



# POST BRAIN INJURY EFFECTIVENESS OF METACOGNITION STRATEGY TRAINING IN YOUNG ADULTS- A REVIEW LITERATURE



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## ABSTRACT

Brain injury is an umbrella term in which there is an insult to the brain and its vital structures either through direct external injuries where fall, road traffic accidents, sports injuries assaults cause injury to grey or white matter of the brain. Or there is a secondary injury to the brain post-infectious disorders, inflammatory disorders, and autoimmune disorders. A head injury might cause loss of motor control, sensory control, poor balance, and coordination. Cognitive activity, specific meta-cognition, is highly affected, causing a lack of self-awareness of actions in patients with persistent long-term symptoms. Head injury in a young adult causes long-term difficulties in learning, memory problems abstract thinking, which causes massive difficulty in their learning performance in the later stage of life. Metacognitive strategy learning and cognitive rehabilitation in the later stage of brain injury improve the learning capabilities and abstract thinking and help them improve their self-awareness and thinking capabilities.

**Key message:** Metacognition strategy training along with cognitive rehabilitation therapy improves the learning disability and abstract thinking in young adult with brain injury.

**Keywords:** Metacognition, Strategy training, Head injury, Memory, Cognition rehabilitation, learning disability.

## 1.0 INTRODUCTION

Metacognition is a broad term that refers to the systems that underpin people's thinking and information processing<sup>1</sup>. Although other definitions of metacognition can be found in the literature, the most prevalent one is that metacognition is defined as persons having knowledge of their cognitive structure and being able to arrange it. Metacognition is about awareness of thinking process, abstract knowledge and learning abilities. Intelligence is a type of higher-order cognition that also includes metacognition. The role of metacognitive processes is crucial. Metacognition is the ability of humans to reflect on their own perceptions, ideas, and actions it is therefore widely characterised as cognitions about cognitions, or thinking about one's own thinking<sup>2</sup>. Post brain injury it is found that there is loss of consciousness, cognitive abilities but there is also loss of metacognition. Young adults in later stage of rehabilitation comes out with difficulties in learning and thinking abilities. Because of varying definitions of brain injury, varying Brain Injury severity levels, determining the incidence of Brain Injury in the general population can be

problematic. Furthermore, prevalence reports differ from one study to the next. In one meta analytic study it was concluded that the prevalence of brain injury in the adult general population was total of 12 percent of the 25,134 adults in 15 studies<sup>3</sup>, all from industrialised countries, had a history of Brain Injury. Men were more than twice as likely as women to have suffered a Brain Injury, implying that male gender is a risk factor for Brain Injury. For young adults studies reveals that the average annual incidence for this age group was 1.10–2.36 per 100, with a 30 percent overall prevalence. For those aged 0–14, falls were the most prevalent cause of injury<sup>4</sup>, followed by contact sports and motor vehicle accidents for those aged 15–25. Approximately one-third of those who suffered brain injury went on to sustain one or more subsequent injuries. There are less study emphasising impact of metacognition on consciousness and cognitive abilities, and hence this review study has been conducted to determine the importance of metacognitive strategy training which enhances metacognition and improves the cognitive ability of patient in later phase of rehabilitation and improves their quality of life.

## 2.0 METHODOLOGY

A literature search was conducted across PubMed and Science Direct databases, including the reference lists of relevant papers which ranged in duration of 2018 to 2021. The specific terms used for identifying relevant literatures were: "Metacognition, Strategy training, Head injury, Memory, Cognition rehabilitation, learning disability". Reference lists of articles obtained from this search were also examined for additional relevant articles. The inclusion/exclusion criteria for studies were based on their potential relevance to the studies including correlation between metacognition strategy training and its effect on learning abilities in young adults patients post brain injury.

## 3.0 DIFFERENCE BETWEEN COGNITION AND METACOGNITION

All of the processes that transform, reduce, elaborate, store, retrieve, and utilise sensory input are referred to as cognition. Attention and focus are two examples of cognitive skills, information processing and comprehension, Memory. Communication, organizing, planning, and putting things together are all important steps in the process. Problem-solving, decision-making, and judgement are all aspects of reasoning. While explaining the notion of metacognition, it will be helpful to clarify the differences between cognition and metacognition. Though they are connected, the ideas of cognition and metacognition are distinct. While metacognition is required to comprehend how a task will be carried out, cognition is required to carry out the activity. Cognition refers to being aware of and comprehending something, metacognition refers to being aware of and comprehending how one learns. Metacognition, or the capacity to notice one's own mental processes, is one aspect of self-awareness. Metacognition occurs differently in various people, reflecting differences in metacognitive ability. Individuals with decreased cognitive ability, such as those who have had a brain damage, may be particularly affected by these disparities. Metacognition is divided into two categories: metacognitive knowledge and metacognitive experience. Metacognitive knowledge refers to a person's overall understanding of their capacity to do a task, while a person's capacity to monitor and evaluate their present, continuing performance on a task is known as metacognitive experience.

## 4.0 IMPACT OF HEAD INJURY ON COGNITION AND METACOGNITION

A person who has had a brain injury may be unable to focus, pay attention, or attend to more than one task at a time. This might lead to:

1. Restlessness and a proclivity for distraction.
2. Difficulty completing a project or working on many tasks at once.

3. Issues in holding extended discussions or remaining stationary for long periods of time.

Because attention abilities are seen as a "building block" for higher-level skills (such as memory and reasoning), persons with attention or concentration issues sometimes exhibit evidence of other cognitive and metacognitive issues. The problem of reduced self-awareness is one of the challenges with generalisation in brain injury therapy. The percentage of reduced self-awareness in persons with severe brain damage has been estimated to be as high as 97 percent. Impaired self-awareness refers to a person's failure to perceive and grasp their limits as a result of a brain damage. It is the goal of rehabilitation efforts because it creates major barriers to rehabilitation involvement and results in the brain injury population. Individuals with low self-awareness of their limitations after a brain injury, for example, do not notice the need to adopt rehabilitation tactics in everyday life to enhance their performance. Individuals must first acknowledge their impairments before they can autonomously adopt a strategy to compensate for these issues in daily life, according to a core premise of cognitive rehabilitation. As a result, it is critical to improve recovery. Many people find it difficult to recognise their cognitive, behavioural, and emotional problems after suffering a brain injury. Lack of self-awareness is defined as the inability to notice deficiencies caused by a brain damage. Anosognosia, or a lack of self-awareness, is common after a brain injury and can make it difficult to fully comprehend the impact that particular deficiencies have on one's ability to do daily tasks.

These domains plays major role in learning, which is severely hampered in young adults during the recovery phase post brain injury, hence metacognitive and cognitive rehabilitation therapy is much needed to improve the patient's condition.

## 5.0 ASSESSMENT TOOLS FOR METACOGNITION AND COGNITION

### 5.1 Metacognitive Tools

Raven's Standard Progressive Matrices (SPM) and Meta-Cognitive Awareness Scale<sup>5</sup> – Domain Specific (MCAS-DS) Scale Development, these are the scales through which multiple questionnaire and activities are conducted to challenge and assess the meta cognition. Under Raven's Standard Progressive Matrices, The SPM is used for 60 things. Each SPM item was given as a puzzle in a matrix style, with one component missing. There are either six or eight viable solution pieces, with only one of them successfully completing the matrix. Meta-Cognitive Awareness Scale – Domain Specific (MCAS-DS) Scale Development includes to create a meta-cognitive awareness questionnaire that is domain-specific Exploratory Factor Analysis was used to assess a 15-item measure that is produced. A five-factor approach evolved, including the components 'Awareness of Engagement in Self-Monitoring,' 'Awareness of Own Ability,' and 'Awareness of Own Ability,' among them. Also 'Awareness of Requisite

Problem Solving,' Awareness of Alternative Solutions,' and 'Awareness of Response Speed/Time is checked.

## 5.2 Cognitive Tools

**5.2.1:** The Mini-Mental State Exam (MMSE) is a commonly used cognitive function test for the elderly that comprises assessments of orientation, attention, memory, language, and visual-spatial abilities. It is a 30 point scale<sup>6</sup>.

**5.2.2:** The Montreal Cognitive Assessment (MoCA) is a commonly used screening tool for determining whether or not someone has cognitive impairment. It is again 30 point scale which is specifically used to check the domains of visuospatial abilities, short term memory, abstract reasoning, attention and executive functions.

Both of these divide the cognition into mild moderate and severe categories<sup>7</sup>.

## 6.0 METACOGNITION THERAPY

Meta Cognition Therapy is a process that uses the metacognitive paradigm to create a case conceptualization and shared knowledge of the maintenance of depression. Depression is perpetuated in this concept by difficult to regulate repeated thinking accompanied by damaging metacognitive beliefs. The goal of therapy is to enhance cognitive-attentional control and change metacognitions like these. To improve the perception of flexibility and control over thought, the attention training method (ATT) was first introduced<sup>8</sup>. ATT is administered during therapeutic sessions. Following that, detached mindfulness and rumination postponement trials are used to create a different connection with trigger ideas and challenge metacognitive notions about ruminative reactions' uncontrollability. Negative beliefs about intractable causes of depression, learning difficulties, and metacognitions about the benefits of rumination and other maladaptive mind control strategies like thought suppression, avoiding stress, and using rest and sleep to cope with thoughts and emotions are also challenged in therapy. MST (metacognitive skills training) is a cognitive rehabilitation technique that aids in the development of self-awareness in patients with Brain trauma Meta cognitive therapy tries to teach patients how to self-monitor their performance, identify and correct flaws, and devise long-term remedies. A metacognitive method strives for both on-line awareness (i.e., recognising and self-correcting flaws in task performance) and intellectual awareness (i.e., self-knowledge of strengths and limitations). This technique integrates self-awareness training elements such as psychoedu-

cation and strategic role modelling with timely verbal, visual, and sensory feedback, as well as self-prediction and self-evaluation of performance in therapy and everyday life. A Meta cognitive Therapy technique has the potential to improve compensatory rehabilitation outcomes and increase generalisation of strategy implementation outside of the therapy session. Metacognitive skills training (MST) is a cognitive rehabilitation strategy that helps people with brain injuries acquire self-awareness. The most prevalent cognitive complaint among persons who have had a traumatic brain injury is memory issues. The capacity to recall to carry out a planned action or intention at a later time is known as prospective memory (PM). Remembering to pay a payment on the due date, taking medication each morning, or passing on a message the next time you meet a certain person are all examples of prospective memory.

## 7.0 COGNITIVE REHABILITATION THERAPY

The ultimate goal of Cognitive Based Therapy is to assist patients in identifying and challenging harmful automatic thoughts, fundamental beliefs, and assumptions, as well as increasing adaptive and enjoyable activity levels<sup>9</sup>.

The paradigm is founded on the idea that depression is perpetuated by negative and erroneous interpretations of experience that emerge as 'automatic thoughts,' and that this, together with coping actions, reduces possibilities for joy and mastery in life. These characteristics are the result of underlying dysfunctional self- and worldviews.

Using collaborative empiricism and behavioural tests, automatic ideas are identified and addressed

In a study it has been found that metacognitive therapy is more effective than cognitive based therapy.

## 8.0 CONCLUSION

There is need of studies indicating effectiveness of metacognition therapy along with cognitive based rehabilitation, specifically in young adults post brain injury. Memory retention, attention focus, learning these are the most important factors making personality of individual, if these therapies are planned in initial days of rehabilitation, patients are going to have huge benefit for later phases of recovery and can also benefit the individuals for normal personality and prevents them from any further chance of neuropsychiatric trauma as well.

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