Cognitive Rehabilitation: A Multimodal Approach
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ABSTRACT
The paper discusses cognitive rehabilitation as a complex multidimensional process that involves patients, their families and their physical and social environment. A series of studies conducted by the author and her research team on patients with closed head injury, schizophrenia and epilepsy have shown that behaviour modification, cognitive stimulation and substitution-transfer techniques can be very successful in dealing with the cognitive, emotional and behavioural problems of patients with brain injury. It is stressed here that cognitive rehabilitation achieves the greatest improvement in a client’s cognitive functioning by training better thought processes, and by interventions that enhance two or more other modes of processing. The paper focuses on the home-based cognitive intervention programmes. The cooperation, involvement and support of the family members play vital role in bringing about significant improvement in the brain-injured patients. Need for conducting awareness programmes for educating patients, their family members and even medical professionals with regard to the nature of cognitive deficits and knowledge of what can be successfully treated has been highlighted.

INTRODUCTION
According to Sohlberg and Mateer (1989), “Cognitive rehabilitation refers to the therapeutic process of increasing or improving an individual’s capacity to process and use incoming information so as to allow increased functioning in everyday life”. In a recent book these two authors go on to suggest that the term “cognitive rehabilitation” is too narrow and it is better to talk about “rehabilitation of individuals with cognitive impairments” (Sohlberg & Mateer,
2001). This seems a sensible suggestion as it implies that people with cognitive
impairment may have additional problems that should also be addressed in
rehabilitation programmes. According to Wilson (1997), we have moved on
from the early days of cognitive rehabilitation with its emphasis on drills and
exercises to try to reduce basic impairments, to a more individualised approach
addressing the everyday manifestations of these impairments, i.e., disabilities
and handicaps.

Cognitive rehabilitation is actually a complex multidimensional process
that involves the patients, their families and their physical and social environment
(Anderson, 1992). According to Green (1993), there are three basic approaches
to the remediation of elementary cognitive functions: general stimulation,
substitution-transfer, and behaviour modification.

The general stimulation approach requires that the patient perform repetitive
drills and exercises in an attempt to remedy a deficiency. Often the tasks that
are used to identify deficits through neuropsychological evaluation procedures
also serve as the exercises for remediation of the deficits with general
stimulation. Though this provides for excellent monitoring of the patient’s
progress, it runs the risk of confusing the dependent measure with the underlying
construct that the measure is supposed to reflect. However, generalisability of
the results outside the clinical situation remains questionable.

The substitution-transfer approach provides the patient with alternative
strategies for achieving goals. Examples of this approach include the functional
adaptation model (Wilson, 1989) and the extensive work of Luria and colleagues
(1969). The aim of this approach is to have an intact part of the brain take
over the functions of the damaged region. Research studies by Gupta and
Rikhye (1997), Gupta and Naorem (2003a,b) and Gupta and Wadhwa (2003)
on patients with closed head injury, schizophrenia and epilepsy have shown
that substitution-transfer techniques for face and name recall can be very
successful. Subjects who received training based on high-imagery
transformations of names and prominent facial features showed a significantly
greater improvement from pre- to post-tests as compared to the control
groups.

The third approach uses the behavioural learning principles (e.g.,
reinforcement, response cost, modeling, shaping) to improve performance.
This approach has shown some efficacy, especially when brain injury results
in severe intellectual or behavioural disturbance. A behavioural intervention
also seems relevant to schizophrenia, because this approach lends itself to
situations in which processing structures are intact but motivational aspects
are lacking (Gupta & Wadhwa, 2003).
The work of Brenner and his colleagues (1990) described the Integrated Psychological Therapy (IPT), a comprehensive programme to improve social competence by first enhancing basic cognitive skills. Brenner’s model of vicious circles (Brenner et al., 1992) is a very useful tool for interpreting how cognition works during cognitive rehabilitation. For example, in case of schizophrenia, Circle 1 combines the elementary and more complex cognitive dysfunctions. Deficits in elementary cognitive processes like attention and early perception diminish the higher-order functioning which integrates incoming information. At the same time, impairment of higher-order processes prevents the co-ordination of elementary cognitive functions so that attention and encoding are skewed. This overall spiral eventually results in impaired perception and maladjusted social responses. In Circle 2, cognitive deficits prevent adequate acquisition of interprets and coping skills, without which patients are more exposed to stress. Under heightened arousal, schizophrenics’ intellectual capacity is severely limited and cognitive deficits aggravated. The combination of these two vicious circles describes the onset of symptoms, the deterioration in social functioning, and the mechanism by which the dysfunctions are maintained. Cognitive training that strives to halt these noxious continuing feedback loops must deal with both the cognitive and social deficiencies that continue to expose the individual to stressful events, by reducing effective coping mechanism and by interfering with acquisition of life skills.

Most of the cognitive rehabilitation techniques in the last two decades have attempted to produce a change in a client’s cognitive processes (Ben Yishay & Diller, 1981; Gianutsos, 1989; Gupta, 1993). In recent years, several researchers and practitioners have sought to broaden the meaning of cognitive rehabilitation (Sohlberg & Mateer, 1989; Wood & Fussey, 1990). Methods that improve cognitive functioning have generally been found to yield improvement in the context of training but not to generalise to activities of daily living (Gupta, 2004). Currently, many cognitive rehabilitation therapists rely not only on cognitive methods for training clients to use better mental processes, but also provide their clients with a treatment programme consisting of an eclectic combination of therapies intended to improve a client’s cognitive performance, while not directly altering the client’s cognitive processes. These other therapies include equipping clients with mental prostheses, counseling them on how to cope with the stress of cognitive tasks, directing them to eat foods, and take vitamins conducive to good brain chemistry and teaching them social skills that augment cognitive performance.
The Multimodal Approach

The multimodal approach to cognitive rehabilitation as proposed by Hermann and Parente (1994) is rooted in the theoretical assumption that cognitive performance can be influenced by other modes of psychological processing (e.g., physiological, perceptual, emotional, motivational, social and responses to the physical environment). According to this approach, cognitive rehabilitation achieves the greatest improvement in a client’s cognitive functioning (1) by training better thought processes, and (2) by interventions that enhance two or more other modes of processing.

Cognitive dysfunctioning is not only a distinctive characteristic of a particular group of patients but also exerts considerable influence on the social and vocational functioning of such patients. Rehabilitation programmes aimed at improving the overall functioning of patients need to focus on the remediation of basic deficits, which would subsequently enable the patients to function at a more competitive level. The practice of rehabilitation as a professional activity includes all means aimed at reducing the impact of people with disabilities to achieve optimal social re-integration. Knowledge of the nature and extent of neuropsychological difficulties is essential in devising remedial programmes, which might help an individual to minimise the effects of such deficits.

According to Wilson and Watson (1996), rehabilitation programmes may work through people to compensate for their difficulties, or through achieving restoration (or partial restoration) of functioning through plasticity and exercising. There is considerable evidence that teaching the use of compensatory strategies results in improved cognitive functioning (Alderman, 1996; Gupta, 1999; Wilson, 1997).

In a study attempting to remediate cognitive, emotional and behavioural impairments in closed head injury patients, Gupta and Rikhye (1997) devised a cognitive remediation program in an eclectic framework. After a careful neuropsychological assessment, the patients were taught relaxation technique of deep breathing and were provided education and information about the nature and effect of injury using a supportive and reassuring approach with the active involvement of the patient and family in a home-based set up. The stress of the training programme was on the cognitive aspects of attention, memory and executive control. The emotional and behavioural difficulties such as anxiety, depression, aggression, impulsivity, social and emotional withdrawal were also assessed before and after training. Mnemonic strategies such as categorisation, chunking, imagery for name recall and story recall,

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etc. were taught to the patients and the family carers with instructions to maintain daily records of practice sessions. The results showed a significant improvement in attention, memory and executive functioning of the experimental group in comparison to the control group who was merely attended to for the same period of time but was not trained for any specific strategies. The training group showed a marked reduction in the level of emotional and behavioural difficulties. Although patients did not recover completely, the quality of their lives was unquestionably improved as reported by the patients and their family members. They were found to be less emotionally distressed after training. However, long-term follow up could not be carried out to check the maintenance of the learned strategies and their application in daily life.

The results provided evidence of neurocognitive plasticity in patients with long-standing illness. Improved performance could be based on practice-related enhancement of the same neural systems involved in task performance prior to practice or could result from the development of alternate neural process strategies. Future studies focusing on the generalisation of enhanced cognitive skills to spheres of social and vocational rehabilitation may prove to be useful. It would be crucial for any research on cognitive functioning to address the question whether changes in neuro-cognition translate into changes in functional outcome.

In recent studies by Gupta and Naorem (2003a & 2003b), the relative change in the targeted skill areas as a consequence of cognitive retraining was examined. A pre- and post-multiple baseline design was adopted with the intention of treating specific deficient skills. The measures of neuropsychological functioning adopted were a composite of tests/tasks with specific emphasis on attention, memory and emotional status. The subject was targeted to a customised neuro-rehabilitation programme comprising of cognitive retraining, supportive therapy and deep breathing relaxation exercises. A regular home intervention programme was conducted simultaneously. Cognitive retraining included both paper and pencil tasks and real-life activities. The results showed an overall improvement in cognitive performance across sessions. The regular home intervention sessions were found to have enhanced the subject’s performance significantly.

The important vital factor in all studies by the author seemed to be the cooperation and involvement of family members in the implementation of the home intervention schedule for which the primary family caretakers were trained. The training programme attempted to motivate the family members to feel involved in the training process so that as per planned training sessions,
task could be regularly practiced at home and performance could be regularly monitored by the family carer. This, in turn, also helped the patients in spending their time constructively instead of being pre-occupied with their illness thereby contributing to an increased sense of well-being.

**Making Cognitive Interventions Effective**

For interventions to be effective, it needs to be ascertained that they are ecologically valid and robust when applied in a variety of settings, including long-term care, and private homes. Further, their nature must be such that they could be delivered effectively by existing caregivers and professionals. In India, due to the paucity of psychologists and neuropsychologists and expensiveness of interventions, it may not be possible to deliver interventions on a large scale. This can be effectively done, instead, by rehabilitation and recreational/activities therapists, social workers, nursing staff, volunteers and family members who need to be adequately trained.

The contention of the author is that family members, nursing staff, social workers, rehabilitation professionals, etc., who deliver care to persons with neurological and psychiatric impairments will not be able to translate research findings published in journals or presented at conferences into patient care practice. In real-world contexts, interventions need to be feasible, be viewed as products that can be easily marketed, and that are expected to work within the existing resources.

A strong need exists for disseminating the intervention through varied staff in long-term care, assisted living, and adult day care settings, as well as through caregivers of persons with brain-injury and psychiatric disorders living in home settings. Further, it is important to use inexpensive materials that can be easily mass-produced thereby making the price of the intervention materials accessible.

It is strongly felt that it is easy to publish an article, or give staff in-service training, but it is very difficult to motivate family carers to participate in an intervention program. Also, if the carers do cooperate and try to implement the interventions as instructed in their respective home settings, the interventions may still not prove to be effective due to many known or unknown reasons. The caregivers may be blamed when the intervention fails. Assigning blame may salve the conscience of researchers who develop an intervention, but it does nothing to enhance the quality of life of persons with varied cognitive, emotional and social problems.
A change in attitude must occur in researchers too. They need to follow their work beyond demonstration into dissemination. Researchers should think of intervention as a large-scale enterprise. They should be willing to let their interventions be applied by non-researchers in setting without good experimental controls. Without this, their interventions may not have a meaningful impact.

**Need for Follow-up**

By and large in most of the researches, the presentation of follow-up data is limited. Typically studies present follow-up data that indicate gains that are maintained beyond the immediate treatment session, but report only relatively short follow-up periods (e.g., Abrahams & Camp, 1993). The use of longer follow-up periods would provide more convincing evidence of genuine lasting benefit. In order to be able to demonstrate that cognitive rehabilitation interventions have the potential to impact on quality of life, it will be important to demonstrate that the theoretical arguments supporting the likelihood of long-term maintenance are borne out in practice and that gains can be maintained over considerable time periods. A critical issue in intervention research always is what happened to the knowledge once daily practice is stopped.

**Conclusion**

In India, since cognitive rehabilitation is a relatively unknown area, even the medical professionals do not understand the need for it. Many times they do no direct their clients to the appropriate professional psychologists and other professionals trained in this area. Even if some efforts are made in this direction, often the family members are not sufficiently motivated to carry on with the required number of sessions needed to bring about a perceptible change. There is a great need for conducting awareness programmes educating patients, family members and even medical professionals with regard to the nature of cognitive deficits and knowledge of what can be successfully treated.

However, despite some methodological and practical problems, strong evidence of the overall effectiveness of rehabilitation in general has emerged in the last few years. The studies by and large have demonstrated that rehabilitation reduces the effect of cognitive, social, and emotional problems, leads to greater independence on the part of the patient, reduces family stress, and eventually leads to employability for many brain-injured people.
REFERENCES


