



EFFECTIVENESS OF COGNITIVE REMEDIATION THERAPY VERSUS FUNCTIONAL ADAPTATION SKILLS TRAINING IN IMPROVING COGNITIVE ABILITY AND ADL IN SCHIZOPHRENIA PATIENTS

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ABSTRACT

Background: Patients with schizophrenia have a drastically increased morbidity and mortality. The most debilitating problem in these conditions is impairments in everyday functioning. Cognitive deficits interfere with ADLs. In non-mental health settings, physiotherapists play an integral role in the management of many of the co morbidities like cognitive ability and ADL in schizophrenia patients which are associated with poor long term functioning.

Purpose: The study is aimed to determine the Effectiveness of Cognitive Remediation Therapy versus Functional Adaptation Skills Training and to find out which treatment protocol is better in to improve cognitive Ability and ADL in Schizophrenia Patients so that better and specific treatment guidelines can be formulated.

Methodology: Samples of thirty indoor (n=30) schizophrenic patients between the ages of 45-55 years with cognitive and functional difficulties in ADL were included in the study. Subjects were divided into 15 in each group by using chit method. Group A CRT n=15 and Group B FAST n=15. The study is carried out for the duration of 6 months the protocol for both the group is for 6 weeks.

Study design: Experimental study

Outcomes: Outcomes would be calculated at the start of the treatment and at the end of the last day of treatment by using General Activities Of Daily Living Scale (GADL) and Mini Mental State Examination (MMSE).

Results: Group A consists of 15 patients, there pre-treatment mean in MMSE scale was 13.733 and post treatment was 18.8 and In GADL scale, the pre-treatment mean was 12.666 and post treatment was 18.7333. This shows that there is significant difference in means of Pre-intervention and Post-intervention MMSE and GADL within Group A with $P < 0.005$. While in group B, which consists of 15 patients, there pre-treatment mean in MMSE was 13.6 and post treatment was 17.6 and in GADL scale, the pre-treatment mean was 10.533 and post treatment was 14.2. This shows that there is significant difference in means of Pre-intervention and Post-intervention MMSE and GADL within Group B with $P < 0.005$. The mean difference in Group A was 5.066 and Group B was 4.000 according to MMSE scale. And the mean difference in Group A was 6.066 and Group B was 3.666 according to GADL scale

Conclusion: Therefore we concluded that Cognitive Remediation Therapy is an effective and beneficial therapy protocol in treating the cognitive Ability and ADL in schizophrenia patients and can be used in combination with other therapy protocol.

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INTRODUCTION

Schizophrenia is a severe mental disorder, characterized by profound disruptions in thinking, affecting language, perception, and the sense of self. It often includes psychotic experiences, such as hearing voices or delusions.

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It can impair functioning through the loss of an acquired capability to earn a livelihood, or the disruption of studies (2017). -By-WHO [1]. There are a number of factors that influence stigma in schizophrenia and it is important to understand them to successfully treat the illness. In India, where about 1.1 billion people reside, the prevalence of schizophrenia is about 3/1000 individuals (Gururaj, Girish, & Isaac, 2005). It is more common in men, and in terms of age of

onset, men tend to be younger by an average of about five years than women when they develop schizophrenia. In terms of symptomatology, overall men with schizophrenia tend to have more negative symptoms, whereas women exhibit more affective symptoms (Leung & Chue, 2000). There are also differences in terms of prognosis; for example, women with schizophrenia tend to have better outcomes in terms of clinical course and occupational and social functioning compared to men (World Health Organization [WHO], 1973; Thara & Rajkumar, 1992) [2],[3].

Today the leading theory of why people get schizophrenia is that it is a result of a genetic predisposition combined with an environmental exposures and / or stresses during pregnancy or childhood that contribute to, or trigger, the disorder. Already researchers have identified several of the key genes - that when damaged - seem to create a predisposition, or increased risk, for schizophrenia. The genes, in combination with suspected environmental factors - are believed to be the factors that result in schizophrenia. These genes that seem to cause increased risk of schizophrenia include the DISC1, Dysbindin, Neuregulin and G72 genes, but it has been estimated that up a dozen or more genes could be involved in schizophrenia risk. There's a connection between neurotransmitters and schizophrenia because drugs that alter the levels of neurotransmitters in the brain are known to relieve some of the symptoms of schizophrenia. Research suggests schizophrenia may be caused by a change in the level of two neurotransmitters: dopamine and serotonin. One of the most positive areas of schizophrenia research today is in the area of identification of early risk factors for development of schizophrenia, and prevention of schizophrenia in those people who are predisposed to the disease. Schizophrenia-spectrum disorders are among the world's most disabling illnesses. Despite the striking nature of psychotic symptoms in schizophrenia, and partially related to cognitive deficits, the most debilitating problem in these conditions is impairments in everyday functioning. Cognitive deficits interfere with ADLs. Lifestyle-relevant IADLs (i.e., diet, exercise, medical care) worsen with cognitive impairment, as do motor skills, reducing physical performance. In turn, the physical capacity to carry out these ADLs suffers. Psychomotor slowing, resulting in part from reduced processing speed and interacting with other motor deficits, can exacerbate ADL disability caused by other factors (i.e., by obesity, symptoms) [4]. Schizophrenia requires lifelong treatment, even when symptoms have subsided. Treatment with medications and psychosocial therapy can help manage the condition. In addition to continuing on medication, psychological and social (psychosocial) interventions are important. These may include: Individual therapy, Psychotherapy may help to normalize thought patterns. Also, learning to cope with stress and identify early warning signs of relapse can help people with schizophrenia manage their illness. Social skills training which focuses on improving communication and social interactions and improving the ability to participate in daily activities, Family therapy. This provides support and education to families dealing with schizophrenia. Physical exercise is especially important in patients with schizophrenia [5]

Till Wykes *et al* (2007) concluded Cognitive Remediation therapy is beneficial in schizophrenic patient. Cognitive remediation therapy was developed with the aim of improving

cognition and thereby increasing the likelihood of improved functioning outcomes. Cognitive remediation therapy is an umbrella term for a number of different interventions defined by their procedural characteristics such as use of a therapist, use of a computer and the method of training. There is some evidence of efficacy for face-to-face therapy from small studies; however, no large study has investigated the effects and cost-effectiveness of face-to-face therapy. Cognitive remediation therapy 'jump starts' engagement in the cognitive system through enhancing positive reward. This is achieved by the reinforcing nature of the tasks; the encouragement within therapy to engage these cognitive systems in everyday tasks; and the improved self-esteem and self-efficacy that further encourage engagement in new tasks, which provides continued practice [6]

Thomas L. Patterson *et al* (2003) studied about the Functional Adaptation Skills Training and proved to be beneficial in schizophrenia patient. The goal of this study was to test the efficacy of an intervention aimed at everyday living skills training, titled "Functional Adaptation Skills Training (FAST)," specifically designed for community-dwelling middle-aged and older patients with schizophrenia or psychotic mood disorder. They hypothesized that patients participating in the FAST intervention would show greater improvements in everyday functioning and in psychopathology than patients randomized to receive treatment [7]

Christopher R. Bowie *et al* (2012) studied Combined Cognitive Remediation and Functional Skills training for Schizophrenia: effects on Cognition, Functional Competence, and Real-World Behaviour. The result that improvements in functional competence were greater and more durable with combined treatment [8].

While the goal of the study was to test the efficacy of an intervention aimed at everyday-living skills training, Together these new treatments hold significant promise of a better life in the future for people who have schizophrenia. Therefore, Cognitive Remediation Therapy (CRT) and Functional Adaptation Skills Training (FAST) are one of those treatments, which are effective in treating the positive and negative syndrome of the disease. There is a need of study for comparing the two treatments i.e. CRT and FAST and to see which one is more effective.

METHODOLOGY

This Experimental study is to evaluate the Effectiveness of Cognitive Remediation Therapy Versus Functional Adaptation Skills Training in improving Cognitive Ability and ADL in Schizophrenia Patients. This study was conducted in Parul Sevashram Hospital Limda, Vadodara. Samples of thirty indoor schizophrenic patients between the ages of 45-55 years were included in the study. The subject who met the inclusion criteria was included in the study. An informed written consent from the patient's guardian was taken. Initial psychotic assessment is done and subjects were divided into 15 in each group by using chit method. Group A CRT n=15 and Group B FAST n=15. The study was approved and conducted between 2016 and 2017 in accordance to the guidelines of the local ethics committee of the PSH. The study is carried out for the duration of 6 months the protocol for both the group is for 6 weeks. Evaluation is taken before start of the treatment and at

the end of the treatment with the use of GADL and MMSE [9], [10], [11].

Inclusion Criteria: Both genders will be included in the study, Patient who is able to understand and follow simple verbal instruction, Age between 45-55 years and patients who are diagnosed with schizophrenia by the psychiatrist.

Exclusion Criteria: Mental retardation, other neurological and cardiovascular disorder patients are excluded from the study, Aphasia, Presence of severe visual disability and visual field effects, any other psychological interventions, orthopaedic deformities.

Procedure

Treatment Duration of both the groups was 60 minutes for 6 days for 6 weeks.

Group A (Crt)

Cognitive remediation therapy consists of 60 minutes per day face to face sessions. The therapy consists of three general clinical principles. [7]

- a. Teaching (or facilitating learning of) new efficient information processing strategies
- b. Individualising therapy
- c. Aiding the transfer of cognitive gains into the real world

The three main outcomes measured were Cognitive flexibility

For cognitive flexibility, patients were given computer assisted brain training games. Patients were made to play the game named "SKILLZ LOGICAL BRAIN GAME" which includes different levels with increasing difficulty. Each level improves skills, memory, and speed, teach colour coordination, and train patient's reflexes. Each level test patient's abilities to their peak. After each level, the results are ranked between 1 to 5 stars and will be rewarded with number of brains.

Planning

For improving the planning feature, patient is made to do spatial/writing skills. The level was increased as the patients were able to complete the task in a particular level. The task is as follows:

We have drawn different shapes on paper with pencil or brightly coloured markers and asked the patient to copy the shape. They were also asked to copy straight lines, curvy lines, circles, squares and triangles.



Fig 1 Patient performing planning task in CRT

Working memory: Recall of pictures, Place two different cards with picture of fruits, face up on a table and allow the patient to view the cards for 5 seconds. Turn the cards face down. Patients were asked to point to the cards as they were named. Periodically ask for a card that was not among those shown.

Increase the number of cards to a maximum of 5 as the student progresses, and then to 8.

Group B (Fast)

FAST is for community dwelling middle age patients with schizophrenia or psychotic mood disorders and it is also very effective in everyday functioning. The treatment was conducted on fifteen patients for a weekly session of 60 minutes per day for a period of 6 weeks. [6]

The technique mainly focuses on improving function such as follows

- Social skills
- Communication skills
- Organization and planning
- Financial management

Social skills

Recall of story material: In this technique we had to make the patient to read the story or we read them the story and make them listen to the story and once done asked questions from the story such as:

- What is the title of the story?
- What is the place mentioned in the story?
- What is the name of the main character of the story?

Communication skills

In it we had made the patient learn the different gestures and make them perform it accordingly as displayed in the picture given such as: Happy face, angry face, sad face, surprised face



Organization and planning

Obtained wooden blocks of similar size that can be easily manipulated with a single hand. We took jenga blocks on a flat firm surface, ask the patient to stack the blocks as high as possible, paying attention to the alignment of edges. Then further increasing the difficulty level we asked them to remove blocks one at a time from the top of a stacked array without knocking over the stack. Furthermore, we asked to remove blocks from the midst of the stack.

Financial management

Stack up a pile of coins in front the patient and we sat beside the patient and make them identify different coins according to their number, shape, and sizes and show them by arranging it yourself once and then have them arrange it later accordingly.

Outcome Measures

Mini Mental Scale Examination Scale (Mmse).

The Mini Mental State Examination (MMSE), which is a tool that can be used to systematically and thoroughly assess

mental status. It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30. A score of 23 or lower is indicative of cognitive impairment. Since its creation in 1975, the MMSE has been validated and extensively used in both clinical practice and research.[11]

General Activities of Daily Living scale (GADL).

In General Activities of Daily Living Scale: a multidimensional measure of activities of daily living for older people. Three factors of ADL (self-care, domestic activities, and complex activities) were identified and used for item reorganization and for the creation of a new inventory, called the General Activities of Daily Living Scale (GADL).[9]

Statistical analysis

Statistical methods

Descriptive statistical analysis was carried out in the present study. Out Come measurements were measured using MMSE and GADL presented as mean ± SD. Significance was assessed at 5% level of significance p<0.005 (2-tailed hypothesis test considered).

Statistical tests

Paired ‘t’ test as a parametric had been used for analysis of Mini Mental Scale Examination and General Activities of Daily Living Scale within the Group A and Group B with calculation of percentage of change.

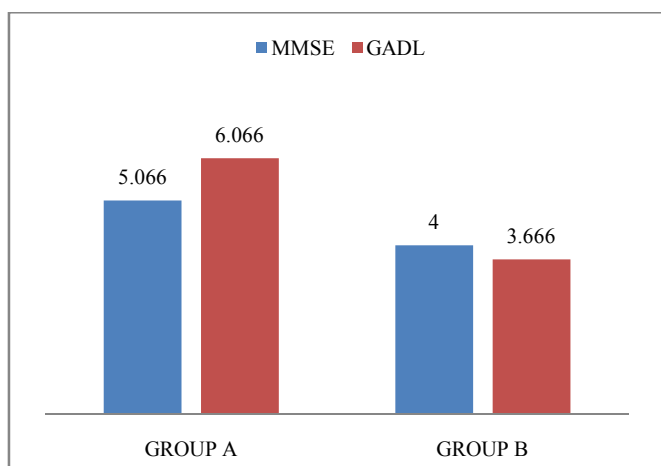
Independent ‘t’ test as a parametric had been used the compare the means of Mini Mental Scale Examination Scale and General Activities of Daily Living Scale between the groups with calculation of percentage of difference between the means.

Statistical software

The Statistical software namely SPSS 17.0 was used for the analysis of the data and Microsoft word and Excel had been used to generate graphs, tables etc.

Comparison of group A and group B with respect to MMSE and GADL with their mean differences

Outcome	Groups	Mean	SD	t-value	P-value
MMSE	Group A	5.066	0.961	2.359	0.026
	Group B	4.000	1.463		
GADL	Group A	6.066	1.579	5.227	0.000
	Group B	3.666	0.816		



The above graph shows that there is statistically significant difference in comparison of means difference of MMSE and GADL in group A and group B.

RESULTS

We took 30 schizophrenia patients with mean age of 50.3 yrs. Group A consists of 15 patients, there pre-treatment mean in MMSE scale was 13.733 and post treatment was 18.8 and In GADL scale, the pre-treatment mean was 12.666 and post treatment was 18.7333. This shows that there is significant difference in means of Pre-intervention and Post-intervention MMSE and GADL within Group A with P<0.005. While in group B, which consists of 15 patients, there pre-treatment mean in MMSE was 13.6 and post treatment was 17.6 and in GADL scale, the pre-treatment mean was 10.533 and post treatment was 14.2. This shows that there is significant difference in means of Pre-intervention and Post-intervention MMSE and GADL within Group B with P<0.005. The mean difference in Group A was 5.066 and Group B was 4.000 according to MMSE scale. And the mean difference in Group A was 6.066 and Group B was 3.666 according to GADL scale. This shows that there is statistically significant difference in mean MMSE score and GADL score between Group A and Group B.

DISCUSSION

Our findings suggest that among older patients with very longstanding schizophrenia or psychotic mood disorder, the 6-week CRT intervention was feasible and produced global improvements on a performance-based measure of everyday functioning. These improvements were evident immediately after completion of the intervention program and may persist at a 3 months follow-up.

Following the end of therapy there was a continuing improvement in cognition, in cognitive flexibility. While the study is aimed to determine the Effectiveness of Cognitive Remediation Therapy Versus Functional Adaptation Skills Training and to find out which treatment protocol is better in to improve cognitive Ability and ADL in Schizophrenia Patients so that better and specific treatment guidelines can be formulated.

We took 30 schizophrenia patients with mean age of 50.3 yrs. Group A consists of 15 patients, there pre-treatment mean in MMSE scale was 13.733 and post treatment was 18.8 and In GADL scale, the pre-treatment mean was 12.666 and post treatment was 18.7333. While in group B, which consists of 15 patients, there pre-treatment mean in MMSE was 13.6 and post treatment was 17.6 and in GADL scale, the pre-treatment mean was 10.533 and post treatment was 14.2.

There are many new and improving psycho-social treatments and cognitive therapies for schizophrenia that are being rolled out with significant success. Together these new treatments hold significant promise of a better life in the future for people who have schizophrenia. It is a devastating disorder for most people who are afflicted, and very costly for families and society. Already researchers have identified several of the key genes - that when damaged - seem to create a predisposition, or increased risk, for schizophrenia. The genes, in combination with suspected environmental factors - are believed to be the factors that result in schizophrenia.[14],[15][20]

Poor memory has been highlighted in a number of studies as predicting poor overall outcome. It was assumed that cognitive improvements would lead to functional change, and this is one of the reasons that cognitive remediation therapy was developed. However, few studies have measured the functional effects at a time when it might be possible for cognitive improvement to have had time to translate into functional changes.[13][18][19] In this study there was support for a model in which change in working memory had a beneficial effect on social behaviour 6 weeks after the end of therapy. The cost-effectiveness analysis has demonstrated that this translates into a small price to pay for memory improvements which are likely to produce further benefits on social behaviour. Wykes & Reeder (2007) have suggested that for change to occur routine behaviours, cognitive capacity of the sort measured by neurological tests must change. The outcomes measured were the Mini Mental State Examination (MMSE), which is a tool that can be used to systematically and thoroughly assess mental status. It is an 11-question measure that tests five areas of cognitive function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30. A score of 23 or lower is indicative of cognitive impairment. The MMSE takes only 5-10 minutes to administer and is therefore practical to use repeatedly and routinely. Since its creation in 1975, the MMSE has been validated and extensively used in both clinical practice and research. And the other scale was General Activities of Daily Living (GADL), the purpose of the scale was to evaluate the psychometric properties of a multidimensional measure of activities of daily living (ADLs) based on the Katz and Lawton indices for Alzheimer's disease (AD) and mild cognitive impairment (MCI). Three factors of ADL (self-care, domestic activities, and complex activities) were identified and used for item reorganization and for the creation of a new inventory, called the General Activities of Daily Living Scale (GADL).

According to the statistical analysis cognitive remediation therapy come up to be effective in the more chronic nature of the impaired functioning in schizophrenia. There was a durable improvement in working memory 6 weeks after the end of therapy, a significant improvement at follow-up in cognitive flexibility. In fact, nearly half of the people who scored at a very poor level on working memory performed within the normal range following therapy.[6][16]

Although Functional Adaptation Skills Training has several strengths, including use of a theory-based intervention specifically designed for older psychotic patients and the use of a randomized longitudinal design, it also has several limitations, such as its reliance upon performance-based measures. Although performance-based measures may reduce self-report bias, when faced with the real world, in all its complexities. The present study did not examine the effectiveness of our intervention in relationship to gender, patterns of symptoms, or past psychiatric history. Considering factors such as these may provide information to suggest more specific intervention designs. The other limitation was that FAST treatment needs caregivers and family members to carry on the tasks and implement in their daily functional activities. [7][8]

Therefore, by the end of the treatment there was gradual improvement in the working memory and cognitive flexibility but the Planning tasks has little less improvement then the other two components in cognitive remediation therapy. While

the functional adaptation skill training has 4 components which includes social skills, communication skills, Organization and planning, improvement was observed at the end of the study but not a significant one as compared to the other group (CRT).

CONCLUSION

Therefore we concluded that Cognitive Remediation Therapy is an effective and beneficial therapy protocol in treating the schizophrenia patients to improve cognitive ability and ADL and can be used in combination with other therapy protocol.

Future Scope

Study can be conducted in younger patients too. The duration of the treatment can be prolonged 6 months to a year.

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