ABSTRACT

Childhood is one of the most challenging stages of human life, characterized by constant growth and development—physically and psychologically. The normal growth and development of the brain occurs in parallel with the growth and development of cognitive functions. Atypical brain development may cause deficits in neuropsychological functions, resulting in academic difficulties. Attention, information processing and working memory are 3 functions that have been associated with scholastic problems in children.

The lack of clarity in defining learning difficulty may lead to under-diagnosis of the problem in children and therefore, denial of possible help. Identifying children at risk and providing general intervention could be a model for prevention adopted in the Indian context. Average scholastic performance in lower classes can be a sign of risk for future difficulties in learning.

Computer based interventions have scope for great use for children. Cogmed (for working memory) and FastForWord (for phonological processing) are 2 computer based programmes that have been repeatedly used with promising results. The Brain Functions Therapy (BFT), a computer-based programme developed in India, has been used in this study. This intervention targets core functions such as visuo-spatial processing, attention, working memory and response inhibition, which in turn contribute to intellectual and academic skills.

The aim of the study was to assess the effectiveness of the BFT on the scholastic performance of children in classes 3, 4 and 5. The objectives of the study were to identify children with average scholastic performance in these classes, and assess their intellectual, academic and behavioural profile. The other objective was to find out the impact of the cognitive enrichment programme on the scholastic performance, intellectual functioning and behaviour of these children.

A before-after experimental design with controls was adopted for the present study. The tools used were a. the Developmental Psychopathology Check List for socio-demographic details and clinical profile of children. The outcome variables were
scores on the Malin’s Intelligence Scale for Indian Children, rating of child’s behaviour by teachers and parents using the Strengths and Difficulties Questionnaire (SDQ) and marks obtained in the school examination. A pilot study was initially conducted, with 12 children in the experimental group (E) and 9 children in the control (C) group. Based on the results obtained, the final sample was estimated with 80% power and 95% confidence interval. The final sample consisted of 20 children in the E group, and 20 children in the C group.

The study was conducted at the hospital. The sample was selected from 3 schools near the hospital that followed the CBSE curriculum. A purposive stratified sampling technique was followed. Boys and girls, aged between 8 and 11 years, who scored between 40% and 60% in the school examination were included. Children with sensory deficits, medical problems and prior diagnosis of a psychiatric problem were excluded. Informed consent was obtained from parents. The children in the E group underwent 20 individual sessions of training, over 3 months, using the BFT, while the C group did not undergo the training. All children were assessed, prior to intervention, immediately after intervention and 3 months after intervention.

The hypotheses made were that there would be improvement in the E group, on all the 3 outcome variables- intellectual functioning, academic performance and behaviour.

The chi square analysis of the background variables revealed that the E and C groups were comparable. 80% of the sample had problems in attention. Despite average scholastic performance, parents reported problems in reading, writing and arithmetic in the group.

On the MISTIC, there was a significant improvement within the E group, on the Verbal IQ, Performance IQ and Total IQ, following intervention. This improvement was not seen in the C group. However, when the performance between the groups was compared, no significant difference emerged. The C group was significantly better than E on the Verbal IQ; in order to correct for this difference, the ANOVA was used. Subsequent analysis, using the corrected means revealed that the difference between groups was significant.
The marks in 3 subjects- English, Mathematics and Science were used for analysis of academic performance. There was no significant difference within the E and C group, on the actual marks immediately after intervention. 3 months later, a significant improvement was noticed, within both groups, in Science alone. On the ANACOVA, a significant difference between groups emerged, on the marks, immediately after intervention. 3 months later, there was a significant difference between the groups, only in Mathematics. Thus the hypothesis related to improvement in the academic performance of the E group, following intervention, was partially accepted.

On the Strengths and Difficulties Questionnaire- teacher version, there was a significant decrease in the scores obtained by the E group in the 4 problem areas (difficulties), following intervention. This change was not evident in the C group. There was improvement in pro-social behaviour of the E group, which was not observed in the C group. The between groups analysis did not show a significant difference. The hypotheses related to improvement in the E group following intervention, was therefore, partially accepted.

On the SDQ- parent version, no significant changes were noted within the scores of the groups, or between the groups, following intervention. The hypotheses related to improvement in the behaviour of the E group, following intervention was therefore rejected.

The study has demonstrated that a computer based intervention programme aimed at improving cognitive functions, has led to significant improvements in cognitive function. The transfer effect to everyday behaviour and academic performance has been positive, but not statistically significant. The results obtained are mixed, showing improvement within the performance of the experimental group on the cognitive, behavioural and academic variables, and statistically significant difference only in cognitive functions, when the 2 groups were compared.

The changes observed as a result of intervention were not statistically significant; however, the direction of change has been encouraging, implying that further work can be taken up in the area. Overall, for children at risk, intervention may be a better alternative than no intervention; whether a computer-based delivery should be the mode of delivery is an aspect that needs to be studied further.