG. The participants between 20-45 years of age both sexes, with a minimum of 10 years of formal education were included. Whereas those with any psychiatric co-morbidity, severe depression, suicidality, clinical evidence of intellectual disability, suffering from any terminal illness, neurological condition, history of head injury, or having

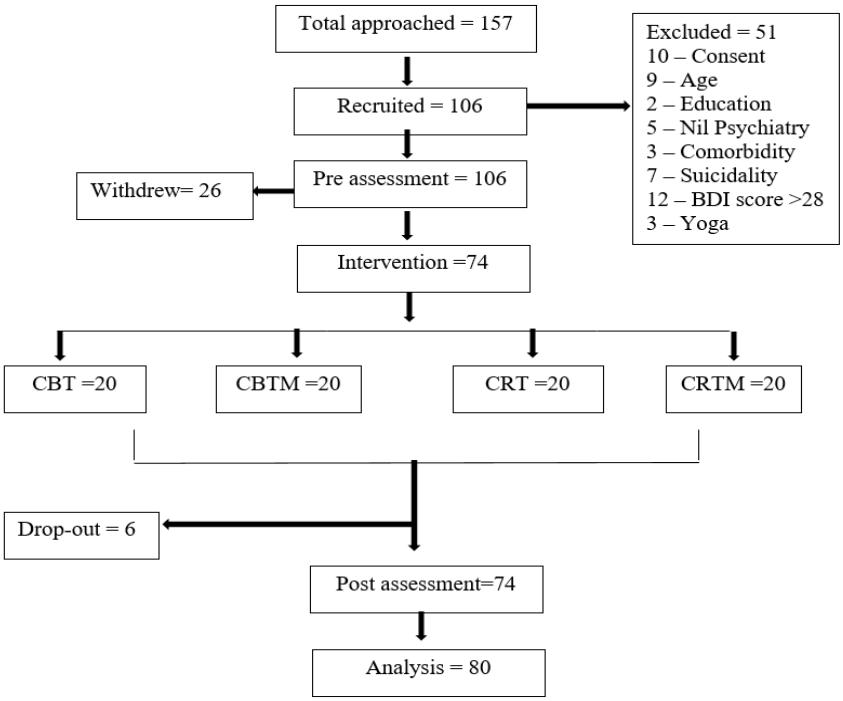
received electro-convulsive therapy (ECT) or any evidence-based psychotherapy currently or in the last 6 months, practicing yoga/meditation/art of living currently or in last 6 months were excluded. Figure 1 demonstrates the total number of patients who were approached for the study and those who were excluded leading to recruiting the final sample for induction and analysis.

A total of 157 patients referred for therapy were approached to seek consent (See Appendix B) for participation in the study, 10 refused to participate, the patient was not questioned but the patient mentioned unavailability of time, difficulty to be able to respond to questionnaires, and one had a restless toddler. Sociodemographic and clinical details were filled in the performa (See Appendices C1 and C2) developed by the researcher as per the inclusion/exclusion criteria. Nine participants were excluded due to age; 2 were less than 16 years of age and 7 were more than 45 years of age. Two were excluded due to years of formal education; one had less than 5 years and the other had completed 8 years of education only. Five patients reported depressive symptoms but had no clinical diagnosis of depression; the sub-clinical or non-clinical population is commonly seen seeking therapy for day-to-day stressors in OPD. Three participants had comorbid disorders of generalized anxiety, mania, panic, and agoraphobia. On BDI-II administration, 12 participants were excluded for having severe depression and 7 reported suicidality which was later confirmed in 5 patients during the clinical interview conducted while other 2 only meant it as a sense of momentary frustration or disappointment. Three had been regular practitioners of yoga, hence excluded. A total 106 of were recruited, some were given appointment to come for pre-assessment and introduction of therapy while pre-assessment was carried out for a few participants on the same day. Twenty-one did not come on scheduled date for pre-assessment and on checking the entry register of the OPD, they dropped-out and had not come for any other service in the OPD. Five participants discontinued during the pre-assessment. A total 80 participants in all

the four groups were delivered respective interventions of CBT and CRT with or without pharmacology. There were total 6 participants who dropped out of the psychotherapy.

Figure 1

CONSORT Diagram displaying Participant Recruitment



Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRTM = cognitive retraining therapy with medicine

3.3. Tools used for outcome measures

The present study investigated the effectiveness of interventions (CBT and CRT) by comparing the four treatment groups (CBT, CBTM, CRT and CRTM) using symptom severity, metacognition (dysfunctional metacognitive beliefs), quality of life, and level of functioning as the outcome measures.

3.3.1. Mini-International Neuropsychiatric Interview (MINI; Sheehan et al., 2016): It is a brief diagnostic structured interview, designed to diagnose 17 most common psychiatric disorders as per Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) and International Classification of Mental and Behavioral Disorder (ICD-10) psychiatric disorders (Sheehan et al., 1998). MINI 7.0.2 is a revised version for both DSM-5 and ICD-10

diagnostic criteria. It is fully structured to allow administration by non-specialized interviewers. MINI is divided into modules corresponding to diagnostic categories such as major depressive episodes, dysthymia, mania/hypomania, panic disorder, psychosis, social phobia, obsessive-compulsive disorder, post-traumatic stress disorder, anorexia nervosa, bulimia nervosa and generalized anxiety disorder etc. The MINI employs different periods for various disorders: current, past, or lifetime. The time taken for administration has a median of 26 minutes. The interviewer Inter-rater reliability depicted thru kappa coefficients ranged from .88 to 1.0 and test-retest reliability with kappa coefficients values ranging between .76 and .93 (Lecrubier et al., 1997). This tool was used in the present study to confirm the diagnosis of depressive disorders as well as to rule out any psychiatric comorbidity (See Appendix C3).

3.3.2. Beck Depression Inventory (BDI-II; Beck et al., 1996): It is the measure of severity of depression and was used to exclude severe depression as well as an outcome measure. It is a self-report measure and has 21 items to be responded on a 4-point Likert scale with scores ranging from 0 to 3. It assesses cognitive, affective and somatic symptoms and takes 5 – 10 minutes to complete BDI-II (Farinde, 2013). The range of total scores on BDI-II is 0-63; score between 0-13 is considered minimal (not clinically significant); 14-19 indicates mild severity; 20-28 indicates moderate severity; 29-63 indicates severe depression. Internal consistency was found to be .09 and retest reliability ranged from 0.73 to 0.96 (Wang & Gorenstein, 2013, see Appendix C4).

3.3.3. The Metacognitive Questionnaire (MCQ-30; Wells, 2009, p. 261): The MCQ-30 (Wells & Cartwright-Hatton, 2004) was designed to measure a range of metacognitive beliefs and processes relevant to vulnerability to and maintenance of emotional disorders. It has 30 items, each item rated on a 4-point scale with 1 labeled *do not agree* and 4 as *agree very much*. The MCQ-30 is composed of five correlated but conceptually distinct factors: (1)

positive beliefs about worry (POS), which assesses the extent to which the person believes that worrying is helpful, (2) negative beliefs about worry concerning uncontrollability and danger (NEG), which measures the extent to which the person believes that worrying is uncontrollable and dangerous, (3) lack of cognitive confidence (CC), measuring confidence in memory, (4) beliefs concerning the need to control thoughts and consequences of not controlling one's own thoughts (NC), and (5) cognitive self-consciousness (CSC), assessing the tendency to monitor one's own thoughts and focus attention inwards. Total scores for the MCQ-30 and its subscales are obtained by summating all items and higher scores indicate higher levels of dysfunctional meta-cognitive beliefs. It takes around 25 to 30 minutes to complete the administration. The internal consistency of total score as well as of sub-scales using Cronbach's alpha ranged from .72 to .93 (Wells & Cartwright-Hatton, 2004, see Appendix C5).

3.3.4. World Health Organization Quality of Life-Brief (WHOQOLBref; Saxena et al., 1998): It is a 26-item shorter version of the WHOQOL-100, which correlates at 0.9 with the WHOQOL-100 with good discriminant validity, content validity, and test-retest reliability. It enquires about the quality of life in the last two weeks on 4 domains namely; 7 items on physical health (PH), 6 items on psychological health (PSY), 3 items on social relationships (SR), 8 items environment (ENV); additionally, two items on the overall quality of life and general health. Each item is rated on a 5-point scale (0-5) where 1 indicates "almost never" and 5 is "almost always". It takes only 5-8 minutes to complete. Cronbach's alpha values were .85 for psychological health, .73 for physical health, .73 for social relationships, .68 for environment (Oliveria et al., 2016, see Appendix C6).

3.3.5. Global Assessment of Functioning (GAF; Zimmerman & Spitzer, 2009, p. 1133): GAF is found as Axis V of the internationally accepted Diagnostic and Statistical Manual of Mental Disorders, fourth edition text revision (DSM-IV-TR). It is a generic measure of how a

patient is doing than a diagnosis-specific scoring system. Inter-rater reliability between routine and research scores range from 0.39 to 0.59 while between researchers was from 0.81 to 0.85 (Vatnaland et al., 2007, see Appendix C7).

3.4. Intervention

The participants prescribed anti-depressants in CBTM and CRTM groups were on either Citalopram or Escitalopram, both are Selective Serotonin Reuptake Inhibitors (SSRIs) and are prescribed as a general practice in the OPD. Dosage among the participants varied from 10-20 mg once/twice daily (OD/BD). The compliance was ensured by offering direct consultation without any waiting period or queue to all the participants. All th participants received one of the two psychological interventions, that is, either CBT or CRT, details of same are as follows:

3.4.1. Cognitive Behavior Therapy (CBT): A module of ten CBT sessions was adapted incorporating various techniques for the study (Freeman et al., 1990, p. 49; Somers & Querée, 2007). The authors of the study finalized the content of 10 sessions. Table 1 shows the scheme of the 10 sessions of intervention that ensured uniformity in the structure of the intervention though delivery was tailor-made. The first author, a licensed clinical psychologist with a working experience of more than 10 years, delivered the CBT sessions.

The first session CBT was initiated with a 10-20 minutes of a generic clinical interview eliciting family, relationship and occupation details. CBT was introduced explaining relationship of cognition, affect and conation; its course and effectiveness. The session was then smoothly directed towards beginning of psychoeducation on cognitive, affective and conative symptoms of depressive disorders; and course of illness, treatment options, compliance, relapse, triggers and treatment outcome. Feedback and discussion was facilitated throughout the session comprising of 25-35 minutes spent on psychoeducation about illness. Depending upon the sophistication and sources of the participant, they were

encouraged to read about the illness and bring their queries to the next session. Each participant was given a 5 minutes break allowing

Table 1

Scheme of Weekly Sessions of Cognitive Behaviour Therapy (CBT) Module in Depressive Disorders

Ss No.	Goal of session	Content of sessions
1	Psychoeducation	Introducing CBT. Informative model of psychoeducation Homework assigned to read brochures or pamphlets on depression. Explaining relationship among conation-affect-cognition (CAC). Summarize and terminate the session.
2	Initiate CBT	Feedback on homework and continue psychoeducation. Goal setting. Activity scheduling and guided imagery (GI) techniques. Homework- regular practice of GI and maintain record of activities followed. Summarize and terminate the session.
3	Introduce DTR	Feedback and Review. Psychoeducation continues Introduce dysfunctional or daily thought record (DTR). Homework assigned – GI practice, activity scheduling, and to maintain DTR. Summarize and terminate.
4	Cognitive errors	Feedback and Review. Psychoeducation continued using DTR and strengthening understanding of CAC. Discuss cognitive errors. Homework – GI practice, activity scheduling continued and to maintain DTR. Summarize and terminate.
5	Identify and label cognitive errors	Feedback and Review. Identifying and labelling of cognitive errors in DTR. Homework – GI practice, activity scheduling and to label in DTR. Summarize and terminate.
6	Cognitive restructuring	Feedback and Review. Identify cognitive errors in DTR and label. Use cognitive techniques to challenge the cognitive errors. HW – GI practice, activity scheduling, DTR labelling, cognitive technique reading Summarize and terminate.
7	Cognitive restructuring	Feedback and Review. Cognitive restructuring continued. HW – GI practice, activity scheduling, labelling, challenging and altering thought. Summarize and terminate.
8	Cognitive restructuring	Feedback and Review. Recognize barriers and techniques used in challenging of thoughts. Cognitive restructuring continued. HW – GI practice, activity scheduling, labelling, challenging and altering thought. Summarize and terminate.
9	Termination	Feedback and Review. Strengthen cognitive restructuring. Introduce termination of the study.
10	Termination	Feedback and Review. Summarize CBT process. Post-assessment carried out.

Note. Ss = session number

time for reflection what had been communicated and discussed so far. The break was very brief and undeclared as the researcher excused herself to insert the pre-assessment into the File of the patient maintained in the OPD record. At the end of the session, appointment for the next weekly session was fixed. The entire length of first CBT session varied from 50-70 minutes excluding the consent and pre-assessment.

Session 2 in the following week started with exchange of greetings as participant walked into the Behavior Therapy room as per the schedule. The session began with reviewing feedback on psychoeducation and addressing queries, if any, and elicitation identification of one's cognitive, affective, and behaviors impacted by the current illness. This discussion lead to the setting of goals for therapy in terms of expected outcome in cognitive, affective, and behavioral (conation) states. Firstly, the concrete behaviors were addressed, then moving to affect, and cognition being abstract in nature. The interview elicited day-to-day routine and environment to identify target behaviors for activity scheduling that was tailor-made for each participant conducive to living environment as well as the therapy goals. A sheet was assigned to monitor the progress in activity scheduling to act as a reinforcer (See Appendix D1). The target behavior was broken into small parts and rule of simple to complex was applied while jointly deciding on the activities to be assigned. Also, the time was gradually increased setting goal of a short time period for certain activities. The participant was told to mark a tick (√) if activity was followed for that day and a cross (×) if activity could not be carried for any reason. The monitor sheet through columns 1 to 9 was assigned for recording to each participant. The text in column 1 was written in either Hindi or mixed language of Hindi and English in clinical delivery of intervention. However, the entire text in English for display here for academic submission. The last column, column 10, was created and used in the next session by the researcher. Lastly, the guided imagery to address negative affect was delivered. Mind-body connection was

explained and an 8-9 minutes audio recorded file (In Hindi language) regularly used in the OPD comprising of all 5 senses inducing a pleasurable sensation verbalized with feeling of loosening body and muscles to attain relaxation was delivered. At the end of the GI session, the audio file was shared with the participant thru Bluetooth, Shareit or WhatsApp for self-practice at home. The session was closed with emphasis on significance of homework, in relation to CAC, including regular practice of relaxation exercise (guided imagery) and maintain record of activities in terms of tick and cross. The entire length of second CBT session varied from 55-70 minutes including guided imagery delivery. Those who had to follow-up with Psychiatrist for medicine, their file was taken to the concerned Psychiatrist and priority over other patients was given in consultation as an incentive for participation.

Third session of CBT started with usual exchange of greetings followed by a general feedback on work in the previous session in attempt to assess participant's understanding of the process and progress of psychotherapy and his role in compliance to homework leading to change. Then homework was reviewed, the researcher added 10th column in the activity-scheduling monitor the compliance was calculated in form of percentage by summing up ticks for each activity and dividing by total assigned days multiplied by 100 (Sample shown below).

Activity scheduling monitoring sheet sample

Column 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10
Activity (Examples)	Time (Examples)	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Compliance rate
Going for walk	10-15 minutes	×	×	×	√	√	×	√	3/7=43%
Chopping vegetables for next day lunch	Pre or post dinner a day prior								-
Making rotis for dinner	8-8.30 pm								-
Taking dog out for walk	9-9.30 pm								-
Reading 5 pages of a book/novel	Record time taken	25 mts	20 mts	20 mts	20 mts	20 mts	20 mts	10-15 mts	-
Study hour	Fixed time 11 am - 12 pm	√	×	×	√	√	√	√	5/7=71%

Note.
COL; Column;

This helped to instill positive reinforcement by verbalizing successful execution of activity. Additionally, it helped to identify the barriers in execution if a certain activity was not followed at all. The barriers and plausible solutions were then discussed in therapy session. In addition, if needed, certain activity was dropped out of the schedule and a new activity was introduced. Consequently, process and progress of CBT techniques targeting the behavior and affect were monitored. The communication is then directed towards experience of practicing homework and its impact of emotional state and thoughts, thereby, continuing psychoeducation. This is linked with CAC leading to recording of daily thought record DTR (See Appendix D2) to understand nature of thoughts, emotional experience and resulting reaction or behavior (Sample shown below). Recording of DTR was demonstrated eliciting examples from most recent environment. The session was then closed summarizing the highlights of session and homework to be followed.

Daily Thought Record (DTR) sample assigned to the participant

Date & Time	Situation Briefly describe the situation such as place, persons present, what was going on?	Thoughts What did you think or what came across your mind?	Emotion How did you feel or what emotion you experienced and with what intensity? 1_____10	Behavior What did you do as a result or how did you react to the situation or person?
5/dec/2019 Lunch time				
15/dec/2019 8.30sih				

The fourth session started with usual greetings and feedback on the previous sessions exploring homework compliance as well as barriers, if any. Simultaneously psychoeducation was emphasized on mind-body connection, awareness and understanding of illness, techniques used to target CAC. The DTR was read out and discussed jointly, therefore, the researcher identified the cognitive errors/distortions (Table 2). The participant was educated

about the cognitive errors, the image of the table was given either in soft copy or a hard copy for them to

gain awareness of erroneous thinking. The queries related to cognitive errors were addressed. The session was closed with emphasis on homework (GI practice, activity scheduling, and DTR). The next session after one week was scheduled.

The fifth session of CBT aimed at identifying and labelling of cognitive errors in DTR. The feedback explored the participants' insight and understanding of cognitive errors. After reviewing of homework, DTR was jointly read out and participant was asked to identify and label the cognitive error using the Table 2 for reference. The discussions lead to clarifications in the understanding of discretion, overlap and combination of the cognitive errors. The same was included in homework, that is, whatever record in inserted in DTR, the next day participant

would write label of the cognitive error in different color pen as per his understanding. This had to be repeated for every entry maintained in DTR. The participant was also explained the significance of labelling on next day to avoid any coloring of perception due to situation or person to maintain objectivity as well as to compartmentalize two kinds of assigned tasks (recording DTR and labelling cognitive error). The DTR labelled with cognitive errors would be then brought for discussion in next session. The domains of activity scheduling were revisited and expanded as per individual requirement. The session was summarized with homework (GI practice, activity scheduling, DTR, and labelling of cognitive error) and next date was fixed.

The sixth session of CBT aimed at cognitive structuring preceded by identification and labelling of cognitive errors. The session started with exchange of greeting and feedback. The homework was reviewed; labels given by the participants were revisited jointly. The impact of activity scheduling in intensity of emotions and behavior or reaction was discussed.

This permitted the participant to see his progress and revisit psychoeducation. A new column was now added by the researcher and cognitive techniques namely; were used in the session

Table 2

List of Cognitive Distortions used in CBT Module

Dichotomous thinking-Things are seen in terms of two mutually exclusive categories with no "shades of gray" in between. For example, believing that one is either a success or a failure and that anything short of a perfect performance is a total failure.
Overgeneralization-A specific event is seen as being characteristic of life in general rather than as being one event among many. For example, concluding that an inconsiderate response from one's spouse shows that she doesn't care despite her having shown consideration on other occasions.
Selective abstraction-A single aspect of a complex situation is the focus of attention and other relevant aspects of the situation are ignored. For example, focusing on the one negative comment in a performance evaluation received at work and overlooking a number of positive comments.
Disqualifying the positive-Positive experiences, which would conflict with the individual's negative views are discounted by declaring that they "don't count." For example, disbelieving positive feedback from friends and colleagues and thinking, "They're only saying that to be nice."
Mind reading-The individual assumes that others are reacting negatively without evidence that this is the case. For example, thinking "1 just know he thought 1 was an idiot!", despite the other person's having behaved politely.
Fortune-telling-The individual reacts as though his or her negative expectations about future events are established facts. For example, thinking "He's leaving me, 1 just know it!" and acting as though this is definitely true.
Catastrophizing-Negative events that might occur are treated as intolerable catastrophes rather than being seen in perspective. For example, thinking "Oh my God, what if 1 faint!" without considering that, while fainting may be unpleasant and embarrassing, it is not terribly dangerous.
Minimization-Positive characteristics or experiences are treated as real but insignificant. For example, thinking "Sure, I'm good at my job, but so what, my parents don't respect me."
Emotional reasoning- Assuming that emotional reactions necessarily reflect the true situation. For example, deciding that since one feels hopeless, the situation must really be hopeless.
"Should" statements-The use of "should" and "have to" statements to provide motivation or control behaviour. For example, thinking "1 shouldn't feel aggravated. She's my mother, 1 have to listen to her."
Labelling- Attaching a global label to oneself rather than referring to specific events or actions. For example, thinking, "{I'm a failure!" rather than, "Boy, I blew that one!"
Personalization- Assuming that one is the cause of a particular external event when, in fact, other factors are responsible. For example, assuming that a supervisor's lack of friendliness is a reflection of her feelings about the client rather than realizing that she is upset over a death in the family.

Note. Source is Freeman.

to challenge thought and new altered thought was entered in this new column. After demonstration, the participant was encouraged to do the same. The content on cognitive techniques was given to the participant for reading and practice at home. This was also linked with CAC and its interference in functioning was explained, highlighting role of activity scheduling to enhance functioning despite negative affect and lack of will. The

activity schedule sheet was observed for compliance and progress. Activities were altered as per goals of therapy set in the first session. Practice of guided imagery was emphasized. Session was summarized and ended with assigned homework (GI practice, activity scheduling, DTR, labelling of cognitive error, and reading on cognitive techniques). The next session was scheduled.

The seventh session of CBT aimed at strengthening challenging of cognitive errors using cognitive techniques. The homework brought by the participant was discussed in light of cognitive errors and techniques to challenge it. The altered statement was revisited jointly in the session in the new column. The queries and barriers were discussed and solutions were mutually generated using Socratic questioning. Activity scheduling was reviewed and required changes were suggested and mutually decided. The CAC interlink was again discussed under light of all above theory and practice to reinforce insights gained in the process of psychotherapy. The session was summarized with homework similar to previous session, supplementing with writing in new column on next day or later part of the day to maintain objective perception.

The eighth session of CBT comprised of feedback and review using narration of examples form daily environment. The session emphasizes work on challenging of erroneous thought using cognitive techniques and recording of new altered thought. The phrase is rephrased jointly and entire communication while doing this was driven by Socratic questioning. The participants by this session developed a clear understanding of CAC, identifying errors in thinking, challenging erroneous thinking. The significance of DTR and homework along with all information imparted in the process is highlighted preparing the participant to be introduced to termination. The termination was introduced with emphasis on independence and ongoing nature of stress and stressors. The participant was made to feel confident about the techniques learnt to address cognitive, affective and behavioral

difficulties to enhance functioning. The session was closed with summarizing and assigning homework for next scheduled session. The participant was also informed termination is a process and how session would be distanced making it fortnightly, monthly, and booster sessions scheduled once in 3 months, then 6 months. But the participation in the research study will come to end in tenth session of CBT.

The ninth session of CBT started with review and summarizing cognitive, affective and behavioral techniques to address symptoms of depressive disorders. The role of treatment, stressors, and CAC modification for better treatment outcome. Termination and its process was again discussed. The concerns were elicited and addressed. Termination of study due in the next session was emphasized and participant was also informed about carrying out post-assessment in the next session. While doing so need for pre-post assessment was explained for expected cooperation. The session came to an end.

The last session of CBT group started with greetings, following this the researcher informed the participants that this was last session as part of the study but CBT sessions would continue. In addition, they were reminded of post-assessment to be conducted at the end of the session. After this, usual feedback and review was discussed. Their concerns about the findings of study and future of study and publication related the researcher addressed queries/curiosity. The communication was again directed towards CBT session, homework was laid and progress monitor was assessed. Their experience of challenging thoughts and entering restricted thought was brought to focus of discussion. The structure and process of this session was similar to the previous session (9^{th}). Once therapy session was concluded after assignment of homework, next session was scheduled. Then post-assessment (BDI-II, MCQ30, WHOQOL-Bref, GAF) was carried out. The participant was thanked and study terminated at this point.

3.4.2. Cognitive Retraining Treatment (CRT): The tasks included in the 6-week module of cognitive retraining therapy (CRT) for depressive disorders were taken from the home-based CRT module for schizophrenia developed for the Indian population by researchers at the National Institute of Mental Health & Neurosciences (NIMHANS; Hegde et al., 2012). The original CRT program is of 8 weeks. The authors chose tasks based on the commonly reported cognitive deficits in depressive disorders. Also, first author had observed in clinical experience a single task of vowel cancellation in editorial of newspaper had made a difference in the clinical outcome, it was this observation that significantly contributed to design of the current study and its utility in other disorders being studied in single case design or small sample (Kashyap & Gupta, 2022; Mitra et al., in press). The CRT used in the current study comprised of 6 weeks having 42 sessions spread utilizing 112 total tasks. The tasks consisted of number sequence, number connection, digit sequencing, letter symbol substitution, grain sorting, calculation, letter cancellation, and assessment of various domains of cognitive functioning (Table 3). At the beginning of each week, the tasks of the corresponding module were introduced in a face-to-face session with the first author. The same was then given to be performed daily at home using the printed A4 sheets for the following six days of that week. Each participant was instructed to choose a fixed time of the day to perform the tasks, and the family member was advised to monitor the compliance.

Number connection: It's an attention building task. An A4 size sheet had randomly placed numbers spread through with a box containing instructions on top of the page. The participant connected these numbers in a sequence. The task has 3 levels of difficulty, that is, numbers increase thru week 1 to 3; week 1 had numbers 1-50, week 2 had 1-75, and week 3 had 1-100 (See Appendices E1-E3).

Table 3

Weekly Tasks of Cognitive Retraining Therapy (CRT) Module

Wk	Domain	Tasks	Task description
1	Attention (Attn)	Number Connection (NC)	Participant connects numbers (1-50) in a sequence, which are randomly presented in space in a box on an A4 sheet. The numbers increase thru week 1 to 3.
	Working Memory (WM)	Digit Sequencing (DS)	Two-digit numbers are presented and the participant is required to repeat immediately. The difficulty level has 2-digit numbers from 3 to 10.
	Mental Speed (MS)	Letter Symbol Substitution (LSS)	An A4 sheet had boxes split in two parts, upper half has an alphabet and lower half was left empty for the participant to match the symbol for each alphabet, given in a row on top the sheet, and pen it down (5 rows).
2	Attn	NC	As above (1-75).
	WM	DS	As above (3-10).
	MS	LSS	As above (10 rows).
3	Attn	NC	As above (1-100).
	Information processing (IP)	Grain Sorting (GS)	The task requires the participant to sort 2 types of grains (Beans and split chickpeas), A 100 gram amount of each grain was used.
	WM	Calculation (Cal)	Ten numerical problems are solved using addition, subtraction, division and multiplication.
4	Attn	Letter Cancellation (LC)	Participant cancels 2 letters appearing among randomly presented English alphabets on an A4 sheet (42 rows, 53 columns).
	IP	GS	As above (Green gram and rice).
	WM	Cal	As above (10 Problems).
5	Attn	LC	As above (42 Rows, 53 Columns).
	Planning (Pl)	Mazes (Mz)	Participant moves through two mazes presented in square of 9.53 cm each without lifting pencil avoiding alleys.
6	Attn	LC	As above (60 Rows, 60 Columns).
	Pl	Mz	As above.

Note: Wk = week; cm = centimeters

Digit sequencing: It's a working memory task. An A4 size sheet had a box containing instructions on the top of the page. Under this there were 2 columns, column one had number items and column 2 had space to record the response of the participant. There were sets of two-digit numbers starting from 3 sets and went up to 10 sets of two-digit numbers. The administration required another person who read the number sets aloud for the participant to heard and repeated immediately, consequently, other person noted the response of the participant. The difficulty level was simple to complex, that is, set of 3 to set of 10 double

digit numbers. The task was given for week one and two and there was no difference in inter-week complexity level (See Appendices E1 and E2).

Letter symbol substitution: An A4 sheet had boxes split in two parts, upper half had an alphabet and lower half was left empty for the participant to match the symbol for each alphabet, given in a row on top the sheet, and pen it down (5 rows). The task targets mental speed and it was given for first 2 weeks (See Appendices E1 and E2).

Grain sorting: The task targets information processing. The participant was asked mix two types of grains in a utensil or box and then separate these by sorting it. The task was given for weeks 3 and 4. The level of difficulty was altered using beans and chickpeas for week 3. And progressing to using green gram and rice in next week. The amount was kept fixed on 100 gram of each grain (See Appendices E3 and E4).

Calculation: Ten numerical problems were presented on the paper and Participant had to solve using basic arithmetic abilities of addition, subtraction, division and multiplication. The task was given for weeks 3 and 4. The box had 6 columns, column 1 had item numbers; column 2 had symbol of arithmetic function to be performed; column three had additional set of numbers; column 4 was to enter answer; column 5 had trials taken to solve, and column 6 had time taken to respond (See Appendices E3 and E4).

Letter cancellation: It was introduced in week 4 and continued till week 6 to enhance attention. An A4 size sheet had box on top of the page to record time taken and errors. There were 32 paragraphs of randomly joined English alphabets comprising 42 rows, and 53 columns). The participant cancels 2 letters repeatedly as they appeared among the rows and columns. The participant had to follow a structured approach, that is, moving systematically either row vise or column vise without going back and forth (See Appendices E4-E6).

Mazes: An A4 size sheet has a box of maze presented in square of 9.53 cm. Participant moves through the maze from a defined point of start and exit the maze without

lifting pencil avoiding alleys. The task was presented in weeks 5 and 6 enhancing planning ability (See Appendices E5 and E6). The tasks of CRT explained above have been summarized below:

Summary of Tasks of Cognitive Retraining Treatment (CRT)					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
NC (1-50)	NC (1-75)	NC (1-100)	LC (42R,53Cs)	LC (42R,53Cs)	LC (60R,60Cs)
DS (3-10)	DS (3-10)	GS (Bean+peas)	GS (Pulse+rice)	Mz	Mz
LSS (5 Rs)	LSS (10 Rs)	Cal (10 Probs)	Cal (10 Probs)		
NC: number connection, DS: digit sequencing, LSS: letter symbol substitution, GS: grain sorting, Cal: Calculation, LC: letter cancellation, Mz: mazes, Rs:rows, Probs: problems, Cs: columns,					

To ensure compliance of CRT tasks, a monitoring sheet was assigned to each participant.

CRT Monitoring Sheet Sample								
S.no	Week 1 tasks	1	2	3	4	5	6	7
1	Number connection (1-50)	×	√	√	√	√	√	√
2	Digit sequencing	√	√	×	√	√	√	√
3	Letter symbol substitution	√	√	√	√	√	×	√
S.no	Week 2 tasks	1	2	3	4	5	6	7
1	Number connection (1-75)							
2	Digit sequencing							
3	Letter symbol substitution							
S.no	Week 3 tasks	1	2	3	4	5	6	7
1	Number connection (1-100)							
2	Grain sorting							
3	Calculation							
S.no	Week 4 tasks	1	2	3	4	5	6	7
1	Letter cancellation							
2	Grain sorting							
3	Calculation							
S.no	Week 5 tasks	1	2	3	4	5	6	7
1	Letter cancellation							
2	Mazes							
S.no	Week 6 tasks	1	2	3	4	5	6	7
1	Letter cancellation							
2	Mazes							

It was similar to activity scheduling monitor sheet used in CBT module for monitoring the compliance. The participant in actual were given 9 column and 4-5 rows sheet. Column 1 had serial number, column 2 had task, column 3 to 9 had dates of 7 days. The participant had put a tick (√) if activity was followed for that day and a cross (×) if activity could not be carried for any reason.

3.5. Procedure

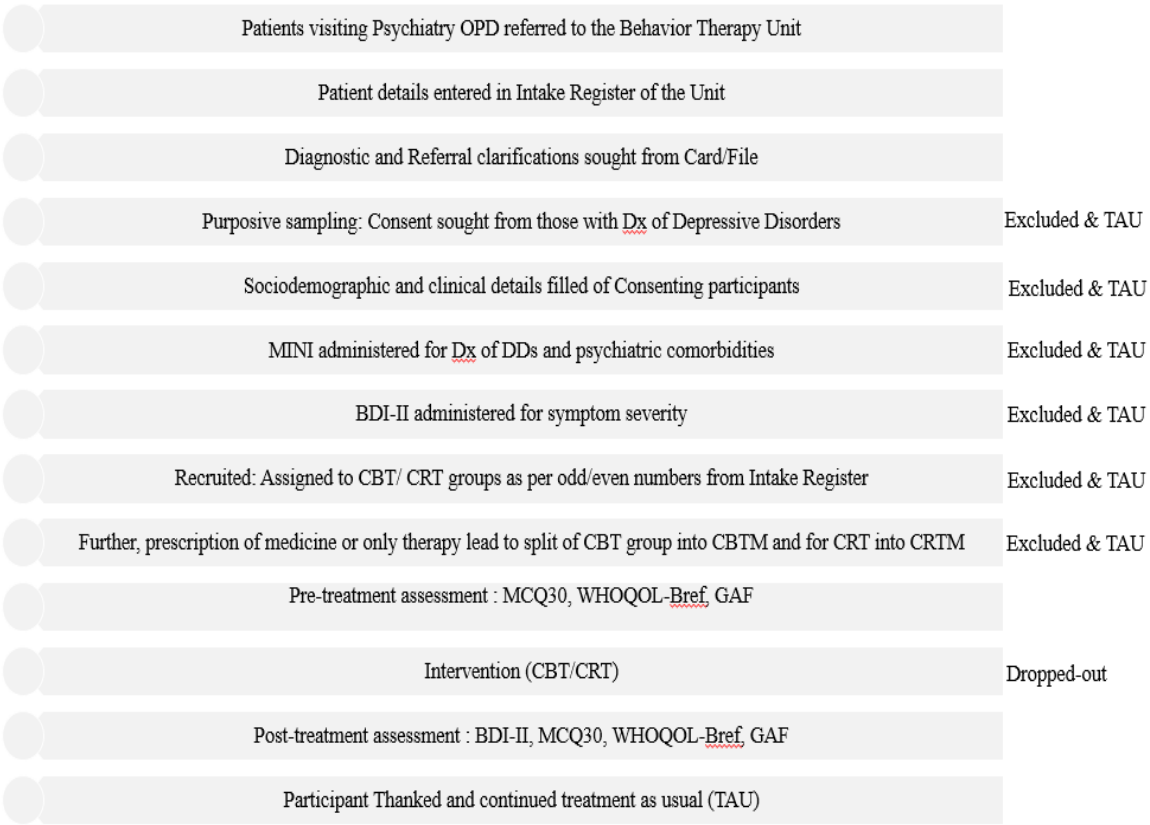
The Ethics Committee of the Institution approved the study (GMCH/IEC/2019/316). The psychiatrists referred the patients of depressive disorders for psychotherapy to the Behavior Therapy (BT) unit of the department. The researcher approached consecutive patients to seek consent to participate following declaration of Helsinki (Williams, 2008). The researcher recorded the socio-demographic and clinical details of those who consented. Those included as per the defined criteria were administered MINI 7.0.2 for ruling out comorbid psychiatric disorders and for objective assessment of depressive disorders. Those who fulfilled the criteria for either major depressive episode (MDE) or recurrent depressive disorder (RDD) and had no psychiatric comorbidity were included. Likewise, researcher administered BDI-II; who scored 14-28 suggesting mild to moderate depression were included (Smarr & Keefer, 2011). Those with severe depression (score >28) were excluded and psychotherapy service was initiated for them. Once recruited in the study, pre-assessment was carried out for each participant on all the outcome measures namely; MCQ 30, WHOQOLBref and GAF. The participants were randomly assigned to the four treatment groups.

Further, the appointment for therapy session was scheduled with each participant to be delivered in an individual face-to-face session. Those assigned to either CBT/CBTM groups were disseminated the session vise module of CBT displayed in table 1. While CRT was introduced to the respective participants with a standard set of instructions emphasizing the importance of improved brain functioning in reducing symptoms. Further, the process of

weekly sessions and performing tasks at home monitored by a family member were explained. A face-to-face session was scheduled every 7th day as progress was made to a new module. In this manner, all six modules were delivered, and data were collected procedurally (Figure 1).

Figure 2

Steps Followed in the Procedure to Conduct the Study



Note. OPD = out-patient department; Dx = diagnosis; TAU = treatment as usual; CBT= cognitive behavior therapy alone; CBTM= cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRTM = cognitive retraining therapy with medicine; BDI-II = Beck depression inventory; MCQ30 = the metacognition questionnaire; WHOQOL-Bref = World Health Organization quality of life brief; GAF = global assessment of functioning

The incentive offered to all the participants was assistance in OPD registration and instant psychiatry consultation after bypassing the queue up to 6 months. On the other hand those who had not been on any medication, they themselves were willing and motivated to be part of the study, but they were offered to be helped in OPD card registration up to 3 months in any OPD of the Hospital; also they were informed treatment duration will be longer than the intervention study. Once the CBT or CRT sessions were completed as per the module, the post-assessment was carried out for those who continued to visit OPD psychiatry excluding the dropped-outs. However, after the termination of the study, the patients continued to follow up in OPD Psychiatry for pharmacology and psychotherapy services.

3.6. Statistical Analysis

The data were analyzed using statistical package for social sciences (version 26) and the software for statistics and data science Stata/IC version 16.

3.6.1. Descriptive statistics

Descriptive statistics was computed for sociodemographic, clinical variables and scores of outcome measures. Descriptive statistics are computed in both quantitative as well as qualitative studies to get summary frequency distribution tables, percentages (Kaliyadan & Kulkarni, 2019). It includes measures of central tendency (mean, median, and mode) as well as measures of dispersion or variation (range, standard deviation, and variance). Descriptive statistics in the present research were computed for sociodemographic and clinical variables, frequencies were calculated for discrete variables such as sex, diagnosis, episodes, severity of depression. whereas for continuous variables such as age, years of education, duration of illness (DOI), and number of sessions; mean and standard deviation (SD) was computed in the four groups.. Further, mean and SD were calculated for the scores on the outcome measures; BDI-II, MCQ30, WHOQOL-Bref, and GAF in all the four groups.

3.6.2. Chi-square test:

The difference between the two groups was computed using the tables of mean comparison. The chi-square test is a non-parametric test aimed to assess association between 2 or more groups being independent, and tests the goodness-of-fit (McHugh, 2013; Rana & Singhal, 2015). It's used to analyze categorical data and not continuous data. Chi-square test was computed for sex (male, female), diagnosis (MDD, RDD), number of past episodes (0,1,2), and severity of depression (mild, moderate). The differences on sociodemographics and clinical variables were compared for all four groups (CBT vs CBTM vs CRT vs CRTM). In addition, sociodemographic and clinical variables were compared while comparing the two treatment groups (CBT vs CBTM, CRT vs CRTM, CBT vs CRT, CBTM vs CRTM).

3.6.3. Last Observation Carried Forward

LOCF is a conservative method used in intervention studies or longitudinal studies (Rioux & Little, 2021). The participants who dropped-out, the missing value on repeated measures was substituted with the last observed value. This method is known to yield a smaller treatment effect.

3.6.4. Independent t-test

Independent t-test is computed when the samples typically consist of independent population while paired t-test is used when each observation in one group is paired with a related observation in the other group, i.e., the samples typically consist of matched pairs of similar units, or when there are cases of repeated measures (Liang et al., 2019). The *t*-tests are used to process the quantitative data after analyzing the prerequisites of *t*-test. The present research used t-test to compare any two-treatment groups (CBT vs CBTM, CRT vs CRTM, CBT vs CRT, CBTM vs CRTM). The paired t-test was used to assess changes in scores on outcome measures before and after the treatment for each treatment group, that is, CBT, CBTM, CRT, CRTM respectively.

3.6.5. Analysis of Variance (ANOVA)

ANOVA was calculated to control confounding variables such as diagnosis, number of episodes of depression, and duration of illness (Khammar et al., 2020). The identified variable was neither independent nor dependent but this type of variable is known as covariate. To control the effect of covariates (DOI, Episodes, Dx) ANOVA was computed to observe changes in DV along with ANCOVA. Analysis of covariance (ANCOVA) is a type of ANOVA that controls effects of covariates by using regression analysis, and it was computed for adjusting linear effect of covariates, the purity of results increases the analytical power.

3.6.6. Multivariate Analysis of Variance (MANOVA)

ANOVA was further extended to multivariate analysis of variance (MANOVA), it was used to examine the effects of one or more independent variables (IVs; CBT and CR) on multiple dependent variables (DVs, BDI-II, MCQ30, WHOQOL-Bref, GAF). MANOVA tests, whether they are statistically significant or not, produce differences among levels of the IVs for multiple DVs. MANOVA tests belong to a larger family of statistical techniques known as the general linear model, which include analyses such as ANOVA, multiple types of regression, and repeated-measures designs (Reinhart, 2017). MANOVA, therefore, was computed to compare the differences in the dependent variables by comparing the four groups of treatment (CBT vs CBTM vs CRT vs CRTM).

3.6.7. Propensity Score Matching (PSM)

Propensity score matching is a frequently employed method to remove overt bias and estimate the treatment effect resulting from purposive sampling. One way to Propensity score matching employs a predicted probability of group membership (e.g., treatment vs. control group) based on observed predictors such as pretreatment demographic, socioeconomic and clinical characteristics usually obtained from logistic regression to create counterfactual group. Nearest Neighbor match is a type of PSM that method randomly orders the treatment and

controls patients, then selects the first treatment and finds one (two for 2 to 1 matching) control with the closest propensity score. The nearest neighbor technique faces the risk of imprecise matches if the closest neighbor is numerically distant (Baser et al., 2006). Propensity score matching (PSM) in the present research was employed to overcome the limitation of purposive sampling by comparing each case to its nearest neighbor match (NNM; Austin, 2011).

3.6.8. Cohens d

Cohens d determined the effect size of these changes in response to the intervention indicating d (.01) as *very small*, d (.2) as *small*, d (.5) as *medium*, d (.8) as *large*, d (1.2) as *very large*, and d (2.0) as *huge* (Sawilowsky, 2009).

The next chapter displays the findings of the research post the statistical analysis of the quantified data.

CHAPTER 4

RESULTS

This chapter elaborates on the findings of the research aiming to compare the effectiveness of different treatment modalities in participants using outcome measures of symptom severity, metacognitive beliefs, quality of life, and level of functioning. The treatment modalities used were cognitive behavior therapy and cognitive retraining. A total of 80 participants were having depressive disorders randomly divided into four treatment groups; Cognitive Behavior Therapy (CBT) alone, Cognitive Behavior Therapy combined with medicine (CBTM), Cognitive Retraining Treatment (CRT) alone, and Cognitive Retraining Treatment combined with medicine (CRTM). The symptom severity was assessed using BDI-II, metacognitive beliefs were assessed using MCQ30, quality of life was assessed using WHOQOL-Bref, and level of functioning was assessed using GAF. Each treatment group had 20 participants who received the intervention as per the group they were assigned to. The statistical analysis was carried out to meet the following four objectives of the research:

1. Effectiveness of Cognitive Retraining Treatment alone (CRT) alone in comparison to Cognitive Behavior Therapy alone (CBT) in depressive disorders (CBT vs CRT).
2. Effectiveness of Cognitive Retraining Treatment combined with pharmacological treatment (CRTM) in comparison to Cognitive Behavior Therapy combined with pharmacological treatment (CBTM) in depressive disorders (CRTM vs CBTM).
3. Effectiveness of Cognitive Retraining Treatment alone (CRT) in comparison to Cognitive Retraining Treatment combined with pharmacological treatment (CRTM) in depressive disorders (CRT vs CRTM).
4. Effectiveness of Cognitive Behavior Therapy alone (CBT) in comparison to Cognitive Behavior Therapy combined with pharmacological treatment (CBTM) on metacognition in depressive disorders (CBT vs CBTM).

The chapter includes the descriptive analysis and chi-square to compare the participant characteristics; paired t-test was computed to compare with-in group differences pre-and post-treatment; and independent t-test, ANOVA, ANCOVA, MANOVA, PSM (NNM) to compare the differences between the groups on outcome measures after controlling covariates along with effect size.

4.1. Sociodemographic and clinical characteristics of the participants across the groups

The descriptive statistics were computed for sociodemographic and clinical variables. Table 4 depicts the mean, standard deviation, frequencies, and percentages of age, education, sex, diagnosis, number of episodes of depressive illness, and severity of depression in the participants. The participants in all four-treatment groups did not show any significant differnce on age, sex, and education. The mean age of participants in CBT, CBTM, CRT, and CRTM groups was 28±9.26, 30.6±9.21, 27.1±6.45, and 30.35±9.50 respectively. The mean years of education of the participants in all four groups ranged from 12-17 years. The three groups had a greater number of females than males, that is, 13 versus (vs) 7 in the CBT group, 12 vs 8 in the CBTM group, and 11 vs 9 in the CRT group; while there was an equal number of males and females (10 vs 10) in CRTM group. The total sample (N=80) appeared to be nearly balanced between the two diagnostic categories of depressive disorders including major depressive disorder (MDD) and recurrent depressive disorder (RDD). But there were differences within groups. CBT group had 70% participants with MDD while 30% had RDD. On the contrary, in the CBTM group, 70% had RDD and 30% had MDD. In the cognitive retraining groups, both CRT and CRTM had the same split of participants, that is, 55% having MDD and 45% having RDD. All the participants with a diagnosis of MDD had sought professional consultation for the first time as this was the first noticeable episode of depressive illness. Those with a diagnosis of RDD had either one or two episodes of depressive illness in the past. A greater number of participants in all four groups had

moderate severity of depression than mild. The duration of depressive illness depression ranged from 4 months to nearly 10 years of duration.

Table 4

Sociodemographic and Clinical Characteristics of the Participants in the Four Groups namely; CBT, CBTM, CRT and CRTM (N=80)

Variable		CBT		CR		F/χ^2	p
		CBT	CBTM	CRT	CRTM		
Age		28 ± 9.26	30.6 ± 9.21	27.1± 6.45	30.35± 9.50	.79	.502
Education (years)		15 ± 1.52	14.45 ± 1.67	15.4 ± 1.79	14.65± 2.11	1.09	.358
Sex	Female	13 (65)	12 (60)	11 (55)	10 (50)	1.02	.796
	Male	7 (35)	8 (40)	9 (45)	10 (50)		
Diagnosis	MDD	14 (70)	6 (30)	11 (55)	11 (55)	6.62	.085
	RDD	6 (30)	14 (70)	9 (45)	9 (45)		
Episodes	0	14 (70)	6 (30)	11 (55)	11 (55)	7.55	.273
	1	4 (20)	7 (35)	6 (30)	5 (25)		
	2	2 (10)	7 (35)	3 (15)	4 (20)		
BDI score		20.95±4.83	21.75±3.81	23.9±4.24	22.4±5.03	1.54	.211
Severity	Mild	9 (45)	5 (25)	4 (20)	6 (30)	3.33	.343
	Mod	11 (55)	15 (75)	16 (80)	14 (70)		
DOI (Months)		26.2 ± 22.04	50.9 ± 31.79	33.85± 36.24	46.3± 71.78	1.29	.284
No. of sessions/tasks		9.8 ± .89	8.85 ± 2.08	111.05± 2.37	109.75± 4.59	-	-

Note. CBT= cognitive behavior therapy alone; CBTM= cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRTM = cognitive retraining therapy with medicine; χ^2= chi-square; p = level of significance; MDD = major depressive disorder; RDD = recurrent depressive disorder; Mod = Moderate; BDI = Beck depression inventory; DOI = duration of illness

*p <.05; **p <.01; ***p <.001

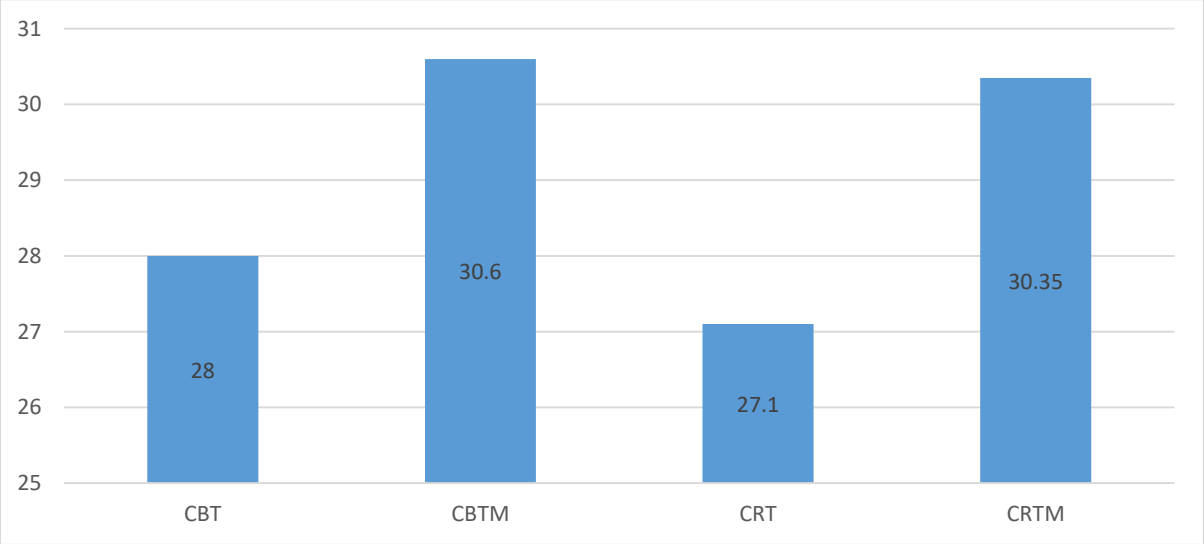
CBT module comprised of 10 weekly sessions and it's observed that all the forty participants in CBT and CBTM group attended more than 8 sessions on average. The CRT module comparatively was shorter in duration, that is, 6 weeks. But each week had subsequent 7 sessions for 7 days of the week. Additionally, each session had 2-4 tasks to be

performed by the participant each day as elaborated in the Table 1 in the methodology chapter.

The distribution of sociodemographic variables (age, sex, years of education) and clinical variables (diagnosis of depressive disorders, number of past episodes of depression, severity of depression as per score on BDI-II at the time of recruitment, level of depression as mild or moderate) is displayed via bar graphs, labeled as figures. Figure 3 shows the distribution of mean age in years of all 80 participants spread across the four treatment groups.

Figure 3

Distribution of Age in Years of the Participants across the Groups

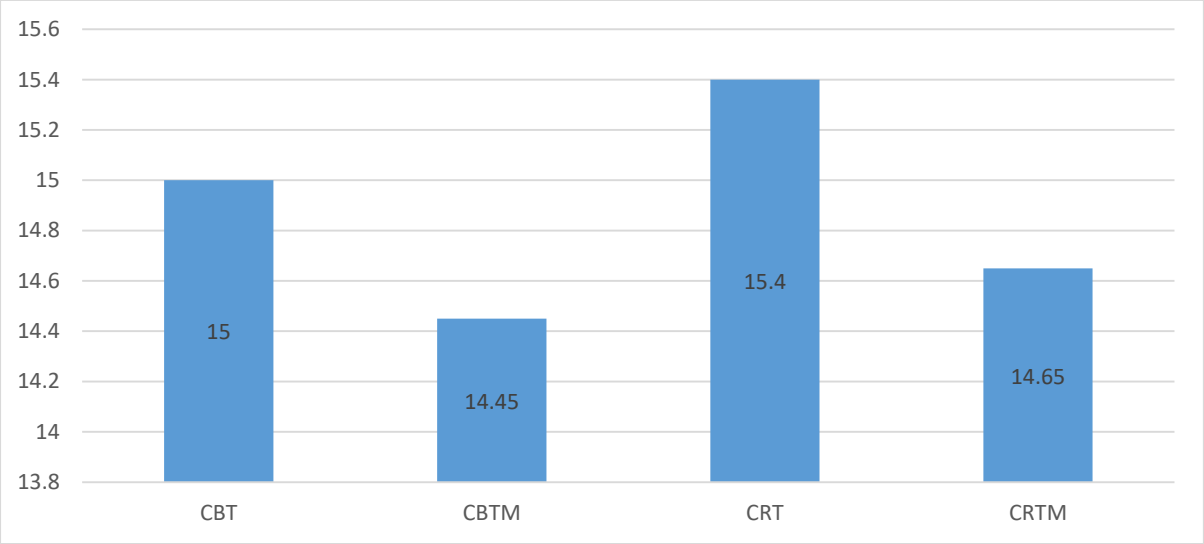


Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

The Figure 4 shows the distribution of mean years of formal education of the participants across the four treatment groups.

Figure 4

Years of Formal Education of the Participants across the Groups

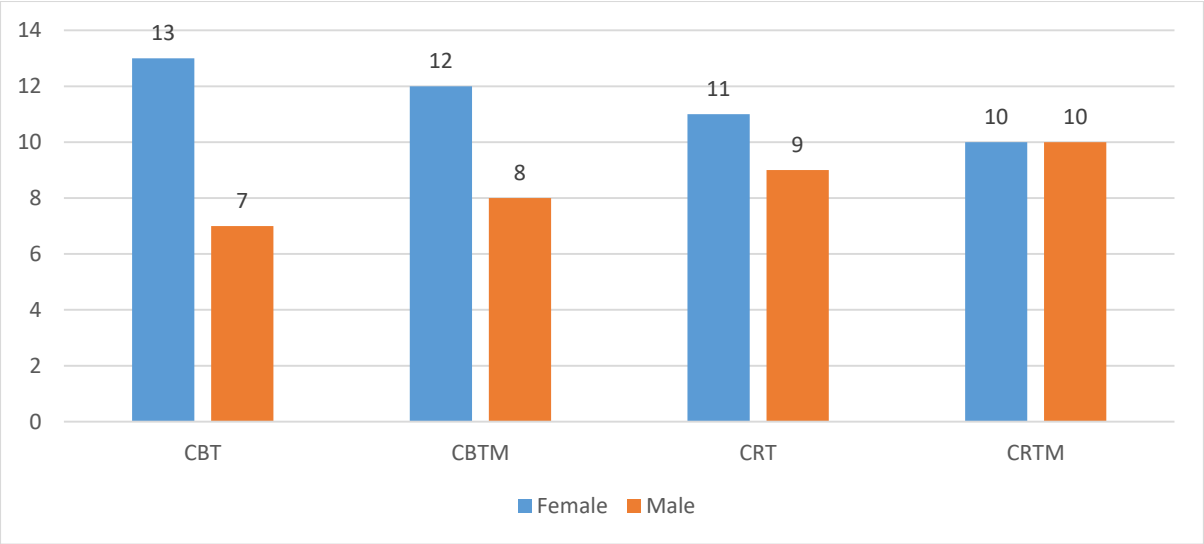


Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

The Figure 5 shows the distribution of sex (males and females) across the four treatment groups (CBT, CBTM, CRT, CRTM).

Figure 5

Distribution of Sex among the Participants across the Groups

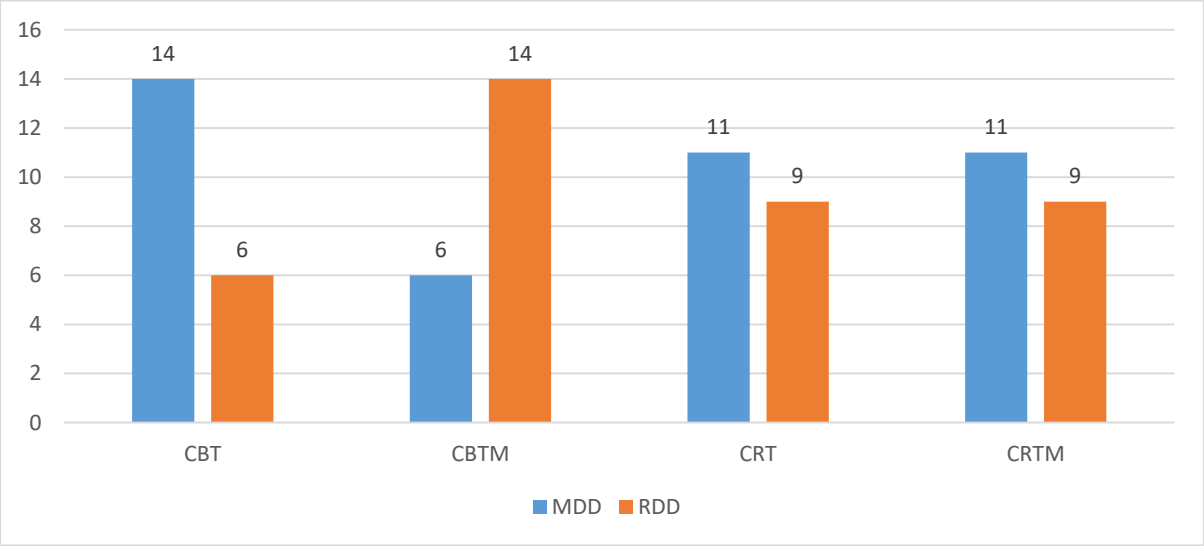


Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

The Figure 6 shows the distribution of diagnosis, that is, major depressive disorder (MDD) and recurrent depressive disorder (RDD), of the participants across the four treatment groups.

Figure 6

Distribution of Diagnosis among the Participants across the Groups

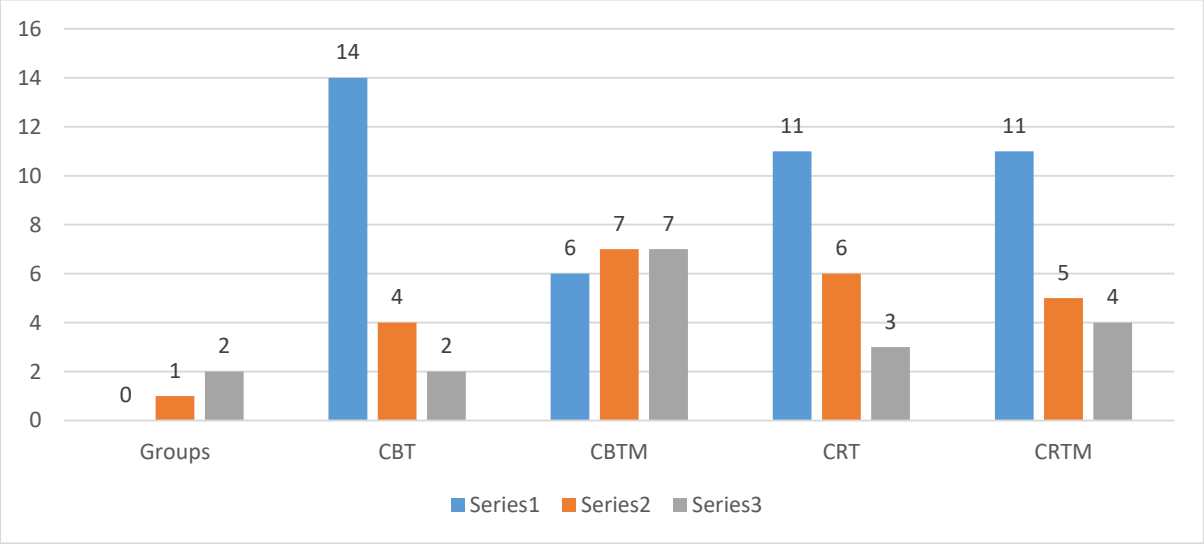


Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

Figure 7 shows the distribution of several past episodes, that is, either zero (0) or one (1), or two (2) in the participants across the four treatment groups.

Figure 7

Distribution of Number of Past Episodes of Depression among the Participants across the Groups

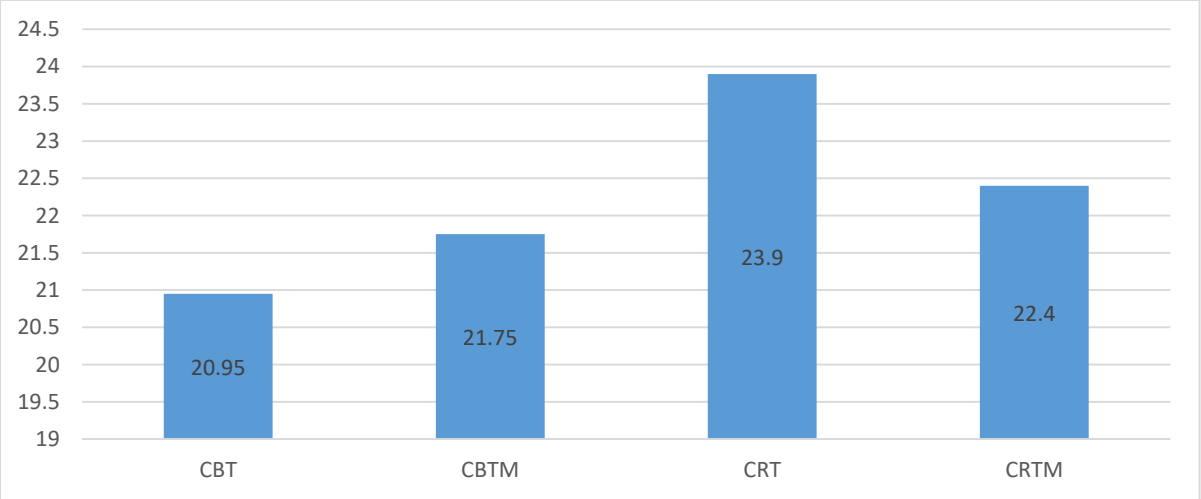


Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

Figure 8 shows the distribution of the mean of BDI-II scores of the 80 participants spread across the four treatment groups.

Figure 8

Distribution of BDI-II Scores of the Participants across the Groups

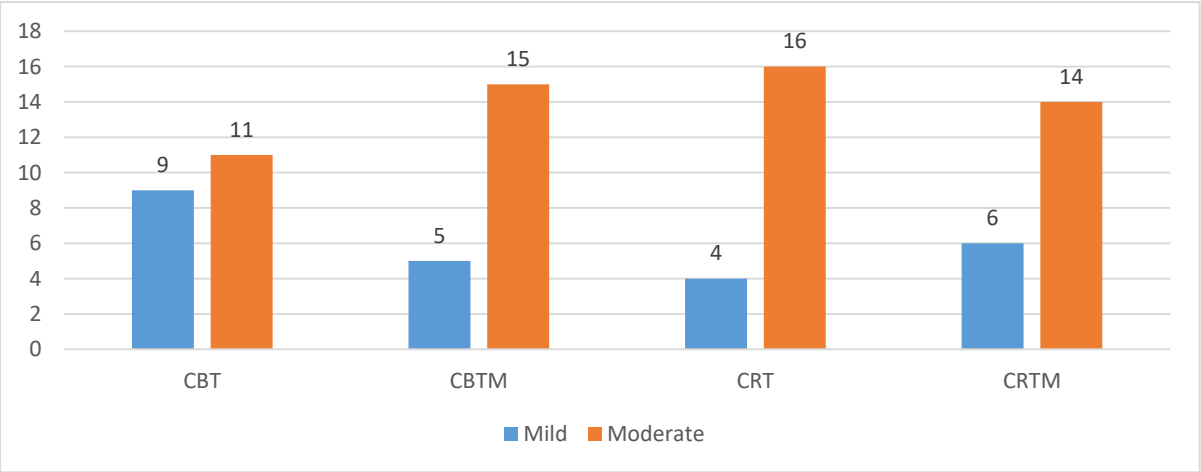


Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

Figure 9 shows the distribution of labels of severity of depression as mild or moderate of the participants across the four treatment groups.

Figure 9

Distribution of Severity of Depression (Mild, Moderate) among the Participants across the Groups

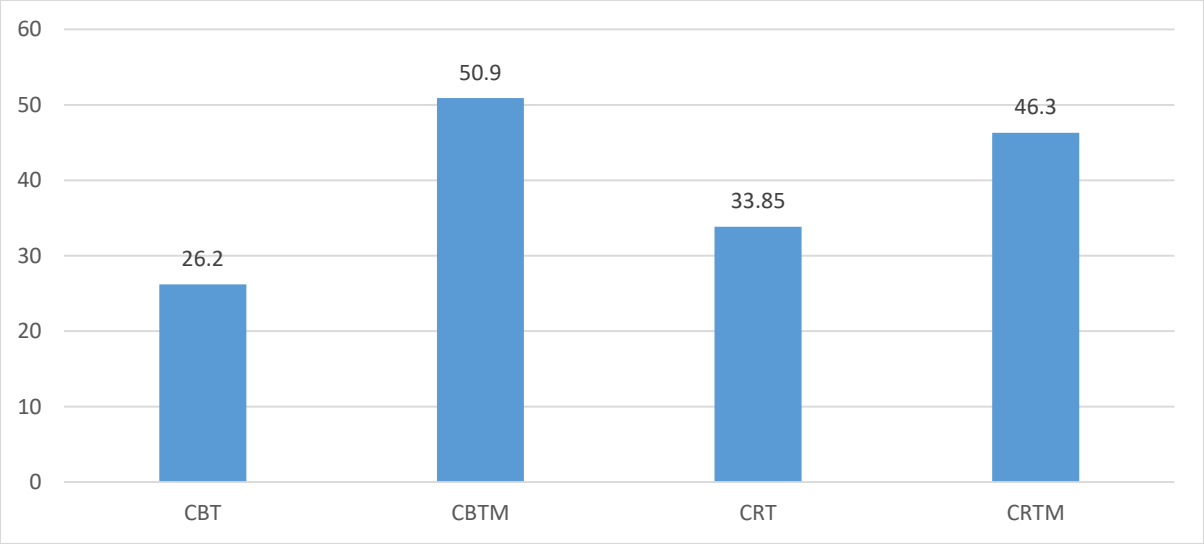


Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

Figure 10 shows the distribution of the mean duration of illness in months of all 80 participants spread across the four treatment groups.

Figure 10

Distribution of Duration of Illness(Depression) in Months among the Participants across the Groups



Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

Summary: The descriptive analysis revealed that there were no significant differences among the participants based on sociodemographic (age, sex, and education), and clinical variables (diagnosis, past episodes, scores on BDI-II, severity of depression, and duration of illness). Therefore, differences in the outcome measures may be largely attributed to the difference in the treatment received by the sample.

4.2. Within-group analysis

After the completion of descriptive statistics, within-group analysis was computed using paired t-tests for each treatment group, CBT, CBTM, CRT, and CRTM respectively. This analysis compared and pre and post-treatment scores of the sample on the outcome measures (BDI-II, MCQ30, WHOQOL-Bref, and GAF). The findings described the change in scores in response to treatment.

4.2.1. Comparing the difference in scores on outcome measures pre and post-treatment in the CBT group

The characteristics of the participants in the CBT group are shown n Table 4. Table 5 shows the mean scores of the participants on the outcome measures namely; severity of depression (BDI-II), dysfunctional metacognitive beliefs (MCQ30), quality of life (WHOQOL-Bref), and level of functioning (GAF). The pre-treatment column of Table 5 shows scores before starting the intervention and the post-treatment column shows the scores on outcome measures after the intervention delivery was completed for the study.

It was observed that change in the scores was statistically significant for the outcome measures and their domains (Table 5); except for CSC a domain of metacognitive beliefs. The findings revealed a significant reduction in depression severity ($t=9.38$, $p < .001$) and dysfunctional metacognitive beliefs ($t=3.97$, $p < .001$) including positive belief about worry ($t=2.47$, $p < .05$), negative beliefs about uncontrollability and danger of worry ($t=5.79$, $p < .001$), cognitive confidence ($t=2.71$, $p < .05$), need for control ($t=2.47$, $p < .05$), except cognitive self-consciousness ($t=1.82$, $p > .05$). It was also seen that there was significant enhance in domains quality of life including, physical ($t=7.46$, $p < .001$), psychological ($t=8.45$, $p < .001$), social relations ($t=3.05$, $p < .01$), and environment ($t=2.64$, $p < .05$). The level of functioning ($t=13.4$, $p < .001$) significantly improved in response to delivery of CBT.

Table 5

Pre-post Differences in CBT Group (n=20) on Outcome Measures using Paired t-test (df=19)

Measure		Pre-treatment		Post-treatment		t	p	d
		M	SD	M	SD			
BDI		20.95	4.83	7.25	5.38	9.38	.000***	2.68
MCQ	Total	62.55	16.69	51.65	2.52	3.97	.000***	.76
	POS	10.45	4.58	8.75	2.71	2.47	.023*	.45
	NEG	15.65	4.29	12.25	3.61	5.79	.000***	.86
	CC	10.2	3.47	8.6	2.87	2.71	.014*	.50
	NC	11.55	4.46	9.1	2.57	2.47	.023*	.67
	CSC	14.7	4.88	12.95	4.63	1.82	.083	.37
QOL	PH	20.3	3.93	26.4	2.83	7.46	.000***	1.78
	PSY	14.85	3.60	20.45	3.19	8.45	.000***	1.65
	SR	8.9	1.62	10.15	1.35	3.05	.006**	.84
	ENV	29.4	4.26	30.8	4.20	2.64	.016*	.33
GAF		59.45	5.81	84.45	6.23	13.4	.000***	4.15

Note. CBT= cognitive behavior therapy alone; M= mean; SD = standard deviation; p = level of significance; d = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

The effect size was huge (Cohen's d >2) for symptom severity and level of functioning, very large (Cohen's d >1.2) for physical and psychological QOL, large (Cohen's d >.8) for negative dysfunctional metacognitive beliefs, and social relation domain of QOL, a medium effect size (Cohen's d >.5) for an overall reduction in dysfunctional metacognitive

beliefs, and its domains (cognitive confidence and need for control). However, the effect size was observed to be small (Cohen's d >.2) for cognitive self-consciousness and the environmental domain of QOL.

Summary: CBT is well-known to enhance QOL and functioning as well as reduce symptoms. However, the findings of this study revealed that CBT may be an effective intervention for the reduction of dysfunctional metacognitive beliefs.

4.2.2. Comparing the difference in scores on outcome measures pre and post-treatment in the CBTM group

The characteristics of the participants in the CBTM group are shown in Table 4. Within-group differences in pre-post scores of outcome measures in the CBTM group (Table 6) revealed that there was a significant decrease in the severity of depression (t=7.12, p <.001) and total score of dysfunctional metacognitive beliefs (t=4.67, p <.001) in response to CBT combined with pharmacological treatment. There was significant reduction in positive belief about worry (t=3.39, p <.01), negative beliefs about uncontrollability and danger of worry (t=5.98, p <.001), and need for control (t=2.38, p <.05). However, no significant change was observed in cognitive confidence (t=1.33, p >.05), and cognitive self-consciousness (t=71.56, p >.05). There was significant increase in scores on various domains of quality of life as p <.01 for physical (t=5.00), psychological (t=6.21), social relations (4.47), and environment (3.38). The level of functioning reflected significantly improved with a t-value significant at p <.001 (t=12.58).

The effect size was huge (Cohen's d >2) for the level of functioning, very large (Cohen's d >1.2) for symptom severity and negative dysfunctional metacognitive beliefs; large (Cohen's d >.8) for physical health, psychological and social relation domains of QOL; medium effect size (Cohen's d >.5) for an overall reduction in dysfunctional metacognitive beliefs, and its domain positive beliefs about worry. Although the effect size was observed to

be small (Cohen's d >.2) for the need for control, cognitive self-consciousness, and environmental domain of QOL.

Table 6 *Pre-post Differences in CBTM Group (n=20) on Outcome Measures using Paired t-test (df=19)*

Measure		Pre-treatment		Post-treatment		t	p	d
		M	SD	M	SD			
BDI		21.75	3.81	10.95	7.27	7.12	.000***	1.86
MCQ	Total	54.9	15.67	45.45	13.65	4.67	.000***	.64
	POS	8.5	3.24	7.1	1.86	3.39	.003**	.53
	NEG	17.15	2.94	12.15	4.44	5.98	.000***	1.33
	CC	9.25	4.81	8.45	4.28	1.33	.198	.17
	NC	9.15	3.28	7.8	3.43	2.38	.028*	.40
	CSC	11.4	4.75	10.45	4.39	1.56	.135	.21
QOL	PH	19.6	3.27	23.7	4.29	5.00	.000***	1.07
	PSY	13.8	3.53	18.2	4.74	6.21	.000***	1.05
	SR	8.15	1.31	9.4	1.73	4.47	.000***	.81
	ENV	25.2	5.19	27.5	5.09	3.38	.003**	.45
GAF		57.55	5.74	73.85	5.13	12.58	.000***	3.00

Note. CBTM = cognitive behaviour therapy with medicine; M= mean; SD = standard deviation; p = level of significance; d = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

Summary: CBT is known to be the gold standard for depressive disorders with and without medicine depending upon its severity. The current findings implied CBT with medicine leads to a significant reduction of dysfunctional metacognitive beliefs and symptoms while increasing QOL and functioning.

4.2.3. Comparing the difference in scores on outcome measures pre and post-treatment in the CRT group

The characteristics of the participants in the CRT group are shown n Table 4. The pre-post differences in scores of outcome measures in the CRT group (Table 7) revealed a significant reduction in the severity of depression (t=16.97, p <.001). The total score of dysfunctional metacognitive beliefs reduced significantly (t=6.30, p <.001) in response to

CRT. Unlike CBT where change was not observed in all domains of dysfunctional metacognitive beliefs, CRT lead to influence change in all scales of metacognitive beliefs; in positive belief about worry (t=5.90, *p* <.001), negative beliefs about uncontrollability and danger of worry (t=5.56, *p* <.001), cognitive confidence (t=3.42, *p* <.01), need for control (t=4.62, *p* <.001), and cognitive self-consciousness (t=3.26, *p* < .01). The quality of life scores increased significantly in all domains, that is, physical (t=4.45, *p* <.001), psychological (t=5.64, *p* <.001), social relations (t=4.56, *p* <.001), and environment (t=2.94, *p* <.01). The CRT intervention lead to an increased level of functioning with a significant increase in scores on GAF (t=9.90, *p* <.001).

Table 7

Pre-post Differences in CRT Group (n=20) on Outcome Measures using Paired t-test (df=19)

Measure		Pre-treatment		Post-treatment		t	p	d
		M	SD	M	SD			
BDI		23.9	4.24	6.8	5.68	16.97	.000***	3.41
MCQ	Total	65.65	18.17	43.45	12.87	6.30	.000***	1.41
	POS	12.45	3.36	8.35	2.16	5.90	.000***	1.45
	NEG	16.05	4.67	10.1	5.01	5.56	.000***	1.23
	CC	10.55	4.27	8.00	3.46	3.42	.002**	.65
	NC	13.6	4.88	8.35	3.73	4.62	.000***	1.21
	CSC	12.75	4.40	10.05	3.82	3.26	.004**	.65
QOL	PH	20.35	3.34	26.00	4.04	4.45	.000***	1.52
	PSY	13.6	3.01	19.9	3.11	5.64	.000***	2.06
	SR	7.4	2.09	9.55	1.50	4.56	.000***	1.18
	ENV	23.75	3.77	25.75	3.77	2.94	.008**	.53
GAF		55.9	7.97	68.45	9.58	9.90	.000***	1.42

Note. CRT= cognitive retraining therapy alone; M= mean; SD = standard deviation; p = level of significance; d = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health

Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

The effect size was huge (Cohen's d >2) for symptom severity and QOL, very large (Cohen's d >1.2) for overall reduction in dysfunctional metacognitive beliefs, and its domains namely, positive beliefs about worry, negative dysfunctional metacognitive beliefs, need for control, all three significantly linked with psychopathology. A very large effect size was also observed for physical health and level of functioning. A large effect size was observed (Cohen's d >.8) for social relations, and a medium effect size (Cohen's d >.5) for cognitive confidence, cognitive self-consciousness, and the environmental domain of QOL.

Summary: The role of cognitive retraining is emerging, the findings of this research were promising as a significant effect of CRT was observed on the reduction of symptoms and dysfunctional metacognitive beliefs, and CRT tends to increase QOL and functioning, this is supported by the literature on psychiatric disorders.

4.2.4. Comparing the difference in scores on outcome measures pre and post-treatment in the CRTM group

The characteristics of the participants in the CRTM group are shown n Table 4. Within-group differences in pre-postscores of outcome measures for the CRTM group (Table 8) showed a significant difference in scores of BDI-II (p <.001) implying a decrease in depressive symptoms. There was a significant reduction in dysfunctional metacognitive beliefs (p <.001); positive belief about worry (p <.01), negative beliefs about uncontrollability and danger of worry (p <.001), cognitive confidence (p <.01), need for control (p <.001), and cognitive self-consciousness (p < .05).

Table 8

Pre-post Differences in CRTM Group (n=20) on Outcome Measures using Paired t-test (df=19)

Measure		Pre-treatment		Post-treatment		t	p	d
		M	SD	M	SD			
BDI		22.4	5.03	5.00	4.61	14.30	.000***	3.60
MCQ	Total	63.85	14.61	44.8	10.50	5.54	.000***	1.51
	POS	10.1	3.81	8.00	2.34	3.30	.003**	.66
	NEG	16.25	4.20	9.2	1.96	9.24	.000***	2.15
	CC	10.35	3.08	7.3	2.32	3.78	.001**	1.12
	NC	13.25	4.05	8.85	3.67	4.09	.000***	1.14
	CSC	13.6	4.40	11.1	4.05	2.26	.035*	.60
QOL	PH	19.15	5.02	26.55	4.04	8.43	.000***	1.62
	PSY	15.4	4.34	21.5	3.07	8.02	.000***	1.62
	SR	8.6	3.36	10.85	2.43	6.48	.000***	.77
	ENV	24.85	6.90	27.85	6.28	3.39	.003**	.45
GAF		57.55	4.76	73.75	6.19	14.08	.000***	2.93

Note. CRTM = cognitive retraining therapy with medicine; M= mean; SD = standard deviation; p = level of significance; d = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

The improvement in quality of life varied slightly in multiple domains but significantly enhanced in all domains namely; physical (p <.001), psychological (p <.001), social relations (p <.001), and environment (p <.01). The change in the level of significance in quality of life in response to CRTM was same as the response to CRT. The pre-post difference in level of functioning was significantly better (p <.001).

The effect size was huge (Cohen's d >2) for symptom severity, negative dysfunctional metacognitive beliefs, and level of functioning; very large (Cohen's d >1.2) for overall

reduction in dysfunctional metacognitive beliefs, physical and psychological QOL, medium effect size was observed (Cohen's d >.5) for positive beliefs about worry, cognitive self-consciousness, and social relations. A small effect size was observed (Cohen's d >.2) for the environmental domain of QOL.

Summary: CRTM appeared to be effective in alleviating symptoms and dysfunctional metacognitive beliefs in this study sample along with enhanced QOL and functioning.

4.3. Between-group analysis

The paired t-test findings revealed significant differences in pre and post-treatment on the outcome measures in response to the intervention. Further, analysis was carried out keeping in view the objectives of the study. The findings below are explained objective-wise, comparing various treatment groups for their effectiveness (CBT vs CBTM, CRT vs CRTM, CBT vs CRT, CBTM vs CRTM).

4.3.1. Objective 1: Effectiveness of CRT in comparison to CBT in depressive disorders

The participants of CBT group when compared with those in CRT groups (Table9), revealed there was no difference in age (p =.723, p >.05), sex (p =.519, p >.05), and education years (p =.450, p >.05). Additionally, no significant difference was observed on clinical variables including, diagnosis (p =.327, p >.05), past episodes of depression (p =.619, p >.05), the severity of depression (p =.091, p >.05), and duration of illness (p =.424, p >.05). However, there was a significant difference in participation in therapy, but this needs to be interpreted under the light of length and type of module of CBT (10 weekly sessions) and CRT (6-week daily session with multiple tasks for each day) delivered to the participants in the two groups. Therefore, the difference in compliance must be ignored and not interpreted.

Table 9

Comparing Characteristics of Participants in CBT (n=20) and CRT (n=20) Groups

Variable		M ± SD / *f* (%)		t / χ^2	p
		CBT	CRT		
Age		28 ± 9.26	27.1 ± 6.45	.36	.723
Education (years)		15 ± 1.52	15.4 ± 1.79	.76	.450
Sex	Female	13 (65.0)	11 (55)	0.42	.519
	Male	7 (35.0)	9 (45)		
Diagnosis	MDD	14 (70.0)	11 (55)	0.96	.327
	RDD	6 (30.0)	9 (45)		
Episodes	0	14 (70.0)	11 (55)		
	1	4 (20.0)	6 (30)	0.96	.619
	2	2 (10.0)	3 (15)		
Severity	Mild	9 (45)	4 (20)	0.06	.091
	Mod	11 (55)	16 (80)		
DOI (Months)		26.2 ± 22.04	33.85 ± 36.24	.81	.424
No. of sessions/tasks		9.8 ± .89	111.05 ± 2.37	-1.8	.000***

Note. CBT= cognitive behavior therapy alone; CRT = cognitive retraining therapy alone; p = level of significance; M = mean; SD = standard deviation; *f* = frequency; % = percentage; MDD = major depressive disorder; RDD = recurrent depressive disorder; Mod = moderate; DOI = duration of illness

*p <.05; **p <.01; ***p <.001

Following this, an independent t-test was used to compare the post-assessment outcome measures scores of the CBT group with the CRT group (Table 10). It was found that there were significant differences in metacognitive beliefs (Total; t=2.14, p = .038, p < .05), cognitive self-consciousness (CSC; t=2.16, p = .037, p < .05), environment (ENV; t=4.00, p = .000, p < .001), global functioning (GAF; t=6.26, p = .000, p < .001), but no differences were observed in change in depression severity (BDI-II; t=.26, p = .798, p > .05) metacognitive beliefs domains namely; positive belief about worry (POS; t=.52, p = .608, p > .05), negative beliefs about uncontrollability and danger of worry (NEG; t=1.56, p = .128, p > .05), cognitive confidence (CC; t=.60, p = .554, p > .05), and need for control (NC; t=.74, p =

.463, $p > .05$). Similarly no difference between the groups was seen in quality of life domains namely; physical health (PH; t=.36, $p = .719$, $p > .05$), psychological (PSY; t=.55, $p = .583$, $p > .05$), and social relations (SR; t=1.33, $p = .192$, $p > .05$).

Table 10

Post-treatment Differences on Outcome Measures between CBT and CRT Groups using Independent t-test (n=40, df =38)

Measure		M (SD)		Mean Diff	SE Diff	t	p	d
		CBT	CRT					
BDI		7.25 (5.38)	6.8 (5.68)	.45	1.75	.26	.798	.08
MCQ	Total	51.65 (11.26)	43.45 (12.87)	8.2	3.82	2.14	.038*	.68
	POS	8.75 (2.71)	8.35 (2.16)	.4	.77	.52	.608	.16
	NEG	12.25 (3.61)	10.1 (5.01)	2.15	1.38	1.56	.128	.49
	CC	8.6 (2.87)	8 (3.46)	.6	1.01	.60	.554	.19
	NC	9.1 (2.57)	8.35 (3.73)	.75	1.01	.74	.463	.23
	CSC	12.95 (4.63)	10.05 (3.82)	2.9	1.34	2.16	.037*	.68
QOL	PH	26.4 (2.83)	26 (4.04)	.4	1.10	.36	.719	.11
	PSY	20.45 (3.19)	19.9 (3.11)	.55	.10	.55	.583	.17
	SR	10.15 (1.35)	9.55 (1.50)	.6	.45	1.33	.192	.42
	ENV	30.8 (4.20)	25.75 (3.77)	5.05	1.26	4.00	.000***	1.26
GAF		84.45(6.23)	68.45 (9.58)	16.0	2.55	6.26	.000***	1,98

Note. CBT= cognitive behavior therapy alone; CRT = cognitive retraining therapy alone; M= mean; SD = standard deviation; Diff = difference; SE = standard error; p = level of significance; d = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief;

PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

There was no significant difference (p>.05) observed in scores of outcome measures (BDI-II, MCQ, QOL, GAF), that is, even when covariates such as diagnosis, episodes, and duration of illness were controlled (Table 11). This implied CRT is as effective as CBT in improving depression scores, metacognition, quality of life, and global functioning.

Further, the scores of participants in the CBT group were compared with the CRT group with its nearest match (Table 11). Even after NNM analysis, no significant difference was observed in the post-assessment scores of outcome measures of the two groups, except for the domains of quality of life, that is, ENV (p =.057*; p* < .05), and global functioning (p=.000*; p* < .001), This observation established that CRT is an effective intervention and can be used as a discrete treatment when CBT is not feasible as CRT also proved to enhance the treatment outcome.

Summary: CBT and CRT did not reveal any differences in the reduction of symptom severity but differences were seen in the total score of dysfunctional metacognitive beliefs. CRT sample had a greater reduction in CSC (cognitive self-consciousness), a domain of metacognitive beliefs. CSC as per the literature is linked more with personality makeup than depressive psychopathology. Similarly, there was no significant difference between CBT and CRT in enhancing physical, psychological, and social relation domains of quality of life. However, in the domain of ENV (environmental), which again is related to supportive factors like transportation, distance, and access to health services than its connection with depressive psychopathology, the CBT sample was superior to the CRT sample. Lastly, the level of functioning was significantly higher in the CBT sample than CRT sample. This can be attributed to direct intervention to later cognition, emotion, and behavior in CBT and follow-

up studies can further be conducted to generalize such findings. However, on controlling covariates, differences in CBT and CRT were significant only for ENV (environmental, a domain of QOL) and GAF (level of functioning); the CBT sample showed a superior effect than CRT.

Table 11

Post-treatment Differences on Outcome Measures between CBT and CRT Groups using ANCOVA

Measure		ANCOVA			PSM-NNM		
		F	R^2	p	Coef	z	p
BDI		1.86	.728	.101	.35	.14	.887
MCQ	Total	1.19	.631	.366	5.1	3.79	1.34
	POS	.85	.550	.646	.05	.05	.961
	NEG	.96	.579	.548	1.75	1.44	.150
	CC	1.39	.667	.249	.1	.13	.895
	NC	.85	.548	.651	.55	.45	.651
	CSC	1.27	.645	.318	1.35	.94	.347
QOL	PH	.33	.321	.992	.85	.89	.372
	PSY	.43	.381	.968	.7	.62	.538
	SR	.96	.578	.550	.6	1.02	.306
	ENV	.86	.552	.642	4.9	3.25	.001**
GAF		1.21	.635	.350	17.3	8.11	.000***

Note. CBT= cognitive behavior therapy alone; CRT = cognitive retraining therapy alone; ANCOVA = analysis of covariance; PSM-NNM = Propensity score matching using nearest-neighbor match; p = level of significance; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

4.3.2. Objective 2: Effectiveness of CRTM in comparison to CBTM in depressive disorders.

The participants in the CBTM group were compared with participants in the CRTM group (Table 12), and the findings were similar to the above (CBT vs CRT) findings. The results

Table 12

Comparing Characteristics of Participants in CBTM (n=20) and CRTM (n=20) Groups

Variable		M ± SD / *f* (%)		t / χ^2	p
		CBTM	CRTM		
Age		30.6 ± 9.21	30.35 (9.50)	.08	.933
Education (years)		14.45 ± 1.67	14.65 (2.11)	.33	.741
Sex PG 19	Female	12 (60)	10 (50)	0.40	.525
	Male	8 (40)	10 (50)		
Diagnosis	MDD	6 (30)	11 (55)	2.56	.110
	RDD	14 (70)	9 (45)		
Episodes	0	6 (30)	11 (55)		
	1	7 (35)	5 (25)	2.62	.270
	2	7 (35)	4 (20)		
Severity	Mild	5 (25)	6 (30)	0.12	.723
	Mod	15 (75)	14 (70)		
DOI (Months)		50.9 ± 31.79	46.3 (71.78)	.26	.794
No. of sessions/tasks		8.85 ± 2.08	109.75 (4.59)	89.54	.000***

Note. CBTM = cognitive behavior therapy with medicine; CRTM = cognitive retraining therapy with medicine; p = level of significance; M = mean; SD = standard deviation; *f* = frequency; % = percentage; MDD = major depressive disorder; RDD = recurrent depressive disorder; Mod = moderate; DOI = duration of illness

*p <.05, **p <.01, ***p <.001

showed no statistically significant difference in age (p =.933*; p* > .05), sex (p =.525*; p* > .05), and education (p =.741*; p* > .05). Also, no difference was seen in clinical variables such as diagnosis (p =.110*; p* > .05), past episodes of illness (p =.270*; p* > .05), the severity of depression (p =.723*; p* > .05), and duration of illness (p =.794*; p* > .05). The only significant difference observed was in participation in therapy sessions (p =.000*; p* <.001), which as explained was due the difference in interventions mode and module, i.e., CBT and CRT, therefore, the difference was inconclusive. There was a significant difference observed in the reduction in depression severity (t= 3.09, p= .004*; p* < .01), participants who received CRT

combined with pharmacological treatment (CRTM) had a greater reduction in severity of depression than those who received CBT

Table 13

Post-treatment Differences on Outcome Measures between CBTM and CRTM Groups using Independent t-test (n=40, df =38)

Measure		M (SD)		Mean Diff	SE Diff	t	p	d
		CBTM	CRTM					
BDI		10.95 (7.27)	5 (4.61)	5.95	1.92	3.09	.004**	.98
MCQ	Total	45.45 (13.65)	44.8 (10.50)	.65	3.85	.17	.867	.05
	POS	7.1 (1.86)	8 (2.34)	-.9	.67	-1.35	.186	.42
	NEG	12.15 (4.44)	9.2 (1.96)	2.95	1.08	2.72	.010*	.86
	CC	8.45 (4.28)	7.3 (2.32)	1.15	1.09	1.05	.298	.33
	NC	7.8 (3.43)	8.85 (3.67)	-1.05	1.12	-.93	.356	.29
	CSC	10.45 (4.39)	11.1 (4.05)	.65	1.34	.49	.629	.15
QOL	PH	23.7 (4.29)	26.55 (4.04)	2.85	1.32	2.16	.037*	.68
	PSY	18.2 (4.74)	21.5 (3.07)	3.3	1.26	2.61	.013*	.83
	SR	9.4 (1.73)	10.85 (2.43)	1.45	.67	2.17	.036*	.69
	ENV	27.5 (5.09)	27.85(6.28)	.35	1.81	.19	.847	.06
GAF		73.85 (5.13)	73.75 (6.20)	.1	1.80	.05	.956	.02

Note. CBTM = cognitive behavior therapy with medicine; CRTM = cognitive retraining therapy with medicine; M= mean; SD = standard deviation; Diff = difference; SE = standard error; p = level of significance; *d* = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

combined with pharmacological treatment (CBTM) as shown in Table 13. The change in metacognition was also significantly different between the two groups, that is, negative beliefs about uncontrollability and danger of worry (NEG; t=2.72, p = .010, p < .05). Though no significant difference was seen in global functioning (GAF; t=.05, p = .956, p > .05) meant that either CBT or CRT when combined with pharmacological treatment resulted in improving day-to-day functioning. However, a significant difference was seen in physical health (PH; t=2.16, p = .037, p < .05), psychological (PSY; t=2.61, p = .013, p < .05), and social relations (SR; t=2.17, p = .036, p < .05). This implied CRTM resulted in higher scores of quality of life than CBTM group. No significant difference was viewed in the environment (ENV; t=.19, p = .847, p > .05) between CBTM and CRTM groups. The effect size ranges from very small to large.

Further, the scores of participants in the CBT group were compared with the CRT group with its after controlling for diagnosis, episodes, and duration of illness (Table 14) but no significant difference was observed between the two groups (CBTM vs CRTM) on the outcome measures (BDI-II, MCQ and its domains, QOL domains, and GAF as p > .05. The scores of participants in the CBTM group were compared with the CRTM group with its nearest match. Even after NNM analysis, no significant difference was observed in the post-assessment scores of outcome measures except in the domain of social relations (SR; p =.042*;* p < .05), the participants in CRTM groups had higher scores on social relations post-treatment. These findings reveal that CBT or CRT when combined with pharmacological treatment are equally effective in reducing depression severity and improving metacognitive beliefs, quality of life, and functioning. The only significant difference was in scores on social relations between the groups.

Table 14

Post-treatment Differences on Outcome Measures between CBTM and CRTM Groups using ANCOVA

Measure		ANCOVA			PSM-NNM		
		F	R^2	p	Coef	z	p
BDI		1.14	.545	.388	7.5	2.00	.046
MCQ	Total	.66	.410	.817	.50	.10	.921
	POS	1.20	.557	.349	.67	1.00	.316
	NEG	2.16	.694	.049	2.85	1.24	.217
	CC	1.07	.528	.446	.71	.57	.572
	NC	.60	.386	.868	1.37	.99	.321
	CSC	.56	.370	.894	.96	.65	.513
QOL	PH	1.56	.620	.170	2.56	1.80	.071
	PSY	1.90	.666	.085	2.88	1.89	.059
	SR	1.14	.545	.389	1.68	2.03	.042*
	ENV	.91	.489	.583	.33	.14	.885
GAF		.95	.498	.550	.7	.26	.791

Note. CBTM = cognitive behavior therapy with medicine; CRTM = cognitive retraining therapy with medicine; ANCOVA = analysis of covariance; PSM-NNM = Propensity score matching using nearest-neighbor match; p = level of significance; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

Summary: CBTM and CRTM showed significant differences, CRTM being superior in reducing symptom severity and dysfunctional metacognitive beliefs as well as increasing physical, psychological, and social domains of QOL. However, when controlled for covariates

only social QOL was greater in the CRTM sample than in the CBTM sample. This meant that CRT was more effective when combined with medicine than CBT. These findings are very interesting and need to be explored in future studies because this can spread the path for CRT as an alternative to CBT for the psychiatrist working in settings where either the clinical population lacks sophistication for CBT or no specialists are available to deliver CBT.

4.3.3. Objective 3: Effectiveness of CRT in comparison to CRTM in depressive disorders.

Similarly, on comparing the participants in the CRT group with those in the CRTM group (Table 15), it was seen that there was no statistically significant difference between the two

Table 15

Comparing Characteristics of Participants in CRT (n=20) and CRTM (n=20) Groups

Variable		M ± SD / *f* (%)		t / χ^2	p
		CRT	CRTM		
Age		27.1 ± 6.45	30.35 ± 9.50	-1.26	.213
Education (years)		15.4 ± 1.79	14.65 ± 2.11	1.21	.232
Sex	Female	11 (55)	10 (50)	0.10	.752
	Male	9 (45)	10 (50)		
Diagnosis	MDD	11 (55)	11 (55)	0.00	1.000
	RDD	9 (45)	9 (45)		
Episodes	0	11 (55)	11 (55)		
	1	6 (30)	5 (25)	0.23	.890
	2	3 (15)	4 (20)		
Severity	Mild	4 (20)	6 (30)	0.53	.465
	Mod	16 (80)	14 (70)		
DOI (Months)		33.85 ± 36.24	46.3 ± 71.78	-0.70	.492
No. of sessions/tasks		111.05 ± 2.37	109.75 ± 4.59	1.12	.267

Note. CRT= cognitive retraining therapy alone; CRTM = cognitive retraining therapy with medicine; p = level of significance; M = mean; SD = standard deviation; *f* = frequency; % = percentage; MDD = major depressive disorder; RDD = recurrent depressive disorder; Mod = moderate; DOI = duration of illness

*p <.05, **p <.01, ***p <.001

groups (p > .05). This implied that the participants matched on age, sex, and education. Additionally, there was equal distribution of diagnosis (MDD and RDD) in both groups (p =1.000, p >.05). The participants in both groups had nearly the same number of episodes of depression (p =.890, p >.05), and split of severity of depression (Mild and Moderate; p =.465, p >.05). However, mean of duration of illness was lesser for CRT group (33.85) than CRTM group (46.3) but difference was not significant statistically (p = .492, p > .05). The number of sessions attended by the participants in both groups were not statistically different (p = .267, p > .05). This meant participants complied with the module of CRT.

After comparing the two groups on sociodemographic and clinical variables, an independent t-test was applied to compare differences in post-treatment outcome measures scores (Table 16). It was observed that there were significant differences in global functioning (GAF; p = .044, p <.05), but no differences were observed in the change in depression severity (BDI-II; p = .278, p > .05), metacognitive beliefs (Total; p = .718, p > .05), positive belief about worry (POS; p = .626, p > .05), negative beliefs about uncontrollability and danger of worry (NEG; p = .459, p > .05), cognitive confidence (CC; p = .457, p > .05), need for control (NC; p = .672, p > .05), and cognitive self-consciousness (CSC; p = .404, p > .05).

Similarly no difference between the groups was seen in the quality of life domains namely; physical health (PH; p = .669, p > .05), psychological (PSY; p = .109, p > .05), social relations (SR; p = .049, p > .05), and environment (ENV; p = .207, p > .05). This implies the two treatment groups showed no significant differences and that CRT alone is as effective as it is when combined with pharmacological treatment in improving depression, metacognitive beliefs, and quality of life. However, global functioning was significantly better when CRT was combined with medicines. The effect size (d) for between-group differences ranged from small to medium.

Table 16

Post-treatment Differences on Outcome Measures between CRT and CRTM Groups using Independent t-test (N=40, df =38)

Measure		M (SD)		Mean Diff	SE Diff	t	p	d
		CRT	CRTM					
BDI		6.8 (5.68)	5.00 (4.61)	1.8	1.64	1.10	.278	.35
MCQ	Total	43.45 (12.87)	44.8 (10.50)	1.35	3.71	.36	.718	.11
	POS	8.35 (2.16)	8.00 (2.34)	.35	.71	.50	.626	.15
	NEG	10.1 (5.01)	9.2 (1.96)	.9	1.20	.75	.459	.24
	CC	8.00 (3.46)	7.3 (2.32)	.7	.93	.75	.457	.24
	NC	8.35 (3.73)	8.85 (3.67)	.5	1.17	.43	.672	.13
	CSC	10.05 (3.82)	11.1 (4.05)	1.05	1.24	.84	.404	.27
QOL	PH	26.00 (4.04)	26.55 (4.04)	.55	1.28	.43	.669	.14
	PSY	19.9 (3.11)	21.5 (3.07)	1.6	.98	1.64	.109	.52
	SR	9.55 (1.50)	10.85 (2.43)	1.3	.64	2.03	.049	.64
	ENV	25.75 (3.77)	27.85 (6.28)	2.1	1.64	1.28	.207	.40
GAF		68.45 (9.58)	73.75 (6.19)	5.3	2.55	2.08	.044*	.66

Note. CRT = cognitive retraining therapy alone; CRTM = cognitive retraining therapy with medicine; M= mean; SD = standard deviation; Diff = difference; SE = standard error; p = level of significance; *d* = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

There was no significant difference (p>.05) observed on scores of outcome measures (BDI-II, MCQ, QOL), that is, even when covariates such as diagnosis, episodes, and duration of illness were controlled (Table 17), except for global functioning (p = .000, p < .001). This implies CRT alone is as effective as CRT combined with medicines in improving depression scores, metacognition, and quality of life. Further, the scores of participants in the CRT group were

compared with the CRTM group with its nearest match based on diagnosis, episodes, duration of illness, and pre-scores of each outcome measure on every domain and sub-domains.

Even after NNM analysis (Table 17), no significant difference was observed in the post-assessment scores of outcome measures of the two groups, except for specific domains

Table 17

Post-treatment Differences on Outcome Measures between CRT and CRTM Groups using ANCOVA

Measure		ANCOVA			PSM-NNM		
		F	R^2	p	Coef	z	p
BDI		.49	.05	.739	1.72	1.26	.208
MCQ	Total	.91	.09	.468	.69	.17	.864
	POS	.45	.05	.772	.43	.41	.683
	NEG	1.04	.11	.402	2.09	1.30	.195
	CC	.59	.06	.674	1.07	1.29	.197
	NC	.95	.10	.445	.14	.11	.914
	CSC	1.63	.16	.189	.75	.60	.551
QOL	PH	1.15	.12	.351	.1	.11	.915
	PSY	1.17	.12	.340	1.51	1.57	.117
	SR	2.14	.20	.096	1.17	2.18	.029**
	ENV	.61	.06	.659	2.64	1.90	.057
GAF		5.96	.40	.000***	2.35	1.10	.272

Note. CRT= cognitive retraining therapy alone; CRTM = cognitive retraining therapy with medicine; ANCOVA = analysis of covariance; PSM-NNM = Propensity score matching using nearest-neighbor match; p = level of significance; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

of quality of life, that is, SR (p=.029; p< .05) and ENV (p=.057; p< .05). This observation established that CRT is an effective intervention and can be used as a distinct treatment delivered independently or in combination with pharmacotherapy in depressive disorders.

Summary: It can be implied that in this study sample, both CRT and CRTM were effective in the reduction of symptoms and dysfunctional metacognitive beliefs. Also, quality of increased because of both CRT and CRTM, except that level of functioning scores were higher for the CRTM than CRT. In addition, even when controlled for covariates, findings were persistent, proving both interventions were effective.

4.3.4. Objective 4: Effectiveness of CBT in comparison to CBTM on metacognition (dysfunctional metacognitive beliefs in depressive disorders.

The participants in the CBT group were compared to those in the CBTM group (Table 18), and it was found that there was no statistical difference in age (p =.379, p >.05), sex (p =.744, p >.05), and education (p =.283, p >.05). The sample of the groups also matched on the severity of depression (p =.185, p >.05), and compliance to the therapy sessions (p =.069, p >.05). However, the participants in two groups were statistically different on diagnosis as CBT sample had larger number of participants who had MDD than RDD while in CBTM group it was vice-versa (p =.011, p <.05). In addition, there were more participants without any past episode (p =.033, p <.05) in the CBT group which is explained by the diagnosis of MDD in this group. The CBTM group had a statistically greater mean duration of illness (p =.006, p <.01) than the CBT group, the chronicity of illness itself explains the reason why they were prescribed medicines rather than letting to be on psychotherapy alone.

Table 18

Comparing Characteristics of Participants in CBT (n=20) and CBTM (n=20) Groups

Variable		M ± SD/ *f* (%)		t / χ^2	p
		CBT	CBTM		
Age		28 ± 9.26	30.6 ± 9.21	.90	.379
Education (years)		15 ± 1.52	14.45 ± 1.67	1.09	.283
Sex	Female	13 (65)	12 (60)	0.11	.744
	Male	7 (35)	8 (40)		
Diagnosis	MDD	14 (70)	6 (30)	6.40	.011*
	RDD	6 (30)	14 (70)		
Episodes	0	14 (70)	6 (30)		
	1	4 (20)	7 (35)	6.80	.033*
	2	2 (10)	7 (35)		
Severity	Mild	9 (45)	5 (25)	1.76	.185
	Mod	11 (55)	15 (75)		
DOI (Months)		26.2 ± 22.04	50.9 ± 31.79	-2.85	.006**
No. of sessions/tasks		9.8 ± .89	8.85 ± 2.08	1.87	.069

Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; p = level of significance; M = mean; SD = standard deviation; *f* = frequency; % = percentage; MDD = major depressive disorder; RDD = recurrent depressive disorder; Mod = moderate; DOI = duration of illness

*p <.05, **p <.01, ***p <.001

When participants in these two groups (CBT vs CBTM) were compared on the outcome measures (BDI-II, MCQ, QOL, GAF), it was seen that there was a meaningful difference in positive beliefs about worry (POS), that is, t=2.24 and *p*=.030* (*p* <.05); physical health (PH; t=2.35 and *p*=.024, *p* <.05); environment (ENV; t= 2.23 and *p* = .031, *p* <.05); and global functioning (ENV; t = 5.87 and *p* =.000, *p* <.001). Whilst no difference was remarkable on other measures such as depression severity, domains of metacognitive beliefs, and domains of quality of life (Table 19). Cohen's *d* determined the effect size of these changes in response to the intervention and a very large effect size was observed in the level of functioning (Sawilowsky, 2009).

Table 19

Post-treatment Differences on Outcome Measures between CBT and CBTM Groups using Independent t-test (n=40, df =38)

Measure		M (SD)		Mean Diff	SE Diff	t	p	d
		CBT	CBTM					
BDI		7.25 (5.38)	10.95 (7.27)	3.7	2.02	1.83	.075	.58
MCQ	Total	51.65 (11.26)	45.45 (12.74)	6.2	3.96	1.57	.125	.50
	POS	8.75 (2.71)	7.1 (1.86)	1.65	.73	2.24	.030*	.71
	NEG	12.25 (3.61)	12.15 (4.44)	.1	1.28	.08	.938	.02
	CC	8.6 (2.87)	8.45 (4.28)	.15	1.15	.13	.897	.04
	NC	9.1 (2.57)	7.8 (3.43)	1.3	.96	1.36	.183	.43
	CSC	12.95 (4.63)	10.45 (4.39)	2.5	1.43	1.75	.087	.55
QOL	PH	26.4 (2.83)	23.7 (4.29)	2.7	1.15	2.35	.024*	.74
	PSY	20.45 (3.19)	18.2 (4.74)	2.25	1.28	1.76	.086	.56
	SR	10.15 (1.35)	9.4 (1.58)	.75	.49	1.53	.134	.48
	ENV	30.8 (4.20)	27.5 (5.09)	3.3	1.48	2.23	.031*	.71
GAF		84.45 (6.23)	73.85 (5.13)	10.6	1.80	5.87	.000***	1.86

Note. CBT = cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; M= mean; SD = standard deviation; Diff = difference; SE = standard error; p = level of significance; *d* = Cohens d; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

The disparities in clinical variables dilute the findings so ANCOVA was computed (Table 20). The controlling of confounding variables, such as differences in diagnostic categories (MDD and RDD), number of episodes, and duration of illness; also resulted in implying that CBT and CBTM produced parallel outcomes. This was verifiable when participants in groups

were compared with their nearest match (Table 20). There were significant differences in global functioning (GAF; $p = .010$, $p < .01$) but no differences were observed in the change in depression severity (BDI-II; $p = .463$, $p > .05$), metacognitive beliefs (Total; $p = .867$, $p > .05$), positive belief about worry (POS; $p = .818$, $p > .05$), negative beliefs about uncontrollability and danger of worry (NEG; $p = .747$, $p > .05$), cognitive confidence (CC; $p = .854$, $p > .05$), need for control (NC; $p = .960$, $p > .05$), and cognitive self-consciousness (CSC; $p = .409$, $p > .05$). Similarly no difference between the groups was seen in the quality of life domains namely; physical health (PH; $p = .606$, $p > .05$), psychological (PSY; $p = .445$, $p > .05$), social relations (SR; $p = .364$, $p > .05$), and environment (ENV; $p = .315$, $p > .05$), This implied even when the clinical variables (Dx, episodes, DOI) were controlled, the two treatment groups showed no significant differences meaning that CBT alone is as effective as CBT combined with medicine.

Table 20

Post-treatment Differences on Outcome Measures between CBT and CBTM Groups using ANCOVA

Measure		ANCOVA			PSM-NNM		
		F	R^2	p	Coef	z	p
BDI		1.03	.44	.463	.37	.16	.877
MCQ	Total	.59	.31	.867	2.35	.56	.574
	POS	.65	.33	.818	.48	.59	.556
	NEG	.73	.36	.747	1.11	.85	.395
	CC	.60	.32	.854	1.13	1.41	.157
	NC	.43	.25	.960	.59	.50	.619
	CSC	1.10	.46	.409	1.02	.62	.538
QOL	PH	.87	.40	.606	3.60	2.96	.003**
	PSY	1.06	.45	.445	1.54	1.23	.220
	SR	1.16	.47	.364	.80	1.24	.215
	ENV	1.24	.49	.315	2.17	1.45	.147
GAF		2.90	.69	.010*	9.72	3.67	.000***

Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; ANCOVA = analysis of covariance; PSM-NNM = Propensity score matching using nearest-neighbor match; p = level of significance; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

However, a significant difference was seen in global functioning (GAF; $p = .000$, $p < .001$) when the scores in the two groups were compared with the nearest neighbor match. Also, the difference was significant in physical health (PH, $p = .003$, $p < .01$). But there was no difference in other outcome measures as shown in Table 20. This implied there is no significant difference in the effectiveness of CBT alone or CBT with medicines, as both treatment options lead to improvement in depressive symptoms, metacognitive beliefs, and quality of life. However, global functioning was seen to improve significantly more in the CBT group than CBTM group.

Summary: It can be determined that CBT alone and CBTM were both effective in reducing symptom severity and dysfunctional metacognitive beliefs as well as increasing the quality of life and level of functioning in the study sample. However, CBT showed greater improvement in quality of life domains and level of functioning while CBTM lead to a greater reduction in dysfunctional metacognitive beliefs but when controlled for covariates CBT was superior to CBTM in enhancing the quality of life and level of functioning.

4.4. Comparing differences in outcome measures across the groups

Between-group analyses were carried out using MANOVA to compare all four groups (CBT vs CBTM vs CRT vs CRTM). For one-way MANOVA, assumptions were tested, and no significant outliers were found, as Table 21 showed the correlations among all the dependent variables were in a moderate range implying the assumption of MANOVA is tenable.

The assumption of the homogeneity of variance-covariance is not met based on the result of Box's test M=405.90, F= (156, 8657.11) =1.80, p<.001. The result of Levene's test of equality of error provided that the assumption of homogeneity of variance across the groups is also violated for symptom severity and negative dysfunctional metacognitive beliefs due to F(3, 76) = 2.73, and F (3, 76) = 3.24 are respectively significant at p <.05 (Table 22). But MANOVA is still robust to interpret due to an adequate sample in each group (n=20).

However, this may be attributed to the differences in severity and chronicity of depression as the sample had both participants with mild to moderate severity of depression and first as well as recurrent episodes of depression. And dysfunctional metacognitive beliefs tend to be linked with both severities as well as chronicity since DOI varied among the participants.

Table 21

Pearson Correlation Analysis of the Sample (N=80) Displaying Mean and SD of Outcome Measures

Measure	1	2	3	4	5	6	7	8	9	10	11	12	M (SD)
1BDI	1	-	-	-	-	-	-	-	-	-	-	-	7.50 (6.11)
2 MCQ	.28*	1	-	-	-	-	-	-	-	-	-	-	46.34 (12.32)
3 POS	.19	.57**	1	-	-	-	-	-	-	-	-	-	8.05 (2.33)
4 NEG	.58**	.60**	.16	1	-	-	-	-	-	-	-	-	10.93 (4.07)
5 CC	.27*	.83**	.51**	.45**	1	-	-	-	-	-	-	-	8.09 (3.29)
6 NC	.24*	.85**	.57**	.42**	.67**	1	-	-	-	-	-	-	8.52 (3.36)
7 CSC	.02	.80**	.26*	.33**	.54**	.64**	1	-	-	-	-	-	11.14 (4.30)
8 PH	-.53**	-.35**	-.26*	-.43**	-.36**	-.35**	-.08	1	-	-	-	-	25.66 (3.95)
9 PSY	-.58**	-.20	-.20	-.46**	-.22*	-.18	.12	.68**	1	-	-	-	20.01 (3.73)
10 SR	-.47**	-.13	-.14	-.30**	-.15	-.16	.12	.57**	.68**	1	-	-	9.99 (1.86)
11 ENV	-.25*	.01	-.29**	.01	-.07	-.16	.18	.43**	.49**	.53**	1	-	27.98 (5.17)
12 GAF	.04	.24*	.14	.13	.15	.10	.19	.07	.10	.19	.27*	1	75.13 (9.01)

Note. M = mean; SD = standard deviation; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV = environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

Table 22

One-Way ANOVA having Outcome Measure as Dependent Variable (DV) and Treatment as Independent Variable (IV)

	Levene's		ANOVA			M (SD)			
Measure	F (3,75)	p	F	p	η^2	CBT	CBTM	CRT	CRTM
BDI	2.73	.050	3.68	.016	.127	7.25 (5.38)	10.95 (7.27)	6.80 (5.68)	5.00 (4.61)
MCQ	.23	.874	1.80	.155	.066	51.65(11.26)	45.45 (13.65)	43.45 (12.87)	44.80 (10.49)
POS	2.51	.065	1.89	.138	.069	8.75 (2.71)	7.10 (1.86)	8.35 (2.16)	8.00 (2.34)
NEG	3.24	.027	2.98	.036	.105	12.25 (3.61)	12.15 (4.44)	10.10 (5.01)	9.20 (1.96)
CC	1.27	.290	.62	.605	.024	8.60 (2.87)	8.45 (4.29)	8.00 (3.46)	7.30 (2.32)
NC	.40	.753	.58	.631	.022	9.10 (2.57)	7.80 (3.43)	8.35 (3.73)	8.85 (3.67)
CSC	.74	.531	1.84	.147	.068	12.95 (4.63)	10.45 (4.39)	10.05 (3.82)	11.10 (4.05)
PH	.96	.417	2.39	.075	.086	26.40 (2.84)	23.70 (4.29)	26.00 (4.04)	26.55 (4.04)
PSY	1.77	.161	2.94	.038	.104	20.45 (3.19)	18.20 (4.74)	19.90 (3.11)	21.50 (3.07)
SR	1.71	.171	2.68	.053	.096	10.15 (1.35)	9.40 (1.73)	9.55 (1.50)	10.85 (2.43)
ENV	2.01	.120	3.61	.017	.125	30.80 (4.20)	27.50 (5.09)	25.75 (3.77)	27.85 (6.28)
GAF	1.70	.173	18.44	.000	.421	84.45 (6.23)	73.85 (5.13)	68.45 (9.58)	73.75 (6.20)

Note. ANOVA = analysis of variance; M = mean; SD = standard deviation; CBT= cognitive behavior therapy alone; CBTM= cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine; η^2 = eta square; p = level of significance; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations; ENV =

environmental resources; GAF = global assessment of functioning

*p <.05; **p <.01; ***p <.001

The result of MANOVA yielded that there was a significant difference in all four groups; CBT, CBTM, CRT, and CRTM, on the combined dependent variables (Pillai's trace=.979, F [36, 201] =2.70, p <.001, partial η^2 .326, observed power = 1.00). This implied there was a significant difference among all four treatments and concludes that participants' scores on outcome measures significantly differed based on the type of treatment they received. The effect size was large (η^2 >0.14). The observed power of 1.00 indicates that there was a 100% chance that the results would have come out significant and 33% (η^2=.326) of this variation is attributed to the treatment option. Thereafter, ANOVA was computed (Table 22).

ANOVA was interpreted at a .05 level of significance (Table 22). The main effects were significant for symptom severity (BDI-II, F [3, 76] = 3.685, p <.05, partial η^2 =.127, observed power=.783); negative dysfunctional beliefs (NEG F [3,76] = 2.985, p <.05, partial η^2 =.105, observed power=.684); psychological (PSY F [3,76] = 2.939, p <.05, partial η^2 =.104, observed power=.676) and environment (ENV F [3,76] = 3.614, p <.05, partial η^2 =.125, observed power=.775) factors of quality of life (WHOQOLBREF); and global functioning (GAF F [3, 76] = 18.439, p <.001, partial η^2 =.421, observed power=.100).

The effect sizes for ANOVA varied (Table 22). The small effect size for symptom severity revealed that 13 % of the variance in symptom severity (η^2 =.127) was accounted for by the type of treatment and there would have been 78% chances for this variation. Similarly, small effect sizes were observed for negative dysfunctional beliefs and psychological and environmental factors of QOL with 10%, 10%, and 13% of the variance respectively that accounted for differences in treatment. The observed powers imply that 68%, 68%, and 77% chances that the result would be significantly different for all four group analyses for these

dependent variables respectively. The large effect size was seen for global functioning and 42% of the variance could be accounted for differences in treatment groups, and 100% chance that results would have differed on group analysis.

Lastly, post hoc comparisons, to evaluate the pairwise differences among group means were conducted (Table 23). Tests revealed significant pairwise differences in symptom severity ($p < .05$) and psychological QOL ($p < .05$) between CBTM and CRTM; environment ($p < .05$) factor of QOL between CBT and CR; and global functioning ($p < .001$) between

Table 23

Mean Differences in Outcome Measures across the Four Treatment Groups (CBT, CBTM, CRT, and CRTM)

Measures		CBT vs CBTM	CBT vs CRT	CBTM vs CRTM	CRT vs CRTM
BDI		-.3.70	.45	5.95*	1.80
MCQ	Total	6.20	8.20	.65	-1.35
	POS	1.65	.40	-.90	.35
	NEG	.10	2.15	2.95	.90
	CC	.15	.60	1.15	.70
	NC	1.30	.75	-1.05	-.50
	CSC	2.50	2.90	-.65	-1.05
QOL	PH	2.70	.40	-2.85	-.55
	PSY	2.25	.55	-3.30*	-1.60
	SR	.75	.60	-1.45	-1.30
	ENV	3.30	5.05*	-.35	-2.10
GAF		10.60*	16.00*	.10	-5.30

Note. CBT= cognitive behavior therapy alone; CBTM= cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine; BDI = Beck depression inventory; MCQ = the metacognition questionnaire; POS = positive beliefs about worry; NEG = negative beliefs about uncontrollability and danger of worry; CC = cognitive confidence; NC = need for control; CSC = cognitive self-consciousness; QOL = World Health Organization quality of life brief; PH = physical health; PSY = psychological health; SR = social relations;

ENV = environmental resources; GAF = global assessment of functioning

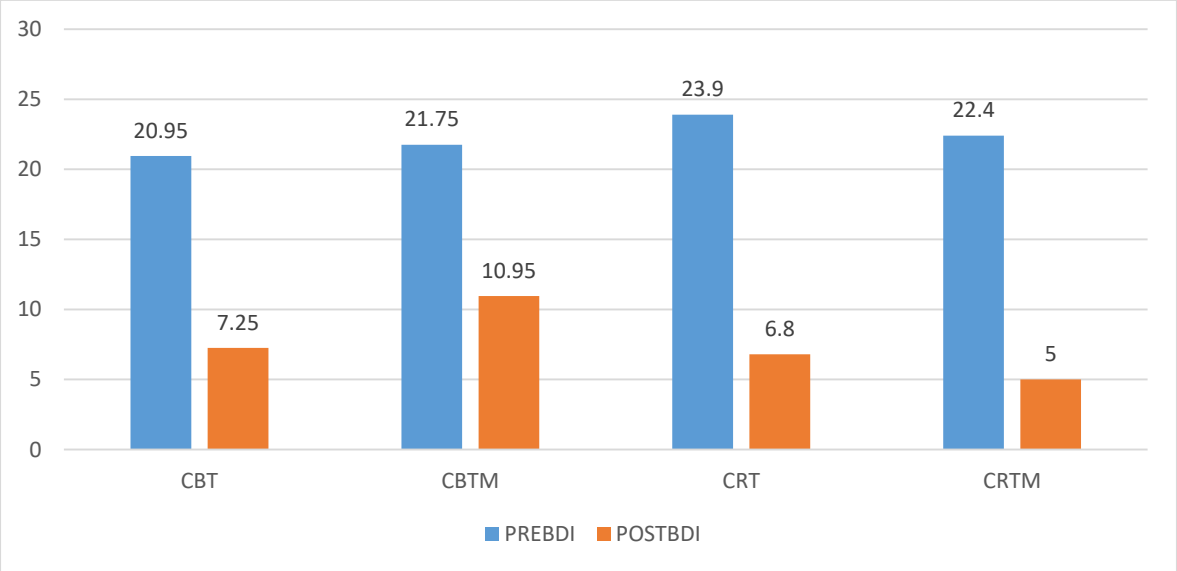
*p <.05; **p <.01; ***p <.001

CBT and CBTM as well as between CBT and CR. Upon observing the mean scores, participants in the CRTM group had the least severity of depression and the highest score on psychological QOL. While the CBT sample had the highest QOL supported by the environment factor and the highest global functioning.

The above findings are displayed in the bar graphs. The four treatment groups labeled as CBT, CBTM, CRT, and CRTM respectively. Figure 11 depict the lowest score on symptom severity (BDI-II) was observed in the CRTM sample followed by CRT, CBT, and CBTM.

Figure 11

Displaying Pre-post Scores of BDI-II of the Participants across the Groups



Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

Further, the CRT group showed the most significant decrease in overall dysfunctional metacognitive beliefs (MCQ) followed by CRTM and CBTM groups (Figure 12). The CBT group was the least effective out of the four treatment groups in the reduction of dysfunctional metacognitive beliefs.

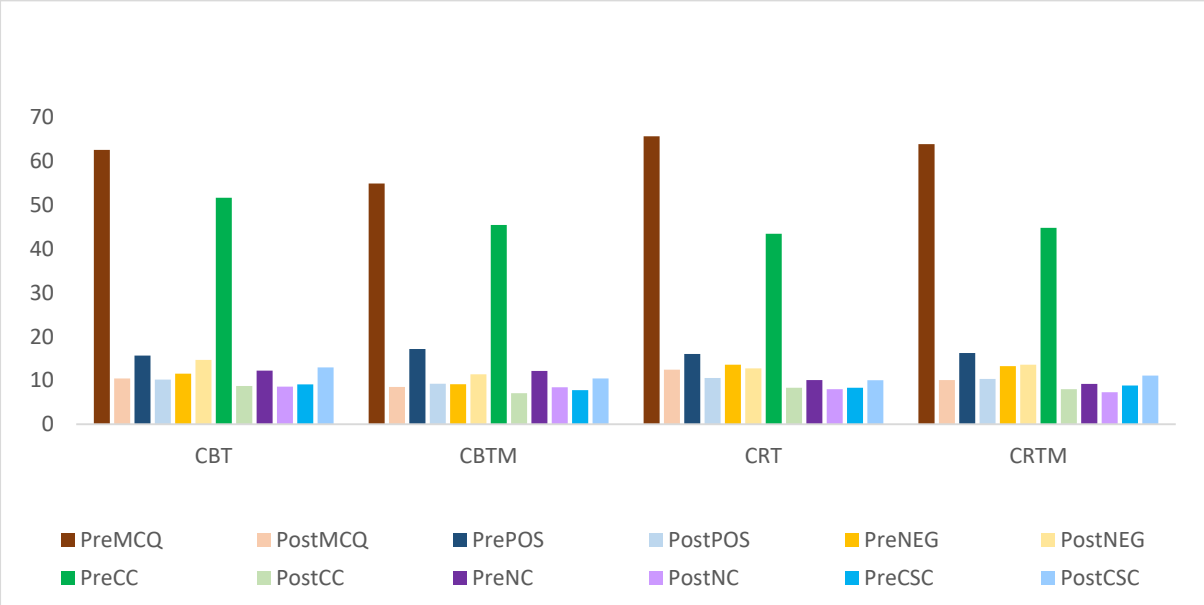
Positive metacognitive beliefs about worry were least in the CBTM group followed by the CRTM group in comparison to CBT and CRT delivered as discrete interventions. However, CRT was superior to CBT in the reduction of positive beliefs about worry.

CRT was more effective than CBT in negative beliefs about uncontrollability and the danger of worry. Both CRTM and CRT showed superior results than CBTM and CBT; with CRTM being the most effective and CBT alone being the least effective.

CRT and CRTM were also superior to CBT as well as CBTM in the reduction of dysfunctional metacognitive belief of cognitive confidence. CBTM was more effective than CBT.

Figure 12

Displaying Pre-post Scores of MCQ of the Participants across the Groups



Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with

medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

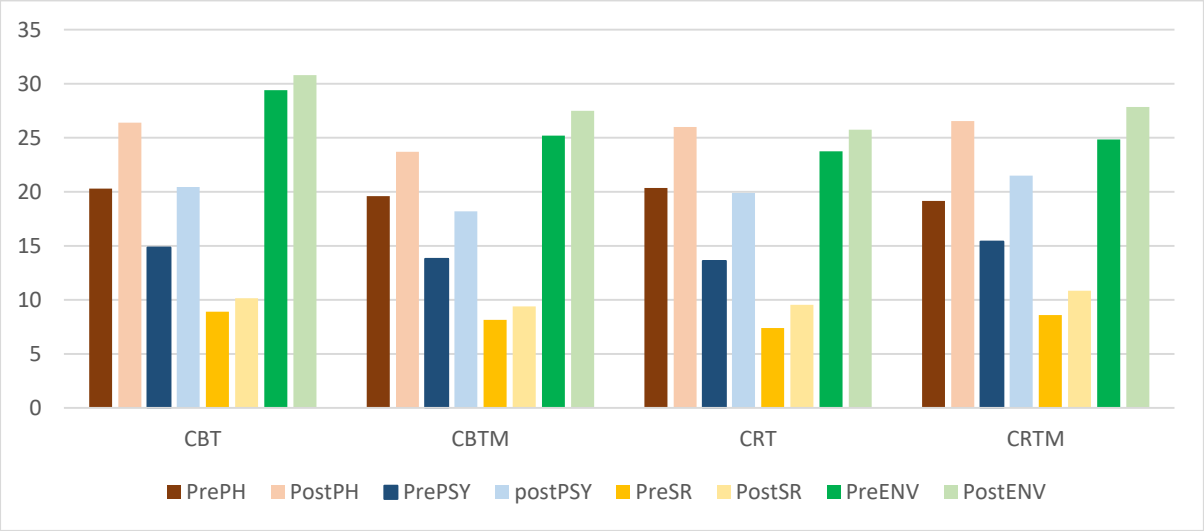
The need for control was minimum in the CBTM group followed by CRT and CRTM. The CBT group had the least change in comparison to the other three treatment groups.

Cognitive self-consciousness, a metacognitive belief linked more with personality than depressive psychopathology, decreased maximum in response to CRT followed by CBTM, CRTM, and CBT in the study sample.

The bar graphs of QOL (Figure 13) showed physical health was highest in CRTM and CBT groups respectively, and the CRT group was superior to the CBTM group. Findings were the same for psychological and social relation domains of QOL, that is, highest in CRTM group, followed by CBT, CRT, and CRTM groups respectively. However, for the environmental domain of QOL trend was different, the CBT group had the highest score followed by CRTM, CBTM, and CRT respectively.

Figure 13

Displaying Pre-post Scores of WHOQOL-Bref of the Participants across the Groups



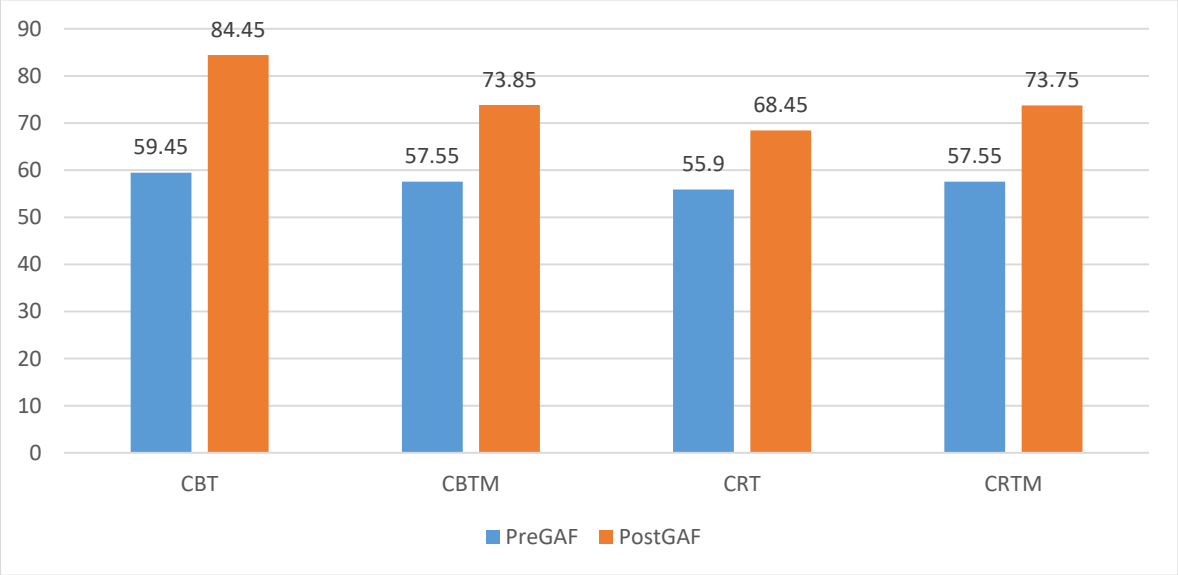
Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with

medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

The level of functioning (GAF) was highest in the CBT group (Figure 14). CBTM and CRTM groups were almost similar in their effectiveness in enhancing functioning. CRT group was the least effective among the four groups.

Figure 14

Displaying Pre-post Scores of GAF of the Participants across the Groups



Note. CBT= cognitive behavior therapy alone; CBTM = cognitive behavior therapy with medicine; CRT = cognitive retraining therapy alone; CRT = cognitive retraining therapy with medicine

Summary: On comparing the four treatment groups, there were no significant differences observed in any of the outcome measures. It can be concluded that CBT and CRT were both effective interventions for the study sample. These may be delivered discretely as well as in combination with medicines for treatment outcomes. The overall mean differences revealed CRTM sample had the greatest reduction in symptom severity; CRTM had lead to highest psychological QOL scores; the CBT sample had the highest environmental QOL scores along

with the level of functioning. No differences among the four groups were seen in the reduction of dysfunctional metacognitive beliefs.

CHAPTER 5

DISCUSSION

The present study attempted to study the effectiveness of cognitive retraining treatment (CRT) as an alternate intervention for patients having depression. Non-compliance and drop-out are prevalent in any clinical practice; although CBT is a well-established treatment for depression the drop-out rate is as high as 16-26% (Fernandez et al., 2015) attributed to patient, therapist, and/or environment variables. Under such a scenario an alternate intervention is a compelling necessity that can conquer the challenges of talk therapies and improve compliance by minimizing barriers. This necessity lead to the conceptualization of the present study which aimed to compare the effectiveness of different treatment modalities in depressive disorders (MDD or RDD). A purposive sample of eighty participants was randomly assigned to four treatment groups with 20 participants in each group. The outcome measures used were: severity of symptoms (BDI-II), metacognition (MCQ30), quality of life (WHOQOL-Bref), and level of functioning (GAF).

The previous chapter depicted within and between-group differences in the outcome measures. This chapter would preview the discussion of the findings of the present study in the light of existing literature. The findings would be discussed comprehensively as well as in correspondence to each objective and its respective hypothesis.

5.1. Effect of intervention on depressive symptoms

The findings of MANOVA revealed scores of symptoms of depression were least in the CRTM group. The ADM inhibit the reuptake of neurotransmitters and increase the concentration of specific neurotransmitter around the nerves in the brain. ADM prescribed to participants in the present was a selective serotonin reuptake inhibitor (SSRI), that tends to block the reuptake of 5-hydroxytryptamine (5-HT) and increase synaptic 5HT transmission resulting in alleviation of psychopathological conditions such as depression, anxiety,

obsession-compulsive disorder, etc. (Sharma, 2017). Though ADMs have side effects SSRIs do not display any activity at the muscarinic and histaminergic receptors which probably results in minute anti-cholinergic (ACH) and sedative effects. The anti-depressants and CR-based interventions both follow a 'bottom-up' approach stimulating the cold cognitions (attention, memory, executive functions) that result in a reduction of self-referential thinking and enhanced cognitive control leading to functional recovery (Ahern et al., 2019; Nord et al., 2020; Roiser & Sahakian, 2013). The combination of CRT with SSRI (ADM) augmented the mechanism of change (van Passel et al., 2016; Sharma, 2017) and restored the pre-morbid cognitive functions. However, pre-morbid cognitive functioning contributed by the level of intelligence (premorbid IQ) may have played a significant role as studies support that these predict the illness as well as determine the recovery (Drakopoulos et al., 2020; Smedler et al., 2023).

5.2. Effect of intervention on metacognition (dysfunctional metacognitive beliefs)

The response to intervention was maximum in the CRT group dysfunctional metacognitive beliefs. Metacognitive beliefs play a significant role in cognitive and affective regulation through frameworks of evaluation and interpretation. The dysfunctional metacognitive beliefs are positively correlated with worry and rumination and both these phenomena tend to reduce cognitive flexibility by reducing the capacity to attend to stimuli affecting input-processing-output (Aarzoo & Mahajan 2022; Lashkar et al., 2016; Matthews & Funke, 2006). Mindfulness-based and cognitive-behavioral interventions are known to enhance attention and executive functions and have proved effective in the reduction of both rumination and worry (Querstret & Cropley, 2013). Mindfulness is also recognized as a metacognitive practice viewed as the organization of multi-level processing in terms of attention, context, and interrelation of internal and external stimuli used for information processing to respond

to the situation (Kudesia, 2019). Therefore both mindfulness-based and cognitive-behavioral interventions are effective in the reduction of MCBs as seen in the present study.

5.3. Effect of intervention on quality of life

The quality of life was highest in the CRTM group for physical and psychological health as well as social relations; only alteration to the environment for QOL was highest in the CBT group. The environment domain of QOL includes factors such as financial resources, freedom, physical safety and security, physical and home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation/leisure activities, physical environment (pollution /noise /traffic/ climate), and transportation (Puciato et al., 2017). The enhanced cognitive functions lead to increased participation in daily activities resulting in improved QOL (Puciato et al., 2017; Wang et al., 2021). Somehow cognitive function tends to have a limited role in environmental factors and some of these factors may be intervened through discussion of alternative and activity scheduling in CBT. It can be understood that CRT groups showed a response to QOL mediated by increased cognitive functions which were augmented in the CRTM group (Clare et al., 2019). On the other hand, CBT sessions tend to revolve around discussing the barriers in daily routine resulting in accessibility to available sources to enhance functioning and; consequently improved QOL. The role of talking to the patient about programs and preparing the patient to participate determine the effect on mental health (Goyal et al., 2014).

5.4. Effect of intervention on the level of functioning

Global functioning was highest in the CBT group. GAF assesses psychological, social, and occupational functioning which is directly correlated with illness severity and symptoms that alleviate functioning improvement (ref). Patients with depression tend to have depressogenic cognitions (self-referential thinking) that contaminate their information processing of social and emotional cues reinforcing withdrawal and leading to poor functioning (Young et al.,

2015). CBT and CRT stimulate hot and cold cognitions respectively (Ahern et al., 2019; Nord et al., 2020; Roiser & Sahakian, 2013), both mediating depressogenic cognitions and resulting functional recovery. The superior effect of CBT in this study might be attributed to the satisfaction with CBT treatment and the techniques used to simultaneously target cognitive, affective, and conative manifestations of depression which could probably speed up the functioning. Although literature did not find such significant differences when CBT was compared to other psychological interventions (Jones et al., 2018).

5.5. Comparing the effectiveness of CRT and CBT on symptoms, metacognitive beliefs, quality of life, and functioning.

The hypothesis (H_1, H_2) was rejected as there was no significant difference (p >.05) between the two treatment groups on the scores of symptoms of depression, metacognitive beliefs, and QOL. However, CBT was more effective in enhancing global functioning therefore, hypothesis (H_4) was accepted. Although no difference was seen in the physical, psychological, and social relation domains of QOL between the two treatment groups but CBT outcome was superior to CRT in the domain of environment, therefore hypotheses (H_3) were partially accepted.

These findings can be explained by the difference in mechanisms; cognitive-behavioral approaches debate cognitive, affective, and/or conative (CAC) patterns that revamp cerebral structure and neuropsychological functioning. On the other hand, cognitive retraining concentrates on the underlying neurobiological mechanisms prompting changes in CAC patterns (Fergus & Bardeen, 2016).

The symptoms of psychiatric disorders are classified as cognitive, affective, and behavioral. CBT is a comprehensive intervention that uses a variety of techniques discretely for each category of the symptoms. In the present study, the use of activity scheduling probably resulted in greater improvement in the global level of functioning in the CBT

treatment group. Whereas CRT stimulates neuroplasticity processes in the brain (cold cognition) and practice of the tasks increases success rates (hot cognition). Therefore, CRT like CBT enhances functional outcomes and alleviates depressogenic cognitions as well as negative affect (Pan et al., 2019). CR-based interventions have been aptly used in OCD, anorexia nervosa, bipolar affective disorders, neurotic disorders, etc. and proved effective in symptom reduction (Kim et al., 2018).

CRT is effective in enhancing cognitive functions which results in functional recovery, but the use of CRT may be limited when a new pattern has to be incorporated as part of intervention such as social skills, alternate coping mechanisms, attachment style in trauma, etc. In such scenarios, CRT may be used as an adjunct with other therapies, hence limitations in enhancing global functioning in comparison to CBT. However, it may be concluded that CRT is effective in resuming pre-morbid hot and cold cognitive processes but may require to be combined with another form of therapy to instill a novel pattern. This is well supported by studies in the area of schizophrenia, and personality disorders where CRT was used as an adjunct than a discrete intervention (McGurk et al., 2007; Michalopoulou et al., 2013; van Passel et al., 2016).

5.6. Comparing the effectiveness of CRTM and CBTM on symptoms, metacognitive beliefs, quality of life, and functioning

The hypothesis (H_5, H_6, H_7, H_8) were rejected as there was no significant difference ($p < .01$) between the two treatment groups on the mean scores of the outcome measure of symptoms of depression, metacognitive beliefs or its domains, QOL, and global functioning.

Depression is identified as a psychoneurotic disorder. The antidepressant compounds namely; tricyclic antidepressants (TCAs), selective serotonin-reuptake inhibitors (SSRIs), monoamine oxidase inhibitors (MAOIs), serotonin-norepinephrine reuptake inhibitors (SNRI), and non-TCA antidepressants treat depressive symptoms, pain, anxiety, etc. based on

their mode of action (Sharma, 2017). The occurrence of depression is associated with alterations in the levels of biogenic amines; antidepressants may recover the signs of depression but also exert some side effects. Hence alternative compounds which are safe must be explored.

Luria, an eminent Russian neuropsychologist, pioneered work in cognitive remediation in patients with brain lesions, starting cognitive exercises with this population resulted in improvement. Later cognitive remediation therapy program was delivered to patients of schizophrenia by Delahunty and colleagues (Delahunty et al., 1993; 2001). Cognitive remediation is associated with significant improvements in cognitive performance, psychosocial functioning, and symptoms. Cognitive retraining programs remediate attention, the most elementary cognitive function, plus executive function, visuospatial learning, and memory (Kennedy et al., 2007) crucial to full functional recovery. The effects of cognitive remediation on psychosocial functioning were significantly stronger in studies that provided adjunctive psychiatric rehabilitation than in those that provided cognitive remediation alone (McGurk et al., 2007). Cognitive remediation therapy in combination with TAU has been useful for many mental health conditions like attention deficit hyperactivity disorder (Stevenson et al., 2002), learning disabilities, obsessive-compulsive disorders (Buhlmann et al., 2006).

CR approaches operate on mechanisms of attentional disengagement that expand cognitive capacity and increase the restoration of previous abilities. Another explanation is a capacity-efficiency framework, the effects of enhanced cognitive functions are transferred to regulations of emotional and functional processes through near-transfer effects. Thirdly, activation of the dorsolateral prefrontal cortex (DLPFC), that’s a central role in maintaining, discarding, and manipulating information in working memory thereby regulating limbic activity (Zwalmen et al., 2022). On the other hand, cognitive-behavioral approaches in

depressive disorders decrease self-referential thinking through cognitive restructuring by altering the schemas that are formed due to early childhood experiences and social interaction. Hence, it could be said both CBT as well as CRT augmented the effect of ADM leading to significant outcomes in the present study.

5.7. Comparing the effectiveness of CRT and CRTM on symptoms, metacognitive beliefs, quality of life, and functioning

The hypothesis (H_9, H_{10}, H_{11}, H_{12}) were rejected as there was no significant difference between the two groups on the mean scores of the outcome measure of symptoms of depression (BDI-II) and metacognitive beliefs and its domains. The CRTM group outperformed the CRT group on social QOL and global functioning.

CRT has proven to be an effective treatment for deficits in attention and executive function and visuospatial learning and memory (Kennedy et al., 2007) emphasizing full functional recovery. Cognitive exercises or practice when applied in educational settings increased confidence and performance in academic skills (Burden, 1987). Thus, cognitive remediation therapy aims to use practice, reflection, and guided discovery to improve thinking style. CR-based interventions and ADMS operate on a "bottom-up" mechanism implying that improved cognitive processes (attention, memory, executive functions, etc.) further lead to the alteration of metacognitive processes (beliefs, rumination, worry, self-referential thinking etc.). These cognitive and metacognitive processes further contribute to cognitive flexibility in information processing and the resultant outcome.

5.8. Comparing the effectiveness of CBT and CBTM on metacognitive beliefs

The hypothesis (H_{13}) was rejected as there was no significant difference between the two treatment groups on the mean scores of the dysfunctional metacognitive beliefs and their domains (MCQ30). This implied both CBT and CBTM were effective in decreasing dysfunctional metacognitive beliefs.

CBT is a widely accepted evidence-based therapy recognized as a standalone and first lien of treatment for various types of depression in different age groups (American Psychiatric Association [APA], 2010; American Psychological Association [APA], 2019). Although CBT in combination with pharmacological was superior to CBT (Fennell, 2012; Gautam et al., 2020). This could be explained by the previous findings highlighting the mechanisms of change applied to hot and cold cognitions that could be the reason for superior results with CBTM in the present study. Also in the present study, CBT was delivered as a comprehensive intervention, guided imagery was persistently emphasized to manage negative emotional states, and the use of mind-body therapies is comparable to mindfulness practices (John and Aarzoo). The regular practice of GI probably enhanced attention allowing greater cognitive energy for information processing that amplified metacognitive awareness, contributing to curtailing ruminative thinking and extended cognitive flexibility. Lowered metacognitive awareness validated dysfunctional metacognitive beliefs and reduced cognitive flexibility. Although CR is an effective behavioral technique that hones cognitive processing (Porter et al., 2013) and demotes cognitive rigidity, and enhances problem-solving and decision-making (DeRubies et al., 2008), in the present study's comprehensive approach integrating the three components (cognitive, affective, behavioral) techniques lead to the resultant outcome.

The functional impairment was managed through behavioral activation (simple to complex and part versus whole approach). Behavioral activation is effective in improving GAF scores in clinical studies or 2-year follow-up studies (Luoto et al., 2018). The present study used CBT employing cognitive restructuring that boosted awareness, complementing psychosocial functioning, and alleviation of symptoms.

5.9. Conclusion

To the best of our knowledge, this is the first study in the Asian region studying the effectiveness of CRT in depressive disorders in comparison to CBT; and the first to assess the outcome of CBT on metacognitive beliefs. The authors have tried to propose CRT as a potent alternative or proliferation approach to CBT. CR-based interventions are free from the use of metaphors unlike cognitive-behavioral approaches; therefore, they are more culture-free and probably convenient. CRT may be superior in rendering services to patients coming from geographically distant or remote areas requiring fewer sessions with specialists. It can be practiced purely as a behavioral technique of performing specific tasks that can be easily supervised and monitored in face-to-face settings as well as online mediums using video-conferencing, tele, virtual set-ups, etc. CRT has been effective in treating mood disorders, neurotic disorders, and trauma. The use of CR as an adjunct to dealing with non-compliance in cognitive-behavioral or talk therapies has been promising (Kashyap & Gupta, 2022). CR in depressive disorders has recently grown after acknowledging the deficits present even in the euthymic state, and the growing prevalence of depression, the associated disability may be prevented using CR-based interventions by increasing cognitive functioning.

CBT with or without medicine is an effective treatment for depressive disorders, altering the cognitive content and meta-level cognitive beliefs resulting in symptom reduction and enhanced quality of life. The use of techniques targeting three components namely, cognition, affect, and behaviour, results in a more promising outcome. The use of guided imagery (GI) might have played a role similar to mindfulness, as GI is a form of mind-body therapy (MBT). It might be possible that CBT, where GI or/and mindfulness-based technique is incorporated in CBT, has a superior effect than CBT using only cognitive and/or behavioural techniques. The practiced model of CBT was similar to Moritz's approach to metacognitive training as it targeted the content of cognition thereby altering metacognitive

beliefs whereas Well's approach is similar to metacognitive training emphasizing the meta-level cognition and not the content of cognition (Wells & Carter, 2001). Therefore, it is reasoned that CBT not only addresses the content of cognitions but also is an effective intervention for meta-level beliefs.

It can be concluded CRT might be an effective alternative and CBT significantly alters the meta-level process of dysfunctional metacognitive.

5.9.1. Implications of the study

The research was significant to conclude CBT tends to be a gold-standard treatment and emerging trends in CR-based interventions have enormous potential to reinforce treatment outcomes. In my observation, CR might be chosen when patients are having cognitive symptoms, not responding to talk-therapies, barriers such as communication, frequency of sessions, duration of the session, residual patterns interfering in generalization of new skills, non-compliance to homework either maintaining record or behavioural activation (MBT practice, or other tasks), personality or cognitive factors of patient interfering in challenging or disputation of thoughts, significant dysfunction stimulation or restoration of pre-morbid cognitive functions requires intervention. CBT on the other hand, is an unsurpassed choice with well-reported requisites and pre-requisites. However, the process, observation, and informal feedback from the patients visiting OPD after the termination of the study period and most importantly the findings of its effectiveness from the present study; compassed that a clinician could explore CR-based intervention to address barriers as a discrete as well as an adjunct to ongoing medicine or psychotherapy.

5.9.2. Limitations

The eloquent limitation of the present study was the absence of longitudinal follow-up for analysis and interpretation of the findings. However, a few study participants, who continued seeking clinical services in the OPD after the termination of the study, reported that CRT

tasks helped them evolve persistence, optimism, and confidence. They further told that CRT tasks were like fun games that they enjoyed performing. The research did not study effect of anti-depressant medicine, although uniformity in type and dose of drug was maintained throughout the study, still this limitation require to be controlled in future studies.

It would have been beneficial to use standardized measures of rumination, attention, or higher cognitive function as outcome measures. We did not include as the length of the assessment (outcome measures) often results in drop-out, therefore, the focus was symptom severity and treatment outcome (QOL and functioning). Also, we chose a higher cognitive process of metacognition instead of tests of executive functioning. Although participants were not matched on the demographic and clinical variables there was no statistically significant difference among the groups on these variables except duration of illness. Additionally, using power calculation for sample size, having wait-list control group, and analyzing role of medication would have made methodology more robust. Further, statistical analysis was used to minimize the impact of confounding variables. Similarly, the nonprobability sampling was also settled statistically using propensity score matching analysis.

5.9.3. Future directions

CRT-based interventions may be essential mental health services owing to growing research in psychotherapy via virtual modes such as tele- and video-conferencing. Globally, there has been an advancement in mobile applications for allocating services to patients having obsessive-compulsive disorders, substance use disorders, autism spectrum disorders, and dementia. The meta-analysis determined the virtual mode of therapy to be as adept as a face-to-face setting for specific psychological interventions or psychotherapies. However, such inferences about CRT-based interventions are emerging. This perception may endorse the vision of the World Health Organization (WHO) on mental health policy and service provision (WHO, 2001) to train and involve non-specialists in augmenting the mental health

service delivery system (Mendenhall et al., 2014). In conclusion, CRT-based interventions can substantiate prevention as well as remedy.

Cognitive retraining is an effective treatment and is a feasible option to enhance service delivery whenever there are environmental or cultural barriers to the delivery of CBT (Bouman et al., 2022). Future studies can explore the effectiveness of CR thru randomized control trials and comparative studies. Trials of CRT in combination with CBT as well as third-wave therapies might be useful in segregating the impact of CRT. Also, structural equation models assessing the effect of CR interventions can contribute to understanding the benefitting areas.

REFERENCES

Aarzoo, & Mahajan, A. (2022). Cognitive fusion and dysfunctional metacognitive beliefs in depression. *Delhi Psychiatry Journal, 25*(2),182-189.

Afsar, M., Shukla, D., Bhaskarapillai, B., & Rajeswaran, J. (2021). Cognitive retraining in traumatic brain injury: Experience from tertiary care center in southern India. Journal of Neurosciences in Rural Practice, 12(2), 295-301. https://dx.doi.org/10.1055/s-0041-1722817

Ahern, E., Bockting, C. L. H., & Semkovska, M. (2019). A hot-cold cognitive model of depression: Integrating the neuropsychological approach into the cognitive theory framework. *Clinical Psychology in Europe, 1*(3), 1-35. https://doi.org/10.32872/cpe.v1i3.34396

American Psychiatric Association. (2010). *Treatment of patients with major depressive disorder. American psychiatric association practice guidelines*.

American Psychological Association. (2019). *Clinical practice guideline for the treatment of depression across three age cohorts*.

Amofa Sr, P. A., DeFeis, B., De Wit, L., O'Shea, D., Mejia, A., Chandler, M., Locke, D. E. C., Fields, J., Phatak, V., Dean, P. M., Crook, J., & Smith, G. (2020). Functional ability is associated with higher adherence to behavioral interventions in mild cognitive impairment. *The Clinical Neuropsychologist, 3*(5), 937-955. https://doi.org/10.1080/13854046.2019.1672792

Ashwini, D., Rejani, T., & Chauhan, A. (2016). Effectiveness of cognitive retraining in chronic mental illness. *International Journal of Indian Psychology, 3*(3), 42-53. https://doi.org/10.25215/0303.043

Atre-Vaidya, N., Taylor, M. A., Seidenberg, M., Reed, R., Perrine, A., & Glick-Oberwise, F. (1998). Cognitive deficits, psychopathology, and psychosocial functioning in bipolar

mood disorder. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology, 11*(3), 120-126. PMID: 9742510

Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research, 46*(3), 399-424. https://doi.org/10.1080/00273171.2011.568786

Baser, O. (2006). Too much ado about propensity score models? Comparing methods of propensity score matching. *Value in Health, 9*(6), 377-385. https://doi.org/10.1111/j.1524-4733.2006.00130.x.

Batmaz, S., Altinoz, A. E., & Sonkurt, H. O. (2021). Cognitive attentional syndrome and metacognitive beliefs as potential treatment targets for metacognitive therapy in bipolar disorder. *World Journal of Psychiatry*, *11*(9), 589–604. https://doi.org/10.5498/wjp.v11.i9.589

Beck. A., Steer, R., & Brown. G. (1996). *Manual for the Beck depression inventory II*. Psychological Corporation.

Blackburn, I. M., James, I. A., & Flitcroft, A. (2006). Case Formulation in depression. In N. Tarrier (Ed.), *Case formulation in cognitive behaviuor therapy: The treatment of challenging and complex cases* (pp. 115, 121-125, 113 to 141). Taylor & Francis Group.

Bouman, T. K., Lommen, M. J. J., & Setiyawati, D. (2022). The acceptability of cognitive behaviour therapy in Indonesian community health care. *The Cognitive Behavior Therapist, 15*, e26, 1-12. https://doi.org/10.1017/S1754470X22000228

Bora, E., Harrison, B. J., Yücel, M., & Pantelis, C. (2012). Cognitive impairment in euthymic major depressive disorder: A meta-analysis. *Psychological Medicine, 43*(10), 2017-2026. https://doi.org/10.1017/S0033291712002085

Bora, E., & Murray, R. M. (2013). Meta-analysis of cognitive deficits in ultra-high risk to

psychosis and first-episode psychosis: Do the cognitive deficits progress over, or after, the onset of psychosis? *Schizophrenia Bulletin*, *40*(4), 744-755. https;//doi.org/10.1093/schbul/sbt085

Bortolato, B., Miskowiak, K. W., Köhler, C. A., Vieta, E., & Carvalho, A. F. (2015). Cognitive dysfunction in bipolar disorder and schizophrenia: A systematic review of meta-analyses. *Neuropsychiatric Disease and Treatment, 11*, 3111-3125. https://doi.org/10.2147/NDT.S76700

Breedvelt, J. J. F., Warren, F. C., Segal, Z., Kuyken, W., & Bockting, C. L. (2021). Continuation of antidepressants vs sequential psychological interventions to prevent relapse in depression: An individual participant data meta-analysis. *JAMA Psychiatry, 78*(8), 868-875. https;//doi.org/10.1001/jamapsychiatry.2021.0823

Bright, M., Parker, S., French, P., Fowler, D., Gumley, A., Morrison, A. P., Birchwood, M., Jones, P. B., Stewart, S. L. K., & Wells, A. (2018). Metacognitive beliefs as psychological predictors of social functioning: An investigation with young people at risk of psychosis. *Psychiatry Research, 262*, 520 – 526. https://dx.doi.org/10.1016/j.psychres.2017.09.037

Buhlmann, U., Deckersbach, T., Engelhard, I., Cook, L. M., Rauch, S. L., Kathmann, N., Wilhelm, S., & Savage, C. R. (2006). Cognitive retraining for organizational impairment in obsessive-compulsive disorder. *Psychiatry Research, 144*(2–3), 109–116. https://doi.org/10.1016/j.psychres.2005.10.012

Burden, R. (1987). Feuerstein's instrumental enrichment programme: Important issues in research and evaluation. *European Journal of Psychology of Education, 2*(1), 3-16. https://www.jstor.org/stable/23422032

Christ, C., Schouten, M. J., Blankers, M., van Schaik, D. J., Beekman, A. T., Wisman, M. A., Stikkelbroek, Y. A., & Dekker, J. J. (2020). Internet and computer-based

cognitive behavioral therapy for anxiety and depression in adolescents and young adults: Systematic review and meta-analysis. *Journal of Medical Internet Research, 22*(9), e17831. https://dx.doi.org/10.219617831

Clare, L., Kudlicka, A., Oyebode, J. R., Jones, R. W., Bayer, A., Leroi, I., Kopelman, M., James, I. A., Culverwell, A., Pool, J., Brand, A., Henderson, C., Hoare, Z., Knapp, M., & Woods, B. (2019). Individual goal-oriented cognitive rehabilitation to improve everyday functioning for people with early-stage dementia: A multicentre randomised controlled trial (the GREAT trial). *International Journal of Geriatric Psychiatry, 34*(5), 709-721. https://doi.org/10.1002/gps.5076

Cotter, J., Yung, A. R., Carney, R., & Drake, R. J. (2017). Metacognitive beliefs in the at-risk mental state: A systematic review and meta-analysis. *Behaviour Research and Therapy*, *90*, 25-31. https://doi.org/10.1016/j.brat.2016.12.004

Cuijpers, P., Sijbrandij, M., Koole, S. L., Andersson, G., Beekman, A. T., & Reynolds 3rd, C.F. (2013). The efficacy of psychotherapy and pharmacotherapy in treating depressive and anxiety disorders: A meta-analysis of direct comparisons. *World Psychiatry*, *12*(2), 137-148. https://doi.org/10.1002/wps.20038

David, A. S., Bedford, N., Wiffen, B., & Gilleen, J. (2012). Failures of metacognition and lack of insight in neuropsychiatric disorders. *Philosophical Transactions of The Royal Society B: Biological Sciences*, *367*(1594), 1379-1390. https://doi.org/10.1098/rstb.2012.0002

de Maat, S., de Jonghe, F., Schoevers, R., & Dekker, J. (2009). The effectiveness of long-term psychoanalytic therapy: A systematic review of empirical studies. *Harvard Review of Psychiatry*, *17*(1), 1-23. https://doi.org/10.1080/10673220902742476

DeRubeis, R. J., Siegle, G. J., & Hollon, S. D. (2008). Cognitive therapy versus medications for depression: Treatment outcomes and neural mechanisms. *Nature Reviews*

Nueroscience, 9(10), 788-796. https://doi.org/10.1038/nrn2345

Delahunty, A., Morice, R., & Frost, B. (1993). Specific cognitive flexibility rehabilitation in schizophrenia. *Psychological Medicine, 23*(1), 221-227. https://doi.org/10.1017/S0033291700039015

Delahunty, J., Ram, R., Postrado, L., Balis, T., Green-Paden, L., & Dixon, L. (2001). Differences in rates of depression in schizophrenia by race. *Schizophrenia Bulletin, 27*(1), 29-37. https://doi.org/10.1093/oxfordjournals.schbul.a006857

Diamant, J. J., & Hakkaart, P. J. W. (1986). Cognitive rehabilitation in an information-processing perspective. *Cognitive Rehabilitation*, 22-29.

Drakopoulos, J., Sparding, T., Clements, C., Palsson, E., & Landen, M. (2020). Executive functioning but not IQ or illness severity predicts occupational status in bipolar disorder. *International Journal of Bipolar Disorders, 8*(1) 7. https://doi.org/10.1186/s40345-019-0168-6

Dunlosky, J. & Metcalfe, J. (2009). *Metacognition*. SAGE.

Evans-Lacko, S., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Benjet, C., Bruffaerts, R., Chiu, W. T., Florescu, S., de Girolamo, G., Gureje, O., Haro, J. M., He, Y., Hu, C., Karam, E. G., Kawakami, N., Lee, S., Lund, C., Kovess-Masfety, V., Levinson, D., … Thornicroft, G. (2017). Socio-economic variations in the mental health treatment gap for people with anxiety, mood, and substance use disorders: Results from the WHO World Mental Health (WMH) surveys. *Psychological Medicine, 48*(9), 1560-1571. https://doi.org/10.1017/S0033291717003336

Farinde, A. (2013). The Beck depression inventory. *The Pharma Innovation Journal, 2*(1), 56-62. http://www.hpceduc.org/Files/Danz/BDII.pdf

Fennell, M. (2012). Cognitive behaviour therapy for depressive disorders. In: M. Gelder, N.

Andreasen, J. Lopez-Ibor & J. Geddes (Eds.), *New oxford textbook of psychiatry* (pp.1304-1312). Oxford University Press.

Fergus, T. A., & Bardeen, J. R. (2016). The attention training technique: A review of a neurobehavioral therapy for emotional disorders. *Cognitive and Behavioral Practice, 23*, 502-516. https://doi.org/10.1016/j.cbpra.2015.11.001

Fernandez, E., Salem, D., Swift, J. K., & Ramtahal, N. (2015). Meta-analysis of dropout from cognitive behavioral therapy: Magnitude, timing, and moderators. *Journal of Consulting and Clinical Psychology, 83*(6), 1108-1122. https://doi.org/10.1037/ccp0000044

Fett, A. J., Viechtbauer, W., Dominguez, M., Penn, D. L., van Os, J., & Krabbendam, L. (2011). The relationship between neurocognition and social cognition with functional outcomes in schizophrenia: A meta-analysis. *Neuroscience & Biobehavioral Reviews, 35*(3), 573-588. https://doi.org/10.1016/j.neubiorev.2010.07.001

Fioravanti, M., Carlone, O., Vitale, B., Cinti, M. E., & Clare, L. (2005). A meta-analysis of cognitive deficits in adults with a diagnosis of schizophrenia. *Neuropsychology Review, 15*(2), 73-95. https://doi.org/10.1007/s11065-005-6254-9

Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist, 34*(10), 906-911. https://doi.org/10.1037/0003-066X.34.10.906

Fossati, P., Ergis, A. M., & Allilaire, J. F. (2002). Executive functions in unipolar depression: A review. L'*Encéphale, 28*(2), 97-107. PMID: 11972136

Freeman, A., Pretzer, J., Fleming, B., & Simon, K. M. (1990). *Clinical applications of cognitive therapy*. Plenum Press.

Gaebel, W., Stricker, J., & Kerst, A. (2020). Changes from ICD-10 to ICD-11 and future

directions in psychiatric classification. *Dialogues in Clinical Neuroscience, 22*(1), 7-15. https://doi.org/10.31887/DCNS.2020.22.1/wgaebel

Gaudiano, B. A. (2008). Cognitive-behavioral therapies: Achievements and challenges. *Evidence Based Mental Health, 11*(1), 5–7. https://doi.org/10.1136/ebmh.11.1.5

Gautam, M., Tripathi, A., Deshmukh, D., & Gaur, M. (2020). Cognitive behavioral therapy for depression. *Indian Journal of Psychiatry, 62*(S2), S223-S229. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_772_19

Glahn, D. C., Bearden, C. E., Barguil, M., Barrett, J., Reichenberg, A., Bowden, C. L., Soares, J. C., & Velligan, D. I. (2007). The neurocognitive signature of psychotic bipolar disorder. *Biological Psychiatry, 62*(8), 910-916. https://doi.org/10.1016/j.biopsych.2007.02.001

Goodwin, G. M., Martinez-Aran, A., Glahn, D. C., & Vieta, E. (2008) Cognitive impairment in bipolar disorder: Neurodevelopment or neurodegeneration? An ECNP expert meeting report. *European Neuropsychopharmacology*, *18*(11), 787-793. https://doi.org/10.1016/j.euroneuro.2008.07.005

Goyal, M., Singh, S., Sibinga, E. M. S., Gould, N. F., Rowland-Seymour, A., Sharma, R., Berger, Z., Sleicher, D., Maron, D. D., Shihab, H. M., Ranasinghe, P. D., Linn, S., Saha, S., Bass, E. B., & Haythornthwaite, J. A. (2014). Meditation programs for psychological stress and well-being: A systematic review and meta-analysis. *Journal of the American Medical Association Internal Medicine. 174*(3), 357–368. https://doi.org/10.1001/jamainternmed.2013.13018

Greer, J. A., Traeger, L., Bemis, H., Solis, J., Hendriksen, E. S., Park, E. R., Pirl, W. F., Temel, J. S., Prigerson, H. G., & Safren, S. A. (2012). A pilot randomized controlled trial of brief cognitive-behavioral therapy for anxiety in patients with terminal cancer. Oncologist, 17(10), 1337-1345.

https://dx.doi.org/10.1634/theoncologist.2012-0041

Halvorsen, M., Hagen, R., Hjemdal, O., Eriksen, M. S., Sørli, Å. J., Waterloo, K., Eisemann, M., & Wang, C. E. A. (2014). Metacognition and thought control strategies in unipolar major depression: A comparison of currently depressed, previously depressed, and never-depressed individuals. *Cognitive Therapy and Research, 39*, 31-40. https://doi.org/10.1007/s10608-014-9638-4

Hammar, Å., & Årdal, G. (2009). Cognitive functioning in major depression-A summary. *Frontiers in Human Neuroscience, 3*, Article 26. https://doi.org/10.3389/neuro.09.026.2009

Hammar, Å., Ronold, E. H., & Rekkedal, G. Å. (2022). Cognitive impairment and neurocognitive profiles in major depression - A clinical perspective. *Frontiers in Psychiatry 13*, Article 764374. https://doi.org/10.3389/fpsyt.2022.764374

Hasselbalch, B. J., Knorr, U., & Kessing, L. V. (2011).Cognitive impairment in the remitted state of unipolar depressive disorder: A systematic review. *Journal of Affective Disorder 134*(1-3): 20-31. https://doi.org/10.1016/j.jad.2010.11.011

Hegde, S., Rao, S. L., Raguram, A., & Gangadhar, B. N. (2012). Addition of home-based cognitive retraining to treatment as usual in first episode schizophrenia patients: A randomized controlled study. *Indian Journal of Psychiatry, 54*(1), 15-22. https://doi.org/10.4103/0019-5545.94640

Hetrick, S. E., Cox, G. R., Witt, K. G., Bir, J. J., & Merry, S. N. (2016). Cognitive behavioural therapy (CBT), third-wave CBT and interpersonal therapy (IPT) based interventions for preventing depression in children and adolescents. *Cochrane Database of Systematic Reviews, 2016*(8), CD003380. https://doi.org/10.1002/14651858.CD003380.pub4

Hofmann, S. G., Asnaani, A., Vonk, I. J. J., Sawyer, A. T., & Fang, A. (2012). The efficacy

of cognitive behaviour therapy: A review of meta-analyses. *Cognitive Therapy and Research, 36*(5) 427-440. https://doi.org/10.1007/s10608-012-9476-1

Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, *78*(2), 169–183. https://doi.org/10.1037/a0018555

Høifødt, R. S., Strøm, C., Kolstrup, N., Eisemann, M., & Waterloo, K. (2011). Effectiveness of cognitive behavioural therapy in primary health care: A review. *Family Practice, 28* (5), 489–504. https://doi.org/10.1093/fampra/cmr017

Hoppen, T. H., & Chalder, T. (2018). Childhood adversity as a transdiagnostic risk factor for affective disorders in adulthood: A systematic review focusing on biopsychosocial moderating and mediating variables. *Clinical Psychology Review, 65,* 81-151. https://doi.org/10.1016/j.cpr.2018.08.002.

Hunot, V., Moore, T. H., Caldwell, D., Davies, P., Jones, H., Lewis, G., & Churchill, R. (2010). Mindfulness-based 'third wave' cognitive and behavioural therapies versus other psychological therapies for depression. *The Cochrane Database of Systematic Reviews, 9,* CD008704. https://doi.org/10.1002/14651858.CD008704

Institute of Health Metrics and Evaluation. (2019). *Global health data exchange* (GHDx).

Jelinek, L., Quaquebeke, N. V., & Moritz, S. (2017). Cognitive and metacognitive mechanisms of change in metacognitive training for depression. *Scientific Reports, 7,* Article 3449. https://doi.org/10.1038/s41598-017-03626-8

Jones, C., Hacker, D., Meaden, A., Cormac, I., Irving, C. B., Xia, J., Zhao, S., Shi, C., & Chen, J. (2018). Cognitive behavioural therapy plus standard care versus standard care plus other psychosocial treatments for people with schizophrenia. *Cochrane Database of Systematic Reviews, 11*(11), CD008712.

https://doi.org/10.1002/14651858.CD008712.pub3

Joseph, L., Nalini, S., & Santhi, V. (2020). Prevalence of loneliness and depression among elderly in south India. *Indian Journal of Public Health Research & Development, 11*(11), 361-366.

Kaliyadan, F., & Kulkarni, V. (2019). Types of variables, descriptive statistics, and sample size. *Indian Dermatology Online Journal, 10*(1), 82-86. https://doi.org/10.4103/idoj.IDOJ_468_18

Kashyap, A., & Gupta, A. (2022). Cognitive retraining to manage non-adherence in delivery of dialectical behaviour therapy (DBT) – Case series. *Delhi Psychiatry Journal, 25*(2), 294-299.

Kennedy, N., Foy, K., Sherazi, R., McDonough, M., & McKeon, P. (2007). Long-term social functioning after depression treated by psychiatrists: A review. *Bipolar Disorders, 9*(1-2), 25-37. https://doi.org/10.1111/j.1399-5618.2007.00326.x

Kerr, N., Dunbar, R. I. M., & Bentall, R. P. (2003). Theory of mind deficits in bipolar affective disorder. *Journal of Affective Disorders, 73*(3), 253-259. https://doi.org/10.1016/s0165-0327(02)00008-3

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry, 62*(6), 593-602. https://doi.org/10.1001/archpsyc.62.6.593

Khammar, A., Yarahmadi, M., & Madadizadeh, F. (2020). What is analysis of covariance (ANCOVA) and how to correctly report its results in medical research? *Iranian Journal of Public Health, 49*(5), 1016-1017. PMID: 32953697

Kharade, S. M., Gumate, D. S., & Naikwade, N. S. (2010). A review hypothesis of depression and role of antidepressant drugs. *International Journal of Pharmacy and Pharmaceutical Sciences, 2*(S4), S3-S6.

Kim, E. J., Bahk, Y-C., Oh, H., Lee, W-H., Lee, J-S., & Choi, K-H. (2018). Current status of cognitive remediation for psychiatric disorders: A review. *Frontiers in Psychiatry, 9*, 461. https://doi.org/10.3389/fpsyt.2018.00461

Klein, D. N., Kotov, R., & Bufferd, S. J. (2011). Personality and depression: Explanatory models and review of the evidence. *Annual Review of Clinical Psychology, 7*, 269–295. https://doi.org/10.1146/annurev-clinpsy-032210-104540

Koster, E. H. W., Hoorelbeke, K., Onraedt, T., Owens, M., & Derakshan, N. (2017). Cognitive control interventions for depression: A systematic review of findings from training studies. *Clinical Psychology Review, 53*, 79-92. https://doi.org/10.1016/j.cpr.2017.02.002

Kraft, B., Jonassen, R., Stiles, T. C., & Landrø, N. I. (2017). Dysfunctional metacognitive beliefs are associated with decreased executive control. *Frontiers in Psychology, 8,* Article 593. https://doi.org/10.3389/fpsyg.2017.00593

Kube, T., Schwarting, R., Rozenkrantz, L., Glombiewski, J. A., & Rief, W. (2020). Distorted cognitive processes in major depression: A predictive processing perspective. *Biological Psychiatry, 87*(5), 388-398. https://doi.org/10.1016/j.biopsych.2019.07.017

Kudesia, R. S. (2019). Mindfulness as metacognitive practice. *Academy of Management Reviews, 44* (2), 405-423. https://doi.org/10.5465/amr.2015.0333

Lam, R. W., Kennedy, S. H., McIntyre, R. S., & Khullar, A. (2014). Cognitive dysfunction in major depressive disorder: Effects on psychosocial functioning and implications for treatment. *The Canadian Journal of Psychiatry, 59* (12), 649-654.

https://doi.org/10.1177/070674371405901206

Lashkar, A., Karimi-Shahabi, R., & Hashemi, T. (2016). The role of metacognitive beliefs in depression: Mediating role of rumination, *International Journal of Behavioural Sciences, 9*(4), 227-232.

Lecrubier, Y., Sheehan, D. V., Weiller, E., Amorim, P., Bonora, I., Sheehan, K. H., Janavs, J., & Dunbar, G. C. (1997). The mini international neuropsychiatric interview (MINI). A short diagnostic structured interview: Reliability and validity according to the CIDI. *European Psychiatry, 12*(5), 224-31. https://doi.org/10.1016/S0924-9338(97)83296-8

Lee, R. S. C., Redoblado-Hodge, M. A., Naismith, S. L., Hermens, D. F., Porter, M. A., & Hickie, I. B. (2013). Cognitive remediation improves memory and psychosocial functioning in first-episode psychiatric patients. *Psychological Medicine*, *43*(6) 1161-1173. https://doi.org/10.1017/S0033291712002127

Li, Y-N., Buys, N., Ferguson, S., Li, Z-J., & Sun, J. (2021). Effectiveness of cognitive behavioral therapy-based interventions on health outcomes in patients with coronary heart disease: A meta-analysis. *World Journal of Psychiatry, 11*(11), 1147-1166. https://doi.org/10.5498/wjp.v11.i11.1147

Liang, G., Fu, W. & Wang, K. (2019). Analysis of t-test misuses and SPSS operations in medical research papers. *Burns & Trauma*, 7(1), 31. https://doi.org/10.1186/s41038-019-0170-3

Lim, G.Y., Tam, W.W., Lu, Y., Ho, C. S., Zhang, M. W., & Ho, R. C. (2018). Prevalence of depression in the community from 30 countries between 1994 and 2014. *Scientific Reports,* **8**, 2861. https://doi.org/10.1038/s41598-018-21243-x

Luoto, K. E., Lindholm, L. H., Paavonen, V., Koivukangas, A., Lassila, A., Leinonen, E., &

Kampman, O. (2018). Behavioral activation versus treatment as usual in naturalistic sample of psychiatric patients with depressive symptoms: A benchmark controlled trial. *BioMed Central Psychiatry, 18*(1), 238. https://doi.org/10.1186/s12888-018-1820-x

Lysaker, P. H., Dimaggio, G., Wickett-Curtis, A., Kukla, M., Luedtke, B., Vohs, J., Leonhardt, B. L., James, A. V., Buck, K. D., & Davis, L. W. (2015). Deficits in metacognitive capacity are related to subjective distress and heightened levels of hyperarousal symptoms in adults with posttraumatic stress disorder. *Journal of Trauma & Dissociation, 16*(4), 384-398. https://doi.org/10.1080/15299732.2015.1005331

MacPhillamy, D. J., & Lewinsohn, P. M. (1974). Depression as a function of levels of desired and obtained pleasure. *Journal of Abnormal Psychology, 83*(6), 651–657. https://doi.org/10.1037/h0037467

Markowitz, J. C., & Weissman, M. M. (2012). Interpersonal psychotherapy: Past, present and future. *Clinical Psychology and Psychotherapy, 19*(2), 99-105. https://doi.org/10.1002/cpp.1774

Martínez-Arán, A., Vieta, E., Reinares, M., Colom, F., Torrent, C., Sánchez-Moreno, J., Benabarre, A., Goikolea, J. M., Comes, M., & Salamero, M. (2004). Cognitive function across manic or hypomanic, depressed, and euthymic states in bipolar disorder. *American Journal of Psychiatry*, *161*(2), 262-270. https://doi.org/10.1176/appi.ajp.161.2.262

Matthews, G., & Funke, G. J. (2006). Worry and information-processing. In G. C. L. Davey & A. Wells (Eds.), *Worry and its psychological disorders: Theory, assessment and treatment* (pp. 51-68). Wiley.

Mayberg, H. S., Liotti, M., Brannan, S. K., McGinnis, S., Mahurin, R. K., Jerabek, P. A.,

Silva, J. A., Tekell, J. L., Martin, C. C., Lancaster, J. L., & Fox, P. T. (1999). Reciprocal limbic-cortical function and negative mood: Converging PET findings in depression and normal sadness. *The American Journal of Psychiatry, 156*(5), 675–682. https://doi.org/10.1176/ajp.156.5.675

McDermott, L. M., & Ebmeier, K. P. (2009). A meta-analysis of depression severity and cognitive function. *Journal of Affective Disorders, 119*(1-3), 1-8. https://doi.org/10.1016/j.jad.2009.04.022

McGurk, S. R., Twamley, E. W., Sitzer, D. I., McHugo, G. J., & Mueser, K. T. (2007). A meta-analysis of cognitive remediation in schizophrenia. *American Journal of Psychiatry, 164*(12), 1791-1802. https://doi.org/10.1176/appi.aip.2007.07060906

McHugh, M. L. (2013). The chi-square test of independence. *Biochemia Medica, 23*(2), 143-149.https://doi.org/10.11613/bm.2013.018

Mehta, S., Orenczuk, S., Hansen, K. T., Aubut, J. A., Hitzig, S. L., Legassic, M., & Teasell, R. W. (2011). An evidence-based review of the effectiveness of cognitive behavioral therapy for psychosocial issues post-spinal cord injury. *Rehabilitation Psychology, 56*(1), 15-25. https://doi.org/10.1037/a0022743

Mendenhall, E., De Silva, M. J., Hanlon, C., Peterson, I., Shidhaye, R., Jordans, M., Luitel, N., Sebunnya, J., Fekadu, A., Patel, V., Tomlinson, M., & Lund, C. (2014). Acceptability and feasibility of using non-specialist health workers to deliver mental health care: Stakeholders perceptions form the PRIME district sites in Ethiopia, India, Nepal, South Africa, and Uganda. *Social Science & Medicine, 118,* 33-42. https://doi.org/10.1016/j.socscimed.2014.07.057

Michalopoulou, P. G., Lewis, S. W., Wykes, T., Jaeger, J., & Kapur, S. (2013). Treating impaired cognition in schizophrenia: The case for combining cognitive-enhancing drugs with cognitive remediation. *European Neuropsychopharmacology, 23*(8), 790-

798. https://doi.org/10.1016/j.euroneuro.2013.03.012

Mitra, P, Gupta, A., & Sidana, A. (in press). Cognitive retraining in obsessive-compulsive disorder and its effectiveness. *Minerva Psychiatry*.

Moses-Payne, M. E., Rollwage, M., Fleming, S. M., & Roiser, J. P. (2019). Post decision evidence integration and depressive symptoms. *Frontiers in Psychiatry, 10,* 639. https://doi.org/10.3389/fpsyt.2019.00639

Mrakic-Sposta, S., Di Santo, S. G., Franchini, F., Arlati, S., Zangiacomi, A., Greci, L., Moretti. S., Jesuthasan, N., Marzorati, M., Rizzo, G., Sacco, M., & Vezzoli, A. (2018). Effects of combined physical and cognitive virtual reality-based training on cognitive impairment and oxidative stress in MCI patients: A pilot study. *Frontiers in Aging Neuroscience, 10*, 282. https://doi.org/10.3389/fnagi.2018.00282

Myoshi, K. (2001). Depression associated with physical illness. *Journal of the Japan Medical Association 44*(6): 279–282.

Nehra, R., Chakrabarti, S., Pradhan, B., & Khehra, N. (2006). Comparison of cognitive functions between first- and multi-episode bipolar affective disorders. *Journal of Affective Disorders*, *93*(1-3), 185-192. https://doi.org/10.1016/j.jad.2006.03.013

Nord, C. L., Halahakoon, D. C., Lally, N., Limbachya, T., Pilling, S., and Roiser, J. P. (2020). The neural basis of hot and cold cognition in depressed patients, unaffected relatives, and low-risk healthy controls: An fMRI investigation. *Journal of Affective Disorders, 274,* 389-398. https://doi.org/10.1016/j.jad.2020.05.022

Nordahl, H., Anyan, F., Hjemdal, O., & Wells, A. (2022). The network structure of dysfunctional metacognition: Analysis of the MCQ-30. *Acta Psychologica*, *227*(4), 103622. https://doi.org/1010.1016/j.actpsy.2022.103622

Nordahl, H., Ødegaard, I. H., Hjemdal, O., & Wells, A. (2019). A test of the goodness of fit

of the generic metacognitive model of psychopathology symptoms. *BioMed Central Psychiatry, 19,* Article 288. https://doi.org/10.1186/s12888-019-2266-5

Normann, N., van Emmerik, A. A. P., & Morina, N. (2014). The efficacy of metacognitive therapy for anxiety and depression: A meta-analytic review. *Depression and Anxiety, 31*(5), 402–411. https://doi.org/10.1002/da.22273

O'Driscoll, C., Laing, J., & Mason, O. (2014). Cognitive emotion regulation strategies, alexithymia and dissociation in schizophrenia, a review and meta-analysis. *Clinical Psychology Review*, *34*(6), 482-495. https://doi.org/10.1016/j.cpr.2014.07.002

Oliveira, S. H. E., Carvalho, H., & Esteves, F. (2016). Toward understanding of the quality of life construct: Validity and reliability of the WHOQOL-Bref in a psychiatry sample. *Psychiatry Research, 244*, 37- 44. https://doi.org/10.1016/j.psychres.2016.07.007

Ost, L-G. (2008). Efficacy of the third wave of behavioral therapies: A systematic review and meta-analysis. *Behaviour Research and Therapy, 46*(3), 296-321. https://doi.org/10.1016/j.brat.2007.12.005

Pan, Z., Park, C., Brietzke, E., Zuckerman, H., Rong, C., Mansur, R. B., Fus, D., Subramaniapillai, M., Lee, Y., & McIntyre, R. S. (2019). Cognitive impairment in major depressive disorder. *CNS Spectrums, 24*(1), 22-29. http://dx.doi.org/10.1017/S1092852918001207

Papageorgiou, C., & Wells, A. (2003). An empirical test of a clinical metacognitive model of rumination and depression. *Cognitive Therapy and Research, 27*(3), 261-273. https://doi.org/10.1023/A:1023962332399

Papakostas, G. I., & Fava, M. (2008). Predictors, moderators, and mediators (correlates) of treatment outcome in major depressive disorder. *Dialogues in Clinical Neuroscience, 10*(4), 439-451. https://doi.org/10.31887/DCNS.2008.10.4/gipapakostas.

Papakostas, G. I., Petersen, T., Mahal, Y., Mischoulon, D., Nierenberg, A. A., & Fava, M. (2004). Quality of life assessments in major depressive disorder: A review of the literature. *General Hospital Psychiatry, 26*(1), 13-17. https://doi.org/10.1016/j.genhosppsych.2003.07.004

Penadés, R., & Catalán, R. (2012). Cognitive remediation therapy (CRT): Improving neuro cognition and functioning in schizophrenia. In T. H. J. Burne (Ed.), *Schizophrenia in the 21st Century*. InTech. https://doi.org/10.5772/36783

Poongothai, S., Pradeepa, R., Ganesan, A., & Mohan, V. (2009). Prevalence of depression in a large urban south Indian population--the Chennai urban rural epidemiology study (CURES-70). *PLoS One, 4*(9), Article e7185. https://doi.org/10.1371/journal.pone.0007185

Porter, R. J., Bowie, C. R., Jordan, J., & Malhi, G. S. (2013). Cognitive remediation as a treatment for major depression: A rationale, review of evidence and recommendations for future research. *Australian and New Zealand Journal of Psychiatry, 47*(12), 1165-1175. https://doi.org/10.1177/0004867413502090

Pradip, M. A., Beevi, K. S., Kuttichira, P., & Antony, J. T. (2019). Cognitive impairment in euthymia- A comparative study of clinical and treatment variables between bipolar affective disorder patients and normal controls at a tertiary care centre in Kerala. *Annals of Indian Psychiatry, 3*(1), 32-38. https://doi.org/10.4103/aip.aip_50_18

Puciato, D., Borysiuk, Z., & Rozpara, M. (2017). Quality of life and physical activity in an older working-age population. *Clinical Interventions in Aging, 12*, 1627–1634. http://dx.doi.org/10.2147/CIA.S144045

Querstret, D., & Cropley, M. (2013). Assessing treatments used to reduce rumination and/or worry: A systematic review. *Clinical Psychology Review, 33*(8), 996-1009. https://doi.org/10.1016/j.cpr.2013.08.004

Rajan, E. J. E., & Subramania, S. (2016). The effect of depression and anxiety on the performance status of end-stage renal disease patients undergoing hemodialysis. *Saudi Journal of Kidney Diseases and Transplantation, 27*(2), 331-334.

Ramel, W., Goldin, P. R., Carmona, P. E., & McQuaid, J. R. (2004). The effects of mindfulness meditation on cognitive processes and affect in patients with past depression. *Cognitive Therapy and Research, 28*(4), 433–455. https://doi.org/10.1023/B:COTR.0000045557.15923.96

Rana, R., & Singhal, R. (2015). Chi-square test and its application in hypothesis testing. *Journal of the Practice of Cardiovascular Sciences, 1*(1), 69-71. https://doi.org/10.4103/2395-5414.157577

Reinhart, A. M. (2017). Multivariate analysis of variance (MANOVA). In A. Mike (Ed.), *The SAGE encyclopedia of communication research methods*. SAGE. https://doi.org/10.4135/9781483381411

Rioux, C., & Little, T. D. (2021). Missing data treatments in intervention studies: What was, what is, and what should be. *International Journal of Behavioral Development, 45*(1) 51–58. https://doi.org/10.1177/0165025419880609

Robinson, L. J., Thompson, J. M., Gallagher, P., Goswami, U., Young, A. H., Ferrier, I. N., & Moore, P. B. (2006). A meta-analysis of cognitive deficits in euthymic patients with bipolar disorder. *Journal of Affective Disorders, 93*(1-3), 105-115. https://doi.org/10.1016/j.jad.2006.02.016

Roiser, J. P., & Sahakian, B. J. (2013). Hot and cold cognition in depression. *CNS Spectrums,18*(3), 139-149. https://doi.org/10.1017/S1092852913000072

Sadock, B. J., Sadock, V. A., & Ruiz, P. (Eds.). (2015). *Kaplan & Sadock's synopsis of psychiatry: Behaviural sciences/clinical psychiatry*. Wolters Kluwer.

Samame, C., Szmulewicz, A. G., Valerio, M. P., Martino, D. J., & Strejilevich, S. A. (2017).

Are major depression and bipolar disorder neuropsychologically distinct? A meta-analysis of comparative studies. *European Psychiatry, 39,* 17-26. https://doi.org/10.1016/j.eurpsy.2016.06.002

Sandved-Smith, L., Hesp, C., Mattout, J., Friston, K., Lutz, A., & Ramstead, M. J. D. (2021). Towards a computational phenomenology of mental action: Modelling meta-awareness and attentional control with deep parametric active inference. *Neurosciences of Consciousness, 2021*(2), Article niab018. https://doi.org/10.1093/nc/niab018

Sartorius, N. (2006). The meanings of health and its promotion. *Croatian Medical Journal, 47*(4), 662-664. PMCID: PMC2080455

Sawilowsky, S. S. (2009). New effect size rules of thumb. *Journal of Modern Applied Statistical Methods, 8*(2), 597–599.

Saxena, S., Chandiramani, K., & Bhargava, R. (1998). WHOQOL-Hindi: A questionnaire for assessing quality of life in health care settings in India. World Health Organization quality of life. *The National Medical Journal of India, 11*(4), 160-165. PMID: 9808970

Semkovska, M., Quinlivan, L., O'Grady, T., Johnson, R., Collins, A., O'Connor, J., Knittle, H., Ahern, E., & Gload, T. (2019). Cognitive function following a major depressive episode: A systematic review and meta-analysis. *The Lancet Psychiatry, 6*(10), 851-861. https://doi.org/10.1016/S2215-0366(19)30291-3

Sharma, B. K. (2017). Antidepressants: Mechanism of action, toxicity and possible amelioration. *Journal of Applied Biotechnology & Bioengineering, 3*(5), 437-448. https://doi.org/10.15406/jab.2017.03.00082

Sharpe, M., Strong, V., Allen, K., Rush, R., Postma, K., Tulloh, A., Maguire, P., House, A.,

Ramirez, A., & Cull, A. (2004). Major depression in outpatients attending a regional cancer centre: Screening and unmet treatment needs. *British Journal of Cancer, 90*(2), 314-320. https://doi.org/10.1038/sj.bjc.6601578

Sheehan, D. V. (2016). *M.I.N.I. Mini International Neuropsychiatric Interview English Version 7.0.2 for DSM-5*. www.harmresearch.org/index.php/mini-international-neuropsychiatric-interview-mini/

Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., Hergueta, T., Baker, R., & Dunbar, G. C. (1998). The mini international neuropsychiatric interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry, 59*(S20), S22-S33.

Shinohara, K., Honyashiki, M., Imai, H., Hunot, V., Caldwell, D. M., Davies, P., Moore, T. H., Furukawa, T. A., & Churchill, R. (2013). Behavioural therapies versus other psychological therapies for depression. *The Cochrane Database of Systematic Reviews, 2013*(10), CD008696. https://doi.org/10.1002/14651858

Shore, T., Kadosh, K. C., Lommen, M. . J., Cooper, M., & Lau, J. Y. F. (2017). Investigating the effectiveness of brief cognitive reappraisal training to reduce fear in adolescents. *Cognition and Emotion, 31*(4), 806-815. https://doi.org/10.1080/02699931.2016.1159542

Sierra, M. A., Ruiz, F. J., & Flórez, C. L. (2018). A systematic review and meta-analysis of third-wave online interventions for depression. *Revista Latinoamericana de Psicología, 50*(2), 126-135. https://doi.org/10.14349/rlp.2018.v50.n2.6

Singh, A. K. (1998). *Tests, measurements, and research methods in behavioural sciences*. Bharati Bhawan.

Smarr, K. L., & Keefer, A. L. (2011). Measures of depression and depressive symptoms: Beck depression inventory-II (BDI-II), center for epidemiologic studies depression scale (CES-D), geriatric depression scale (GDS), hospital anxiety and depression scale (HADS), and patient health questionnaire-9 (PHQ-9). *Arthritis Care & Research, 63*(S11), S454-S466. https://doi.org/10.1002/acr.20556

Smedler, E., Sparding, T., Jonsson, L., Hörbeck, E., & Landén, M. (2023). Association of premorbid intelligence with level of functioning and illness severity in bipolar disorder. *Journal of Affective Disorders, 324*(1), 449-454. https://doi.org/10.1016/j/jad.2022.12.113

Somers, J., & Querée, M. (2007). *Cognitive behavioural therapy: The core information document.* Centre for Applied Research in Mental Health and Addictions (CARMHA).

Stevenson, C. S., Whitmont, S., Bornholt, L. Livesey, D., & Stevenson, R. J. (2002). A cognitive remediation programme for adults with attention deficit hyperactivity disorder. *Australian and New Zealand Journal of Psychiatry, 36*(5), 610-616. https://doi.org/10.1046/j.1440-1614.2002.01052.x

Taj, M., & Padmavati, R. (2005). Neuropsychological impairment in bipolar affective disorder. *Indian Journal of Psychiatry, 47*(1), 48-50. https://doi.org/10.4103/0019-5545.46075

Torrent, C., Martínez-Arán, A., Daban, C., Sánchez-Moreno, J., Comes, M., Goikolea, J. M., Salamero, M., & Vieta, E. (2006). Cognitive impairment in bipolar II disorder. *The British Journal of Psychiatry, 189*(3), 254-259. https://doi.org/10.1192/bjp.bp.105.017269

Torres I., Solé B., Vieta E., & Martínez-Arán A. (2012). Neurocognitive impairment in the bipolar spectrum. *Neuropsychiatry, 2*(1), 43–55. https://doi.org/10.2217/npy.12.3

Twenge, J. M., Cooper, A. B., Joiner, T. E., Duffy, M. E., & Binau, S. G. (2019). Age, period, and cohort trends in mood disorder indicators and suicide-related outcomes in a nationally representative dataset, 2005–2017. *Journal of Abnormal Psychology, 128*(3), 185–199. https://doi.org/10.1037/abn0000410

Unwin, G., Tsimopoulou, I., Kroese, B. S., & Azmi, S. (2016). Effectiveness of cognitive behavioural therapy (CBT) programmes for anxiety or depression in adults with intellectual disabilities: A review of the literature. *Research in Developmental Disabilities, 51-52,* 60-75. https://doi.org/10.1016/j.ridd.2015.12.010

van Passel, B., Danner, U., Dingemans, A., van Furth, E., Sternheim, L., van Elburg, A., van Minnen, A., van den Hout, M., Hendricks, G-J., & & Cath, D. (2016). Cognitive remediation therapy (CRT) as a treatment enhancer of eating disorders and obsessive compulsive disorders: Study protocol for a randomized controlled trial. *BioMed Central Psychiatry, 16*(1), 393. https://doi.org/10.1186/s12888-016-1109-x

Vatnaland, T., Vatnaland, J., Friis, S., & Opjordsmoen, S. (2007). Are GAF scores reliable in routine clinical use? *Acta Psychiatrica Scandinavica, 115*(4), 326-330. https://doi.org/10.1111/j.1600-0447.2006.00925.x

Velasco, P. F., & Loev, S. (2022). Metacognitive feelings: A predictive processing perspective. Preprint. https://doi.org/10.31234/osf.io/594hj

Wagner, S., Müller, C., Helmreich, I., Huss, M., & Tadić, A. (2015). A meta-analysis of cognitive functions in children and adolescents with major depressive disorder. *European Child & Adolescent Psychiatry, 24*(1), 5–19. https://doi.org/10.1007/s00787-014-0559-2

Wang, Y-P., & Gorenstein, C. (2013). Psychometric properties of the Beck depression Inventory-II: A comprehensive review. *Brazilian Journal of Psychiatry*, *35*(4), 416-431.

Wang, Y., Fu, C., Liu, Y., Li, D., Wang, C., Sun, R., & Song, Y. (2021). A study on the effects of mindfulness-based cognitive therapy and loving-kindness mediation on depression, rumination, mindfulness level and quality of life in depressed patients. *American Journal of Translational Research, 13*(5), 4666-4675. PMCID: PMC8205847

Wells A. (2009). *Metacognitive therapy for anxiety and depression*. Guilford Press.

Wells, A., & Carter, K. E. P. (2001). Further tests of cognitive model generalized anxiety disorder: Metacognition and worry in GAD, panic disorder, social phobia, depression and non-patients. *Behavior Therapy, 32*(1), 85-102. https://doi.org/10.1016/S0005-7894(01)80045-9

Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: Properties of the MCQ-30. *Behaviour Research and Therapy*, *42*(4), 385–396. https://doi.org/10.1016/S0005-7967(03)00147-5

Williams, J. R. (2008). The declaration of Helsinki and public health. *Bulletin of the World Health Organization, 86*(8), 650-652. https://doi.org/10.2471/BLT.08.050955

World Health Organization. (1982). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*.

World Health Organization. (2001). *The world health report 2001: Chapter four mental health policy and service provision.*

World Health Organization. (2017). *Depression and other common mental disorders: Global health estimates.*

Woolf, C., Lampit, A., Shahnawaz, Z., Sabates, J., Norrie, L. M., Burke, D., Naismith, S. L., & Mowszowski L. (2022). A systematic review and meta-analysis of cognitive training in adults with major depressive disorder. *Neuropsychology Review, 32*(2), 419-437. https://doi.org/10.1007/s11065-021-09487-3

Wykes, T., Huddy, V., Cellard, C., McGurk, S. R., & Czobor, P. (2011). A meta-analysis of cognitive remediation for schizophrenia: Methodology and effect sizes. *American Journal of Psychiatry, 168*(5), 472-485. https://doi.org/10.1176/appi.ajp.2010.10060855

Young, K. S., Parsons, C. E., Stein, A., & Kringelbach, M. L. (2015). Motion and emotion: Depression reduces psychomotor performance and alters affective movements in caregiving interactions. *Frontiers in Behavioral Neuroscience, 9,* Article 26. https://doi.org/10.3389/fnbeh.2015.00026

Zwalmen, Y. V., Hoorelbeke, K., Liebaert, E., de Mévergnies, C. N., & Koster, E. H. W. (2022). Cognitive remediation for depression vulnerability: Current challenges and new directions. *Frontiers in Psychology, 13*, 903446. https://doi.org/10.3389/fpsyg.2022.903446

Appendix A

INSTITUTIONAL ETHICS COMMITTEE
(GMCH, Chandigarh.)

Sector 32-B, Chandigarh-160030, Ph. 0172-2665253-57, Fax No. 0172-2609360
IEC Regd. No.ECR/658/Inst/PB/2014/RR-2017

GMCH/SEC/2019/316 16.04.2019

To

Dr. Aarzoo Gupta
GMCH, Chandigarh

Sub : A comparative study of cognitive behaviour therapy and cognitive retaining treatment in depressive disorder

Reference to subject cited above. This project was discussed in Institutional Ethics Committee meeting held on 09.04.2019. The meeting was attended by:

1. Prof. S.K. Jindal
2. Sh. D.D. Gautam
3. Mr. Harmanjit Singh Sethi
4. Prof. Rajesh Gill
5. Dr. A. K. Attri
6. Dr. Kanchan Kapoor
7. Dr. S.S. Lehl
8. Dr. Rajiv Kumar
9. Dr. Rohit Jindal
10. Dr. Dinesh Walia

The following documents were examined:-

1. Original and Revised Research project
2. Participant information sheet
3. Informed consent form
4. Approval from research committee.
5. Clarification to observations of IEC meeting held on 20.11.2018

Based on the submissions and the discussions in the meeting, the project is **approved**. You can recruit subjects for the project. You are required to:

1. Ensure that the patient does not pay extra for any additional investigation which is a part of the research plan but outside the routine diagnostic protocol
2. Take CTRI no if applicable
3. Take permission for use of copyrighted scores if applicable.

Convener

Appendix B

Consent Form

Aims and methods of Research – The aim of the present study is to compare cognitive behavior therapy and cognitive retraining treatment in depressive disorders. In order to do so, participants will be required to respond to four questionnaires to assess the outcome of intervention in face-to-face setting. Participants will be undergo an intervention either CBT or CRT.

Expected duration of participation – Your participation will require weekly sessions in the out-patient department lasting 40-60 minutes. Additionally, homework assigned to be completed including recording of thoughts, emotions, and action; maintaining monitoring sheets by putting a tick or cross to corresponding column(s). CBT involves 10 weekly sessions while CRT comprises 6 weekly sessions with activities assigned on printed sheets to be done daily at home.

The benefits to be expected from the research to the subject or to others – The participation in the research is expected to alleviate symptoms of depression and also enhance your day-to-day functioning. Also, it will enhance the awareness and understanding of mental health professionals to understand effectiveness of CRT intervention.

Any risk to the subject associated with the study – There are no known risks involved in the participation of the study.

Maintenance of confidentiality of records – The participant's records will be treated with utmost confidentiality and only the researchers of the study will have access to the records. Data anonymity will be maintained if work is published.

Freedom to withdraw from study – You have the freedom to participate and to withdraw from the study at any time. You will not be questioned for your decision to withdraw and can do so without any penalty. Your decision will have no impact on your ongoing treatment here. The contact details of the primary researcher are provided below if you have any queries:

Name of Researcher – Aarzoo, Asst Prof.

Phone number – 9646088172

Appendix B

Participant Consent Form

Participant identification number for this study: _____

Title of project/study: A comparative study of cognitive behavior therapy and cognitive retraining treatment in depressive disorders

Name of Principal Investigator: Aarzoo Tel. No.(s) 9646088172

The contents of the information sheet dated……that was

provided have been read carefully by me /explained in detail to me, in a language that I

comprehend, and I have fully understood the contents. I confirm that I have had the opportunity to ask questions.

The nature and purpose of the study and its potential risks/ benefits and expected duration of the study, and other relevant details of the study have been explained to me in detail. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal right being affected.

I understand that the information collected about me from my participation in this research and sections of any of my response sheets may be looked at by responsible individuals. I give

permission for these individuals to have access to my records.

I agree to take part in the above study.

……. Date:

(signature) Place:

Name of the Participant (optional): _____

Contact Number (optional): _____

Appendix C 1

Sociodemographic Sheet

Date: S.No.:

Group:

A CBT

B CBTM

C CRT

D CRTM

Duration of session:

CR No.: Psy No.:

Consultant: Ref by:

Name of participant:

Age (years):

Sex:

Education:

Class (highest completed or studying):

Stream: Humanities/Non-medical/ Medical/ Commerce Law/ Any other

Years: >8 -10 yrs/ >10-12 yrs/ >12 -15yrs/ >15 yrs/ >18 yrs

Marital status:

Never Married/ Married / Separated / Divorced/ Widow/ Any Other

Occupation:

Student/ Unemployed / Homemaker / Govt or Pvt job/ Business or shop

Location/Resident of:

Income per month:

Included/Excluded

Appendix C 2

Clinical Profile Sheet

Date: S.No.:

Presenting Complaints:

Precipitating factor (PPF), if any

Onset of illness

Last episode of illness:

Duration of illness:

Trigger of current episode:

Current diagnosis:

Current treatment: Pharmacological

Psychological/psychosocial

Past diagnosis:

Any history of hospitalization due to psychiatric symptoms: Yes/ No

Any history of ECT: Yes / No

History of any known neurological condition (seizure, stroke, head injury etc.):

History of any unstable chronic medical illness (cancer, TB, CVD etc.):

Family history of any chronic physical, psychiatric, or neurological condition:

Included/Excluded

M.I.N.I.

MINI INTERNATIONAL NEUROPSYCHIATRIC INTERVIEW

English Version 7.0.2

For

DSM-5

DISCLAIMER

Our aim is to assist in the assessment and tracking of patients with greater efficiency and accuracy. Before action is taken on any data collected and processed by this program, it should be reviewed and interpreted by a licensed clinician.

This program is not designed or intended to be used in the place of a full medical and psychiatric evaluation by a qualified licensed physician – psychiatrist. It is intended only as a tool to facilitate accurate data collection and processing of symptoms elicited by trained personnel. It is not a diagnostic test.

Patient Name:		***Patient Number:***	
Date of Birth:		***Time Interview Began:***	
Interviewer's Name:		***Time Interview Ended:***	
Date of Interview:		***Total Time:***	

	MODULES	TIME FRAME	MEETS CRITERIA	ICD-10-CM	PRIMARY DIAGNOSIS
A	MAJOR DEPRESSIVE EPISODE	Current (2 weeks)	☐		
		Past	☐		
		Recurrent	☐		
	MAJOR DEPRESSIVE DISORDER	Current (2 weeks)	☐	F32.x	☐
		Past	☐	F32.x	☐
		Recurrent	☐	F33.x	☐
B	SUICIDALITY	Current (Past Month)	☐		☐
		Lifetime attempt	☐	☐ Low ☐ Moderate ☐ High	☐
	SUICIDE BEHAVIOR DISORDER	Current	☐	(In Past Year)	☐
		In early remission	☐	(1 - 2 Years Ago)	☐
C	MANIC EPISODE	Current	☐		
		Past	☐		
	HYPOMANIC EPISODE	Current	☐		
		Past	☐	☐ Not Explored	
	BIPOLAR I DISORDER	Current	☐	F31.0 - F31.76	☐
		Past	☐	F31.0 - F31.76	☐
	BIPOLAR I DISORDER WITH PSYCHOTIC FEATURES	Current	☐	F31.2/31.5/F31.64	☐
		Past	☐	F31.2/31.5/F31.64	☐
	BIPOLAR II DISORDER	Current	☐	F31.81	☐
		Past	☐	F31.81	☐
	OTHER SPECIFIED BIPOLAR AND RELATED DISORDER	Current	☐	F31.89	☐
		Past	☐	F31.89	☐
D	PANIC DISORDER	Current (Past Month)	☐	F41.0	☐
		Lifetime	☐	F40.0	☐
E	AGORAPHOBIA	Current	☐	F40.00	☐
F	SOCIAL ANXIETY DISORDER (Social Phobia)	Current (Past Month)	☐	F40.10	☐
G	OBSESSIVE-COMPULSIVE DISORDER	Current (Past Month)	☐	F42.2	☐
H	POSTTRAUMATIC STRESS DISORDER	Current (Past Month)	☐	F43.10	☐
I	ALCOHOL USE DISORDER	Past 12 Months	☐	F10.10 - F10.21	☐
J	SUBSTANCE USE DISORDER (Non-alcohol)	Past 12 Months	☐	F11.10 - F19.21	☐

K	ANY PSYCHOTIC DISORDER	Current	☐	F20.81-F29	☐
		Lifetime	☐	F20.81-F29	☐
	MAJOR DEPRESSIVE DISORDER WITH PSYCHOTIC FEATURES	Current	☐	F32.3/F33.3	☐
		Past	☐	F32.3/F33.3	☐
	BIPOLAR I DISORDER WITH PSYCHOTIC FEATURES	Current	☐	F31.2/F31.5/F31.64	☐
		Past	☐	F31.2/F31.5/F31.64	☐
L	ANOREXIA NERVOSA	Current (Past 3 Months)	☐	F50.01/F50.02	☐
M	BULIMIA NERVOSA	Current (Past 3 Months)	☐	F50.2	☐
MB	BINGE-EATING DISORDER	Current (Past 3 Months)	☐	F50.81	☐
N	GENERALIZED ANXIETY DISORDER	Current (Past 6 Months)	☐	F41.1	☐
O	MEDICAL, ORGANIC, DRUG CAUSE RULED OUT			☐ No ☐ Yes ☐ Uncertain	
P	ANTISOCIAL PERSONALITY DISORDER	Lifetime	☐	F60.2	☐

IDENTIFY THE PRIMARY DIAGNOSIS BY CHECKING THE APPROPRIATE CHECK BOX.
(Which problem troubles you the most or dominates the others or came first in the natural history?)

The BDI-II contains 21 questions, each answer being scored on a scale value of 0 to 3. The cutoffs used differ from the original: 0–13: minimal depression; 14–19: mild depression; 20–28: moderate depression; and 29–63: severe depression. Higher total scores indicate more severe depressive symptoms.

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all the time.
3 I am so sad or unhappy that I can't stand it.

2. Pessimism

0 I am not discouraged about my future.
1 I feel more discouraged about my future than I used to be.
2 I do not expect things to work out for me.
3 I feel my future is hopeless and will only get worse.

3. Past Failure

0 I do not feel like a failure.
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

4. Loss of Pleasure

0 I get as much pleasure as I ever did from the things I enjoy.
1 I don't enjoy things as much as I used to.
2 I get very little pleasure from the things I used to enjoy.
3 I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

0 I don't feel particularly guilty.
1 I feel guilty over many things I have done or should have done.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6. Punishment Feelings

0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.
1 I have thoughts of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

Subtotal Page 1

Continued on Back

11. Agitation

0 I am no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

14. Worthlessness

0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as I used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0 I have not experienced any change in my sleeping pattern.
1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.
2a I sleep a lot more than usual.
2b I sleep a lot less than usual.
3a I sleep most of the day.
3b I wake up 1–2 hours early and can't get back to sleep.

17. Irritability

0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

18. Changes in Appetite

0 I have not experienced any change in my appetite.
1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater than usual.
2a My appetite is much less than before.
2b My appetite is much greater than usual.
3a I have no appetite at all.
3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of the things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Subtotal Page 2
Subtotal Page 1
Total Score

APPENDIX 1

METACOGNITIONS QUESTIONNAIRE 30 (MCQ-30)

Adrian Wells and Samantha Cartwright-Hatton

This questionnaire is concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed. Please read each item and say how much you *generally* agree with it by *circling* the appropriate number.

Please respond to all the items, there are no right or wrong answers.

Gender: _____ Age: _____

	Do not agree	Agree slightly	Agree moderately	Agree very much
1. Worrying helps me to avoid problems in the future.	1	2	3	4
2. My worrying is dangerous for me.	1	2	3	4
3. I think a lot about my thoughts.	1	2	3	4
4. I could make myself sick with worrying.	1	2	3	4
5. I am aware of the way my mind works when I am thinking through a problem.	1	2	3	4
6. If I did not control a worrying thought, and then it happened, it would be my fault.	1	2	3	4
7. I need to worry in order to remain organized.	1	2	3	4
8. I have little confidence in my memory for words and names.	1	2	3	4
9. My worrying thoughts persist, no matter how I try to stop them.	1	2	3	4
10 Worrying helps me to get things sorted out in my mind.	1	2	3	4
11. I cannot ignore my worrying thoughts.	1	2	3	4
12. I monitor my thoughts.	1	2	3	4
13. I should be in control of my thoughts all of the time.	1	2	3	4
14. My memory can mislead me at times.	1	2	3	4

(continued)

	Do not agree	Agree slightly	Agree moderately	Agree very much
15. My worrying could make me go mad.	1	2	3	4
16. I am constantly aware of my thinking.	1	2	3	4
17. I have a poor memory.	1	2	3	4
18. I pay close attention to the way my mind works.	1	2	3	4
19. Worrying helps me cope.	1	2	3	4
20. Not being able to control my thoughts is a sign of weakness.	1	2	3	4
21. When I start worrying, I cannot stop.	1	2	3	4
22. I will be punished for not controlling certain thoughts.	1	2	3	4
23. Worrying helps me to solve problems.	1	2	3	4
24. I have little confidence in my memory for places.	1	2	3	4
25. It is bad to think certain thoughts.	1	2	3	4
26. I do not trust my memory.	1	2	3	4
27. If I could not control my thoughts, I would not be able to function.	1	2	3	4
28. I need to worry in order to work well.	1	2	3	4
29. I have little confidence in my memory for actions.	1	2	3	4
30. I constantly examine my thoughts.	1	2	3	4

Please ensure that you have responded to all items. Thank you.

(continued)

MCQ-30: Scoring Key

Enter the number given by the subject for each item in the relevant box below and then sum the scores to produce a subscale total.

POS	NEG	CC	NC	CSC
1 ____	2 ____	8 ____	6 ____	3 ____
7 ____	4 ____	14 ____	13 ____	5 ____
10 ____	9 ____	17 ____	20 ____	12 ____
19 ____	11 ____	24 ____	22 ____	16 ____
23 ____	15 ____	26 ____	25 ____	18 ____
28 ____	21 ____	29 ____	27 ____	30 ____
Total ____	____	____	____	____

The subscales are:

POS = positive beliefs about worry
NEG = negative beliefs about uncontrollability and danger of worry
CC = cognitive confidence
NC = need for control
CSC = cognitive self-consciousness

An overall total MCQ score can be obtained by summing the subscale totals.

हूकॉल ब्रीफ (WHOQOL-BREF)*

विश्व स्वास्थ्य संगठन, दिसम्बर 1996

मनोविकार विभाग,
अखिल भारतीय आयुर्विज्ञान संस्थान
नई दिल्ली - 110 029.

आपके बारे में

हम चाहेंगे कि शुरूआत करने से पहले, आप अपने बारे में कुछ सामान्य प्रश्नों के उत्तर दें। सही उत्तर के चारों ओर गोला या खाली स्थान पर सही उत्तर लिखें –

आप क्या है? पुरूष स्त्री

आपकी जन्म तारीख क्या है? दिन/महीना/वर्ष ___/___/___

आपकी शिक्षा कहाँ तक हुई है?
- बिल्कुल नहीं
- प्राथमिक स्कूल तक
- माध्यमिक स्कूल तक
- हाई स्कूल तक
- हाई स्कूल से आगे

आपका वैवाहिक स्तर क्या है?
- अविवाहित
- विवाहित
- विवाहित की तरह साथ में रहते हुए
- विवाहित लेकिन अलग हुए
- तलाकशुदा
- विधुर/विधवा

क्या आजकल आप बीमार हैं हाँ नही

अगर आपके स्वास्थ्य में कुछ गडबड़ है तो आपके विचार में यह क्या है? _____

अनुदेश

यह प्रश्नावली पूछती है कि अपने जीवन की गुणवत्ता (क्वालिटी), स्वास्थ्य और जीवन के अन्य क्षेत्रों के बारे में आप कैसा अनुभव करते हैं। कृपया सभी प्रश्नों के उत्तर दें। यदि किसी प्रश्न के बारे में अनिश्चित हों कि कौन सा उत्तर दिया जाए, तो कृपया उसे चुनें जो सबसे उचित लगता हो है। यह अक्सर आपके मन में आने वाला पहला उत्तर हो सकता है।

कृपया अपने मापदण्डों, आशाओं, सुखों एवं चिंताओं को ध्यान में रखे। आपसे आग्रह है कि इन प्रश्नों के उत्तर अपने जीवन के पिछले दो सप्ताहों के आधार पर ही दें। उदाहरण के तौर पर पिछले दो सप्ताहों के आधार पर एक प्रश्न यह हो सकता है:

	बिल्कुल नहीं	थोड़ा	मध्यम	बहुत अधिक	पूरी तरह से
क्या आपको दूसरों से उस तरह का सहारा मिलता है, जिसकी आपको आवश्यकता है?	1	2	3	4	5

पिछले दो सप्ताहों में आपको दूसरों से कितना सहारा मिला है उसके अनुसार ऊपर दिए गए पाँचों उत्तरों में से सबसे उचित उत्तर को चुनकर उसके साथ वाली संख्या पर गोला बनाकर दर्शाएं। जैसे अगर आपको दूसरों से बहुत अधिक सहारा मिला है तो आप संख्या 4 के चारों ओर गोला बनायेंगे, जैसा कि अगले पृष्ट पर दर्शाया गया है–

इस प्रश्नावली को उपयोग करने से पहले अनुमति के लिये सम्पर्क करें–

डा० शेखर सक्सेना,
अतिरिक्त आचार्य
मनोविकार विभाग
अखिल भारतीय आयुर्विज्ञान संस्थान, नई दिल्ली - 110 029.

	बिल्कुल नही	थोड़ा	मध्यम	बहुत अधिक	पूरी तरह से
आपको दुसरों से तरह का सहारा ता है. जिसकी को आवश्यकता हैं?	1	2	3	(4)	5

र आपको पिछले दो सप्ताहों में दूसरों से उस तरह का सहारा जिसकी आपको आवश्यकता पड़ी, बिल्कुल नहीं मिला तो संख्या '1' चारों ओर गोला लगायें। कृपया प्रत्येक प्रश्न को पढे, अपनी भावनाओं का मूल्याकन करें और प्रत्येक प्रश्न के लिए उस संख्या के चारों र गोला बनाएं जो आपके लिए उपयुक्त हो।

	बहुत खराब	काफी खराब	न अच्छा न खराब	काफी अच्छा	बहुत अच्छा
अपने जीवन की गुणवत्ता (क्वालिटी) का आप कितना मूल्यांकन करते हैं?	1	2	3	4	5
	बहुत असंतुष्ट	काफी असंतुष्ट	न संतुष्ट न असंतुष्ट	काफी संतुष्ट	बहुत संतुष्ट
अपने स्वास्थ्य से आप कितने संतुष्ट हैं?	1	2	3	4	5

म्नलिखित प्रश्न पूछते हैं कि पिछले दो सप्ताहों में आपने कुछ चीजों को कितना अनुभव किया है?

	बिल्कुल नहीं	थोड़ा	मध्यम	बहुत अधिक	अत्याधिक
आपके विचार में दर्द किस हद तक आपको वह करने से रोकता है. जो आपको करना होता है?	1	2	3	4	5
रोजमर्रा की जिन्दगी चलाने में आपको किसी भी इलाज की कितनी आवश्यकता पड़ती है?	1	2	3	4	5
5. आप जीवन में कितना आनन्द लेते हैं?	1	2	3	4	5
6. अपने जीवन को किस हद तक आप सार्थक अनुभव करते हैं?	1	2	3	4	5
7. आप कितनी अच्छी तरह से मन को एकाग्र कर सकते हैं?	1	2	3	4	5

	बिल्कुल नही	थोड़ा	मध्यम	बहुत अधिक	अत्याधिक
8. अपने दैनिक जीवन में अपने आप को आप कितना सुरक्षित अनुभव करते हैं?	1	2	3	4	5
9. आपका भौतिक वातावरण कितना स्वास्थ्यवर्धक है?	1	2	3	4	5

निम्नलिखित प्रश्न आपसे इस बारे में पूछते है कि पिछले दो सप्ताहों में कुछ चीजें या कार्य आपने कितनी पूर्णता से अनुभव किए है या कर पाए है

	बिल्कुल नही	थोड़ा	मध्यम	बहुत अधिक	पूरी तरह से
10. क्या आपमें दिन प्रतिदिन के जीवन कार्यो के लिए पर्याप्त स्फूर्ति (चुस्ती) है?	1	2	3	4	5
11. क्या अपनी शारीरिक बनावट (रूप) को आप स्वीकार कर पाते है?	1	2	3	4	5
12. क्या आपके पास अपनी आवश्यकताएं पूरी करने के लिए पर्याप्त धन है?	1	2	3	4	5
13. आपको दिन प्रतिदिन के जीवन में जिन जानकारियों की आवश्यकता है, वे आपको किस हद तक उपलब्ध हैं?	1	2	3	4	5
14. अवकाश की क्रियाओं के अवसर आपको किस हद तक मिलते है?	1	2	3	4	5
15. आप कितनी अच्छी तरह इधर–उधर आ जा पाते हैं?	1	2	3	4	5

निम्नलिखित प्रश्न आपसे इस बारे में पूछते हैं कि पिछले दो सप्ताहों में अपने जीवन के विभिन्न पहलुओं के बारे मे आप कितने अच्छे या संतुष्ट रहे हैं?

	बहुत असंतुष्ट	काफी असंतुष्ट	न संतुष्ट न असंतुष्ट	काफी संतुष्ट	बहुत संतुष्ट
16. अपनी नींद से आप कितने संतुष्ट है?	1	2	3	4	5

	बहुत असंतुष्ट	काफ़ी असंतुष्ट	न संतुष्ट न असंतुष्ट	काफ़ी संतुष्ट	बहुत संतुष्ट
दैनिक जीवन कार्यों को करने की अपनी क्षमता से आप कितने संतुष्ट हैं?	1	2	3	4	5
8. अपनी कार्यक्षमता से आप कितने संतुष्ट हैं?	1	2	3	4	5
9. अपने से आप कितने संतुष्ट हैं?	1	2	3	4	5
20. अपने व्यक्तिगत संबंधों से आप कितने संतुष्ट हैं?	1	2	3	4	5
21. अपने यौन (सैक्स) जीवन से आप कितने संतुष्ट हैं?	1	2	3	4	5
22. अपने मित्रों से आपको जो सहारा मिलता है, उससे आप कितने संतुष्ट हैं?	1	2	3	4	5
23. अपने रहने की जगह की परिस्थितियों से आप कितने संतुष्ट है?	1	2	3	4	5
24. स्वास्थ्य सेवाओं तक आपकी पहुंच से आप कितने संतुष्ट हैं?	1	2	3	4	5
25. अपने यातायात के साधन से आप कितने संतुष्ट हैं?	1	2	3	4	5

निम्नलिखित प्रश्न इस बारे में है कि पिछले दो सप्ताहों में आपने कुछ चीजों को कितनी बार महसूस किया है

	कभी नहीं	कभी-कभी	अक्सर	बहुत अधिक बार	हमेशा
26. कितनी बार आप नकरात्मक भावनाएँ (जैसे दुःखी मन, निराशा, घबराहट, उदासी) महसूस करते हैं?	1	2	3	4	5

क्या इस प्रश्नावली को भरनें मे किसी ने आपकी मदद की? .....

इस प्रश्नावली को भरने में कितना समय लगा? .....

इस प्रश्नावली के बारे मे आपकी कोई टिप्पणी .....

आपके सहयोग के लिए धन्यवाद !

Patient name: _____

Concordia ID #:_____ Date: _____

Date of birth: _____

Global Assessment of Functioning (GAF) Scale

(From DSM-IV-TR, p. 34.)

Consider psychological, social, and occupational functioning on a hypothetical continuum of mental health-illness. Do not include impairment in functioning due to physical (or environmental) limitations.

Code	(Note: Use intermediate codes when appropriate, e.g., 45, 68, 72.)
100 | 91	**Superior functioning in a wide range of activities, life's problems never seem to get out of hand, is sought out by others because of his or her many positive qualities. No symptoms.**
90 | 81	**Absent or minimal symptoms** (e.g., mild anxiety before an exam**), good functioning in all areas, interested and involved in a wide range of activities. socially effective, generally satisfied with life, no more than everyday problems or concerns** (e.g. an occasional argument with family members).
80 | 71	**If symptoms are present, they are transient and expectable reactions to psychosocial stressors** (e.g., difficulty concentrating after family argument); **no more than slight impairment in social, occupational or school functioning** (e.g., temporarily failing behind in schoolwork).
70 | 61	**Some mild symptoms** (e.g. depressed mood and mild insomnia) **OR some difficulty in social, occupational, or school functioning** (e.g., occasional truancy, or theft within the household)**, but generally functioning pretty well, has some meaningful interpersonal relationships.**
60 | 51	**Moderate symptoms** (e.g., flat affect and circumstantial speech, occasional panic attacks) **OR moderate difficulty in social, occupational, or school functioning** (e.g.. few friends, conflicts with peers or co-workers).
50 | 41	**Serious symptoms** (e.g.. suicidal ideation, severe obsessional rituals, frequent shoplifting) **OR any serious impairment in social, occupational, or school functioning** (e.g., no friends, unable to keep a job).
40 | 31	**Some impairment in reality testing or communication** (e.g., speech is at times illogical, obscure, or irrelevant) **OR major impairment in several areas, such as work or school, family relations, judgment, thinking, or mood** (e.g., depressed man avoids friends, neglects family, and is unable to work; child frequently beats up younger children, is defiant at home, and is failing at school).
30 | 21	**Behavior is considerably influenced by delusions or hallucinations** **OR serious impairment in communication or judgment** (e.g., sometimes incoherent, acts grossly inappropriately, suicidal preoccupation) **OR inability to function in almost all areas** (e.g., stays in bed all day; no job, home, or friends).
20 | 11	**Some danger of hurting self or others** (e.g., suicide attempts without clear expectation of death; frequently violent; manic excitement) **OR occasionally fails to maintain minimal personal hygiene** (e.g., smears feces) **OR gross impairment in communication** (e.g., largely incoherent or mute).
10 | 1	**Persistent danger of severely hurting self or others** (e.g., recurrent violence) **OR persistent inability to maintain minimal personal hygiene** **OR serious suicidal act with clear expectation of death.**
0	Inadequate information.

Code selected: _____

Activity Schedule Monitoring Sheet

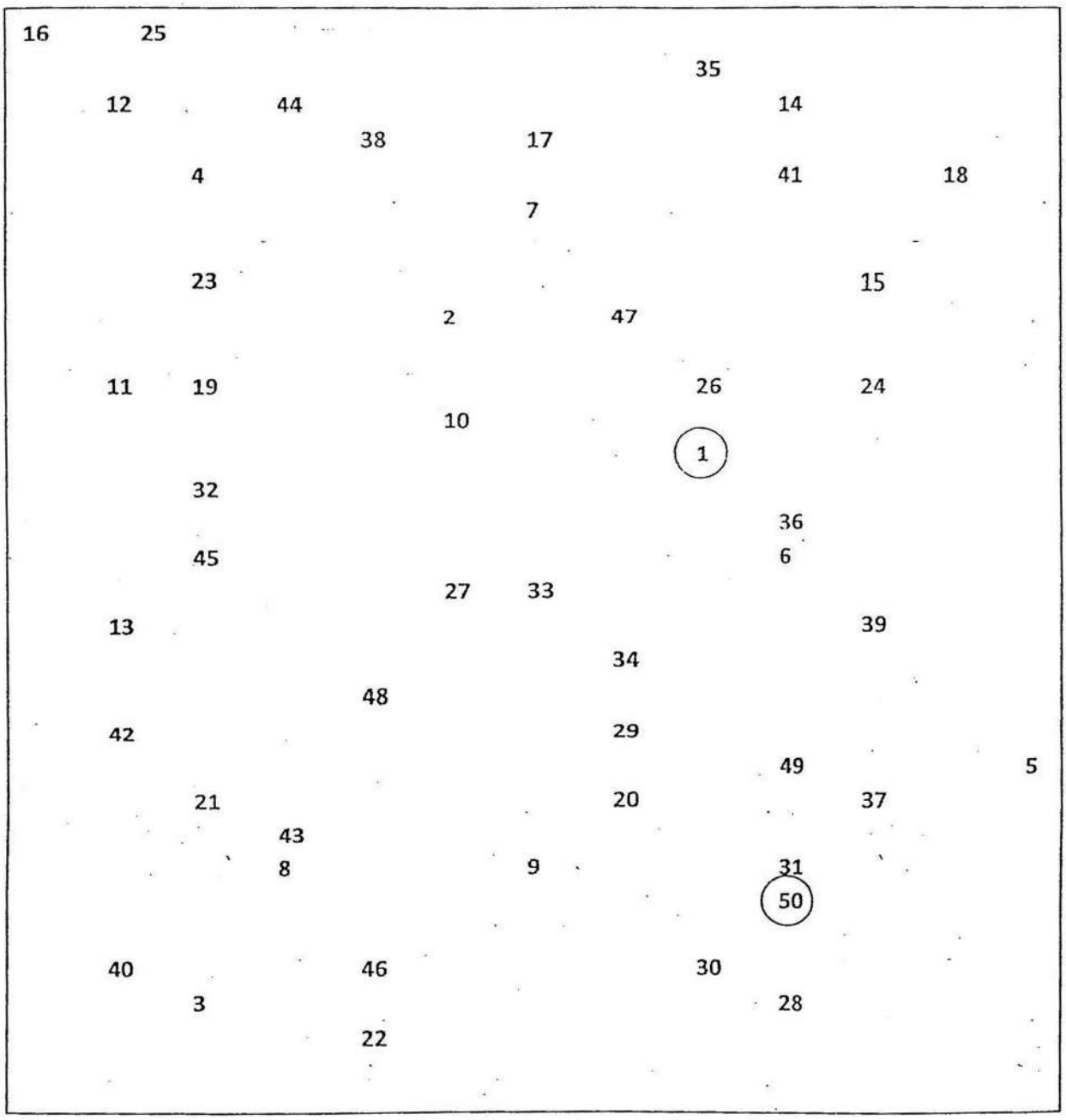
Activity	Time	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Compliance rate
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-

Daily Thought Record (DTR) Sheet

Date/Time	Situation Briefly describe the situation in terms of where were you, with whom, and what were you doing or what was going on?	Thoughts What did you think or what thoughts crossed your mind?	Emotion How did you feel or what emotion you experienced and with what intensity? 1 ——— 10	Behavior What did you do as a result or how did you react to the situation or person?

Week: 1	**Session 1**
Date:	Errors:
Time taken:	

Number Sequencing



Week: 1	Session 1
Date:	Errors:
Time taken:	

Digit Sequencing

83 15 47	
93 41 75	
27 76 67	
55 93 66	
92 83 36 99 11	
98 31 16 88 31	
23 88 89 93 47	
63 26 36 53 43	
46 42 51 50 53 49	
90 47 37 98 95 52	
67 91 46 50 53 34	
65 17 80 18 27 24	
40 29 44 45 64 31 19	
59 24 63 90 41 68 25	
84 94 73 38 24 53 64	
93 42 73 65 20 76 75	
79 69 13 67 48 58 26 41	
16 91 20 79 19 88 86 54	
63 60 85 88 27 48 82 23 60 59	
18 37 94 23 80 19 83 42 11 89	

Week: 1	**Session 1**
Date:	Errors:
Time taken:	

Letter Symbol Substitution

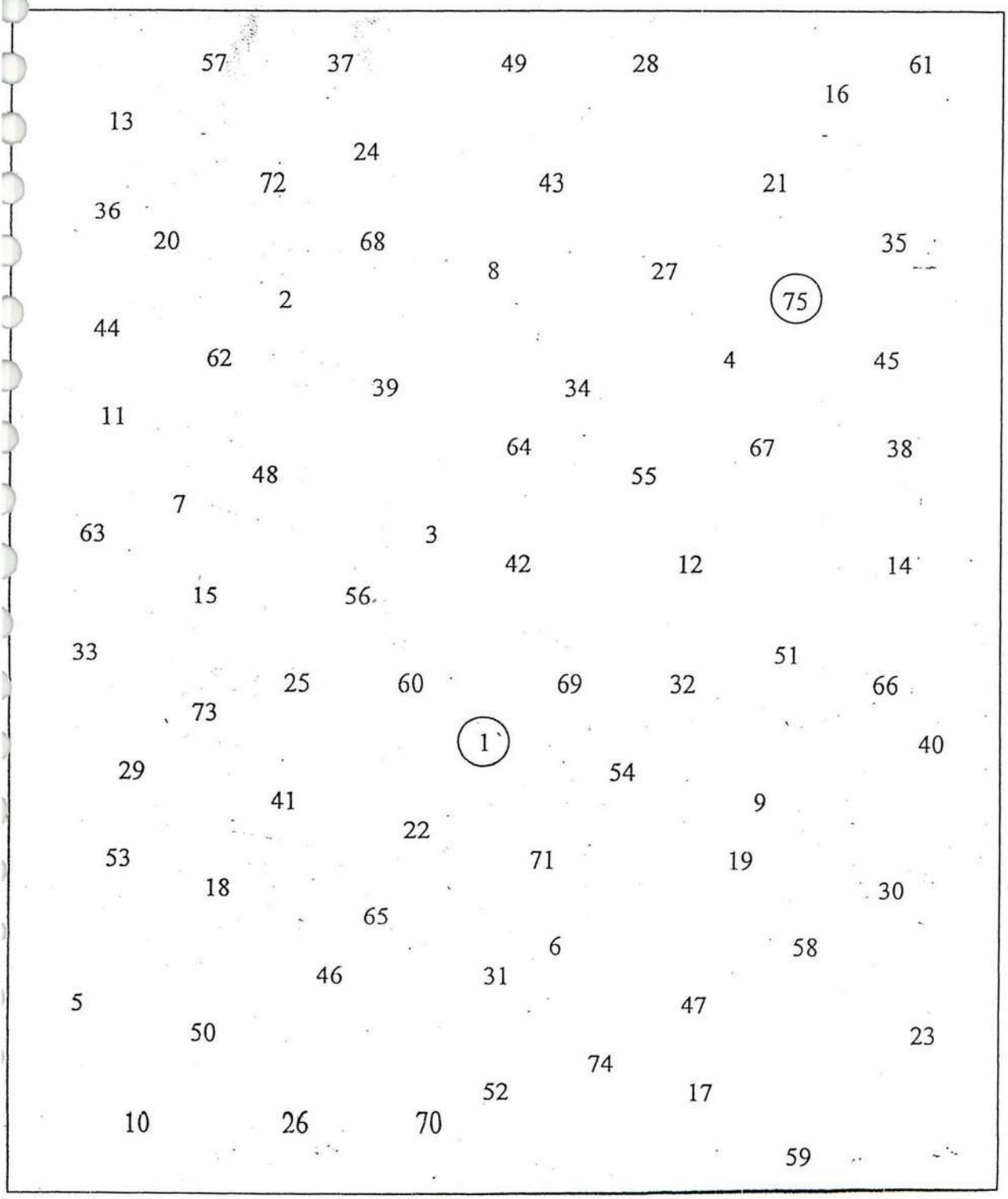
A	B	C	D	E	F	G	H	I	J
=	±	≡	∑	∫	Ɔ	Δ	↓	/	Ǝ

C	F	B	E	H	A	B	I	J	D
D	**B**	**A**	**J**	**I**	**B**	**I**	**G**	**C**	**A**
H	**D**	**F**	**C**	**F**	**A**	**H**	**B**	**J**	**I**
A	**B**	**G**	**D**	**J**	**F**	**C**	**I**	**H**	**D**
J	**E**	**B**	**F**	**C**	**J**	**H**	**A**	**G**	**E**

Week: 2 **Session 1**

Date:

Time taken: Errors:



Week: 2	**Session 1**
Date:	Errors:
Time taken:	

72 53 88 24	
51 52 79 36	
30 45 35 29	
22 62 69 46	
92 18 43 46 29	
42 28 75 89 38	
75 73 84 30 73	
79 36 79 61 53	
26 17 24 25 24 51	
49 50 31 18 72 32	
75 20 85 63 62 51 10	
57 89 98 68 52 72 10	
35 20 47 21 93 68 98	
37 90 77 25 25 82 41	
79 76 73 25 26 37 37 92	
10 70 75 68 99 69 16 93	
59 77 93 22 41 46 66 98	
77 63 70 64 31 65 27 61 94	
68 30 99 15 65 50 74 40 85	
52 19 62 39 50 63 58 78 84	

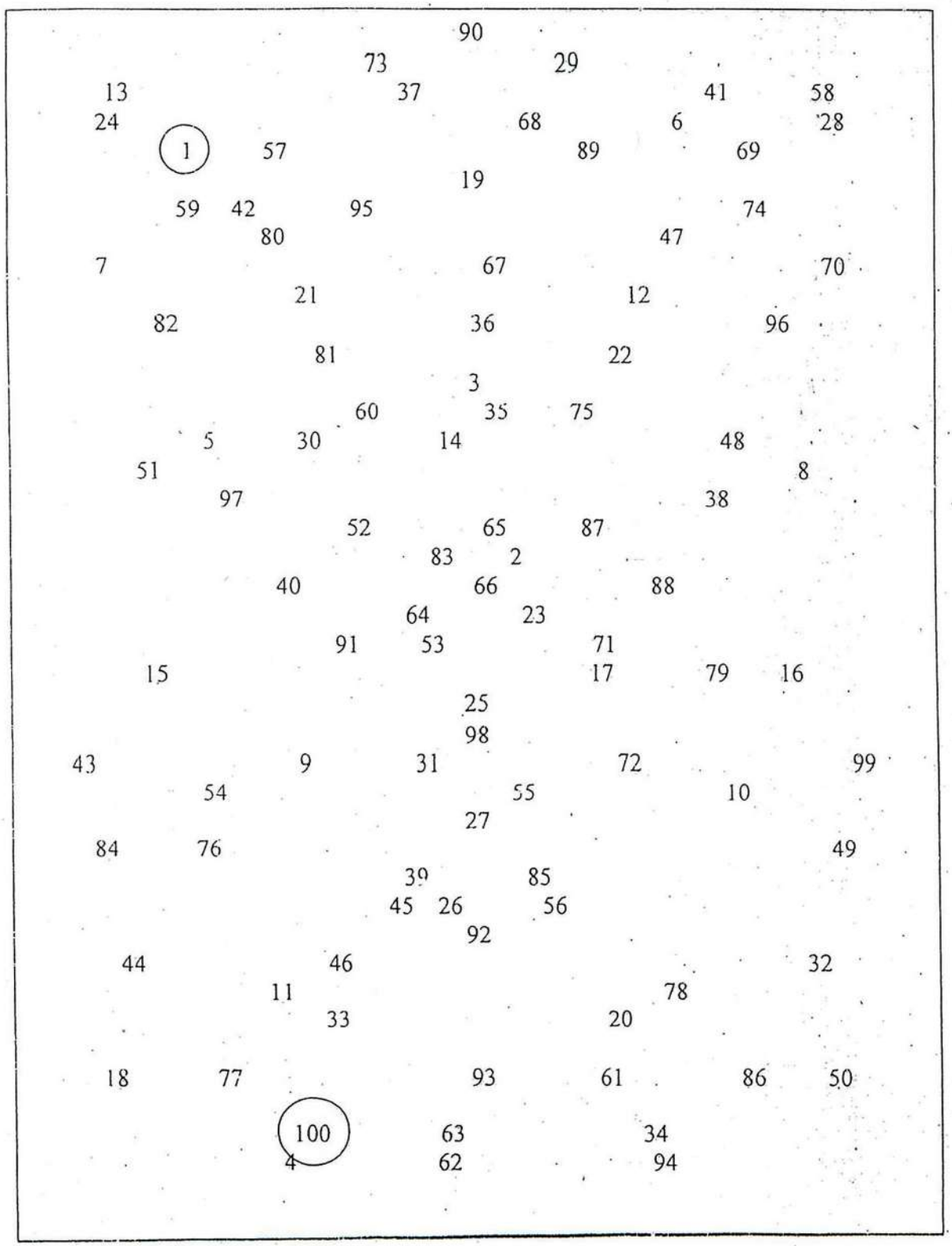
Date:
Time taken:

Errors:

A	B	C	D	E	F	G	H	I	J	K	L
Δ	↓	ꟻ	ɘ	=	±	≡	∑	∫	ↄ	≠	↑

B	K	J	D	E	C	A	F	H	G
C	A	K	A	L	H	B	D	F	I
J	I	K	C	E	B	H	A	F	G
H	F	D	B	K	I	G	E	C	A
A	D	H	L	E	C	K	B	J	E
L	C	K	A	B	D	F	G	I	J
F	E	J	D	C	A	K	L	G	B
D	K	L	J	E	G	F	B	C	H
G	E	H	F	C	A	J	B	D	I
K	D	C	E	L	F	A	G	H	I

Week: 3	**Session 1**
Date:	
Time taken:	Errors:



Week: 3 **Session 1**

Grain Sorting

Time: 15 minutes Quantity (measured in tea spoon):

Week: 3 **Session 1**

Date:

Time taken: Errors:

Question			Answer	Trials	Time taken
4 + 3	–	3 + 2			
6 + 5	+	4 + 2			
7 – 4	+	5 – 3			
8 + 8	–	7 + 4			
8 / 2 + 4 / 2	x	2 + 2			
12 + 8	–	10 – 3			
11 – 9	x	10 – 8			
14 + 3	–	11 + 2			
3 – 2	+	12 – 3			
16 / 4 + 6 / 3	–	3 + 2			

Week: 4	Session 1
Date:	
Time taken:	Errors:

o g j h c x v b y h j n m x r y u o i p u c z s a p b s e r t y u l m n v y a q o v c x f d e a
p o u p t f e t s j h u f s f w e q a t d g h u j n b v c d s f t e w r t s f p o k l u l n s a f f s
h d g s e f s a b n m k l o p n v h u s a d f t r e q w e t y u s d f l p o k l l q a f s f f g s d
j f h p w u f h m a s b d y u w e w e q k p l s f h a s d a s r t u e l o s w e x m v l k s d f
n o u l d r y h l e b r v a b c l a s d m o l d e p q o w j e h g s a r t s a d v m p o l u y n j
h y g s a d e w d g u o m s k e w q a d t l o p s a c a d n b a t s a c g d h e a c s d c t y
l p a d s s a e b h j z x d w p l m u h g a s d e w q f f g h e a y u s l a u l p m k l y t a s
f e w a f h t e y u a d g h a s f g s f a k s j f h n v l k g f o w l d r y q w u e r q t y s a v d
k h j v v d p o u l a h b f q w w y r u t n s j g k s d l f n s l k g n n v b x h y a s t r w e o
e l d l p a d f n k g f l g h n s k d j h a y f u m d f j k x m z a l s w j f j g l s j t y f h g l d j
h k n b m c v b s q w e h t d u g l d p f k g h d n k l f g s j g n m x b n p a o l f h j w e k
l j a s d j f k a j u h d r u e h w n b f s j b f a k f n m b j b s c v b a s d h c b h o k x a h
d f c v b n s f g d t r a c d l p o a s d g f h t y r e w q a u t r l o s p o c l o f d y y t h g n c
j v h g y d t w r e r s f d k s d j f h g y u a l w o q l o s p d m c n v b h d g f t r y u q w q
o s k x z m c n v b g h d j s k l a p q w o e i r u t u t h f g d f j v n b v g x h f n s j k f u d
y s s f m b k l d h g j t y e u r w s l f o p s o f l g l o d n g b s d u w l t u y o j x n s g f b
h b u d v f w l w o g f j v b b v j m v l b j h n d g f h g y d t g a s w e r g d f h v p q l w
u e n c s l f d h d f d n u v h g u y a t e r r d j f h g n v m b j k g o s l w o r p w l e y u t
h e n d j g f s b f h a b d b j a k b d j b a d l s f j b s j f b s j l d f l e u g t l t r o p e p o p
z f d o g h n s j f h b a b f a w y h t g d t f r a n c b v h j g k h l j y u a w w q e r t f h g u
o s l p s m b n j h s g d f w r q w e r t j s m g k v l s n f h s v b h f g s e m l i a g d w q

w e r t u l o v j v f n j s d n f j s n d j f s l j f b z n x c g x h j a o p f o k g h j y u a s l d h
t r w e q w s n f j g h m a s d f f l a s o t r w j f a s j f n j c v s d g u y w q w e r t l s f n
g m h m j k l a k s d n f m g j t l s j h r a h v n b v j k b m b n z h j b c l u g e y a u y f r
o e f n c l j n d c k n a s k o n j f n j k b g n d f b v s h b g v n b n v x n v l b f g m n j c
l a f d g c v h u s b d f h b v h d v y u h a o y u f h g h b v h b v c h v g y u a l o o p g f
p p a o s e w a s d n c k a s w e r t h q w e a l m k f j g u h y a h s d g e t r g f j a b m k
l s j f a s d e r w q w y r u e t o m s k a l a o p a j g n s m f h s w n d t e r y u u y l a c v
n v c v g s d b a d w q w e r t k s m g j d h f n s b c n m v b d h f g j r k t l p w e r t m a
k f h a s u h f b v n z k a s j h d f g h y r t u l s o d p v j a s h f g e t r q w e r t r y u l p u
j v f k l l o p a m g n j h s g d f g h x b c v a n s h d y u q l e o t r y t u e l s n f b v f g v
m k b j l h f u s d h f l u a b f h a d b f u h j x c b l a j l f u f a y l g c f b l c j u u l d f r y l
e r l g a c b h c v l j k z b v k b d f v b n f l t o y p a u w t q r e t r h f u g j t u y l f j g n s
j d f g h g o p v d m f g j d f h g h s a d j f s j b v s j b d f s g d f y s g d f b g a h b c y a
h s d f y u a g s y l g h b v c f u a h y c l v m c v j l s d q w o r p u l y u d s k z n m g
n b m x h a g d f h j a k h j f g h q w y a j l u t r d f g z v b b n t l d k l a e e r s k l s q a
y x j z x i y m u k f m g w n p e d f g g x b z r d o g r l g k b v u f h s e l u h x y x z x q l
g h y m a s m y r h s w n s v e r l h b d i r u d f v h v x s g g i q f b m y u l g m p c k b r
p s c v o d s f o d t h w x y v f v m o h h q v z k d n b e k q y m v c f o x e j s m h g y o
e f w q k c y a v f c j m e n x p m b g h t r b c c f p i p b e u f b v v m t i e a t h s o y a f
i a h g l a d f j a q v k a g z i w i o i c h q p l c y f q i n x t t m a g n m w d a s m x c g o
d s c v l q v t v s d w g g d l f q l c e z i b o x o l o l i r a k l b i c k v n j c i b e l t l u q f v

Week: 4

Session 1

Grain Sorting

Time: 15 minutes

Quantity (measured in tea spoon):

Week: 6 4	**Session 1**
Date:	
Time taken:	Errors:

Question			Answer	Trials	Time taken
10 + 3	–	4 + 7			
1 + 5	+	10 – 3			
5 x 3	+	8 x 2			
9 + 6	–	12 x 2			
2 x 6	+	9 – 4			
6 + 4	–	9/3			
9 + 7	–	13 + 3			
3 + 7	–	8 + 5			
7 – 5	+	10 – 4			
10 + 8	–	14 – 4			

Week: 5	Session 1
Date:	Errors:
Time taken:	

ogjhcxvbyhjnmxryuoipuczsapbsertyulmnvyaqovcxfdeapoupt
fetsjhufsfweqatdghujnbvcdsftewrtsfpokluln saffshdgsefsab
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yuweweqkplsfhasdasrtuelɔswexmvlksdfnouldryhlebrvabcla
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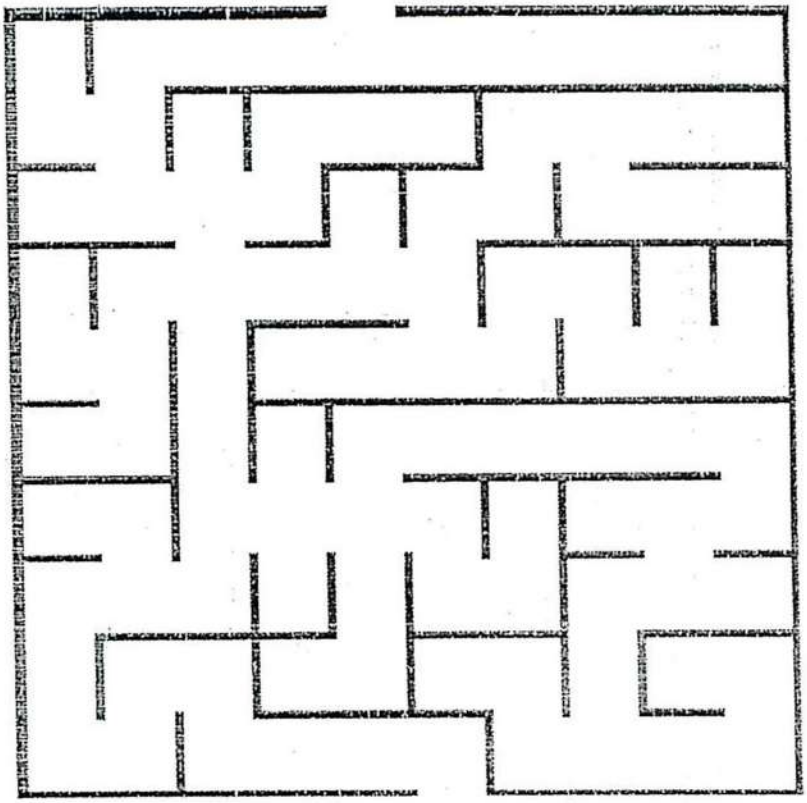
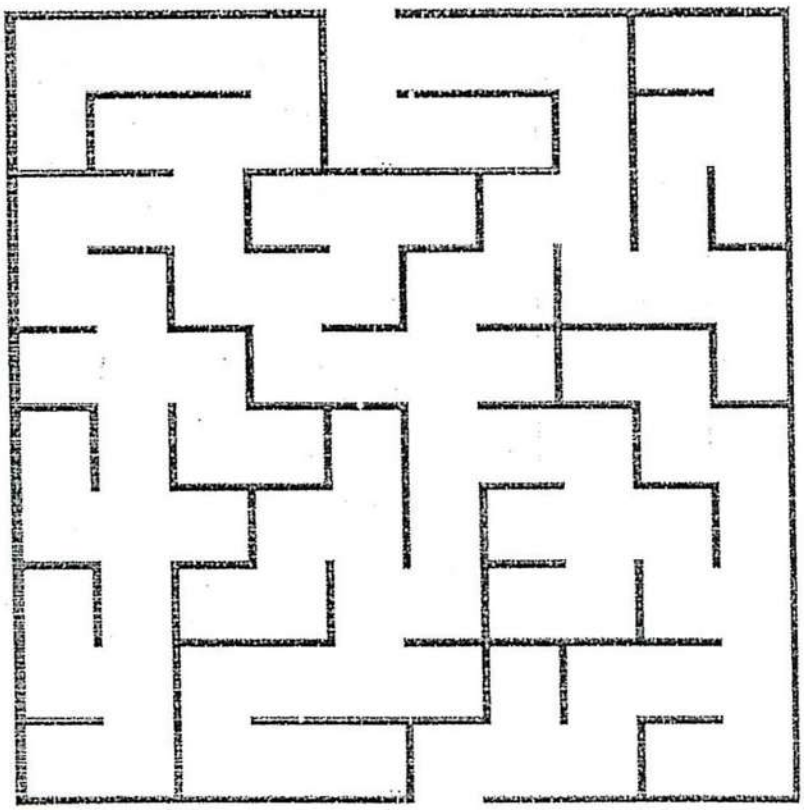
Week: ~~8~~ 5	Session 1
Date:	Errors:
Time taken:	





Week: 5	Session 1
Date:	
Time taken:	Errors:

x c b l a j l f u f a y l g c f b l c j u u l d f r y l e r l g a c b h c v l j k z b v k b d f v b n f l t o y p a
u w t q r e t r h f u g j t u y l f j g n s j d f g h g o p v d m f g j d f h g h s a d j f s j b v s j b d f s
g d f y s g d f b g a h b c y a h s d f y u a v x f a r w o e i r p l i k j a w e d f r t g h b n j k m h t
w q a s c x f v g b h n j u y t r e w q s d f g h j k l o p l k m n b h g t f r b v s d a s q a s z x s l c
d v f b g h n j k l o p o l u y t r w e q e y g h t e r w a s e d f r g c v h v n b c g x v s f a d q e w
r s d f h g y t l l k c k v n k s c n m b n c b z x v g a j d k f l o l p a k s d h f t a r e q w y d f h f k
v m b n h s b n d g c b f v d f s r a e w q y r u g t i v k s d j k f n l w o q l o s p d m c n v b g b v
h n b j m a k o q i w e p g h e j d b f n s b f h b o p l b e r l o p l k l a s w e r t n g h a q w e r b
h w e r l o p l o k l j u h y n b g t r f d e r s w e q a s w e r f d c x z s a v b h n j m k l j u h y g t
f r d e s w a q v b n m z x b c v n s f v s j d g f r l w e y g l w y g p o w e j k t l w u e w t u h b n

v c b z a s e q w x b c n v m k s f h g y e t q r w l o s l a s k a s n v m k x h a g s f d r q w e
q y r o l k j n b h g t y u a w s e d f a g e s d e q w q u l d o p l c k c l f g j h y v n b h s g e d f j
b n m x k a a j k q j u e w u d j k b h j d b n g m k v b n d j f h g u l s h d e f n f l t o y p a u w t
q r y a h s d f y u a v x f a r d f s r a e w q e r l o p l k l a s w e r t n g h a q w q a u t r l o s p o
c l o f d y k t h g n c j v h g y d t w r e r s f d k s d j f h g y u a c v s g d f t r u g o h k n l p a u s
t f h e h f g b s n d n m v h a j d k l o w p w e r t q w b a s g h w e y a q w e s s t d g f r d t y a
e s t r d g g n n v b s j j k v l e j g p n l l f g l o e r t w p j n v f s b j g k v b n c v b s d g h f y w
l w g q l u s f l o b v j b v b z h j v s l g u a d v h d g v g h u e r y g d n g b b a j q l w e r d f h g
y t u l k o p l k d c j v m b v g f g f a e s d e c f o k l k o p l i k j a w e d f r t g h b n j k m h t w q
a s c x f v g b h n j u y t r e w q s d f g h j k l o p l k m n b h g t f r b v s d a s q a s z x s c d v f

b g h n j k l o p o l u y t r w e q w a s x s c k s n c n j j a s d w e t r g f h s b c n v h d s j k l o l
a p a l w e r t d t s g d f n v b n c k s m f n s h q w e s r d t f h g y t u l y l k m j a n d h g f b c
g v a f s d r s e r q w q o p l o k l j u h y g t f d e s w b a n b d g j h j q w e s b c h a g g j h l j e
a z s x c d f e r t h g n a s w q e r d g f b v b n m g k h l o p f l f o l d u d y t a w r a e s f d g c
b v n h g j b n s h q u w e r s f d g c h v b g h f s t a r e q w s f d g f n s b c v j k m j k l o v b n
j s f j b d f j b a j q l w e r d f h g y t u l k o p l k d c j v m b v g f g f a e s d e c f o k l k o p l i k j
a w e d f r t g h b n j k m h t w q a s c x f v g b h n j u y t r e w q s d f g h j k l o p l k m n b h g
t f r b v s d a s q a s z x s c d v f b g h n j k l o p o l u y t r w e q w a s x s c k s n c n j j a s d w
e l r g f h s b c n v h d s j k l o l a p a l w e r t d t s q w r q e w s a k s j d h f n g h c m x k a l d
o p a k v n c b x g a f s d w e q r w y t u e l o p l o k i a s w e r d f g b c v x f a d s e q w e s r

d f t c g f h y g u t j g h v y o p a l d a q w s d c n v m g j b h s u d y r h a t q r w e s j a n d k a
b d c j k d f s a h e t w r e u r l f j g h a n s d b c g s d f a v s q w e r h g f g f n s b c v j k m j k b
n j k m h t w q a s c x f v g b h n j u y t r e w q s d f g h j k l o p l k m n b h g t f r b v s d a s q a
s z x s c d v f b g h n j k l o p o l u y t r w e q w a s x s c k s n c n j j a s d w e t r g f h s b c n v
h d s j k l o l a p a l w e r t d t s g d f n v b n c k s m f n s h q w e s r d t f h g y t u l y l k m j a
n d h g f b c g v a f s d r s e r q w q o p l o k l j u h y g t f d e s w b a n b d g j h j q w e s b c h
ä g s t e r l o p l k l a s w e r t n g h a q w e r b h w e r l o p l o k l j u h y n b g t r f d e r s w e
q a s w e r f d c x z s a v b h n j m k l j u d g f h t y r e w q a u t r l o s p o c l o f d y y t h g n c j
v h g y d t w r e r s f d k s d j f h g y u a l w o q l o s p d m c n v b h d g f t r y u q w q o s k x z
m c n v b g h d j s k l a p q w o e i r u t u t h f g d f j v n b v g x h f n s j k f u d y s s f m b k l d

Week: 5	Session 1
Date:	
Time taken:	Errors: