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Cognitive Remediation Intervention for people with Schizophrenia and Schizoaffective disorder in the Cavan Rehabilitation Service

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The phenomenology of schizophrenia and Schizoaffective illness involves a triad of negative, positive and cognitive symptoms. The latter had been largely ignored while clinicians concentrated more on positive and negative symptoms. However, increasingly it has been identified that cognitive deficits are a core feature of schizophrenia and schizophrenia spectrum disorders to the extent that it has been proposed that this be incorporated into the diagnostic criteria for these illnesses in DSM V.

It is estimated that while 70−80% of people with schizophrenia have cognitive deficits when compared to the normative sample, almost 100% had cognitive deficits when compared to their own premorbid level of ability (**Medalia & Choi, 2009**). The cognitive triad thought to be affected in Schizophrenia include attention, memory and executive function. **Heinrich and Zakzanis (1998)** conducted a series of meta-analysis examining the nature and severity of cognitive deficits in schizophrenia, and the role of potential moderator variables. In doing this they examined 204 studies published between 1980 and mid 1997 involving 7,420 schizophrenia patients and 5,865 controls. They determined that neurocognitive dysfunction is a reliable finding in schizophrenia and that no single cognitive domain or test is able to completely separate schizophrenia and control distributions. They also reported that there was no significant relationship between cognitive dysfunction and moderator variables (including age, education, duration of illness, number of psychiatric admissions, onset age, medication dose amongst others). Furthermore, **Heinrich and Zakzanis** have also reported that schizophrenia is characterised by a generalised intellectual impairment.

In first episode patients, **Bilder et al (American Journal of Psychiatry 2000; 157:549-559**) compared 94 patients with first episode psychosis after initial stabilisation of psychosis to normal controls. They demonstrated that cognitive functioning had little relation to psychiatric symptoms at study entry but was correlated to negative symptoms once patients were clinically stabilised. Indeed they demonstrated a substantial compromise in a wide range of domains (including language memory, attention, visuo-spatial abilities and executive function) 0.5 to 2.0 below standard deviation.

In summary therefore, in patients with schizophrenia or schizophrenia spectrum disorder by the time of diagnosis, significant cognitive impairment is typically present even before hospitalisation or initiation of treatment (**Jahshan et al 2010**). Individuals with a first episode psychosis may exhibit generalised cognitive impairment with evidence of relatively selective impairment in memory(immediate and delayed verbal and visual memory), attention and information processing speed, and executive function(e.g. abstraction, sequencing, mental flexibility)(**Fitzgerald et al 2004,Bilder et al 2000**,). However, it must be noted that the heterogeneity associated with schizophrenia patients is also reflected in some degree in the cognitive domain such that some first episode psychosis patients (**Nuyen et al 2005**) and chronic schizophrenia patients(**Abi-Saab et al 2005**) may not exhibit significant memory difficulties. Cognitive deficits typically remain stable over the course of the illness (**Hoff 1999, Gold 1999).**

It has been established that Neuropsychological status has a significant impact on functional outcome. This impact of cognitive deficits on functioning may be mediated via several pathways including (memory, attention, executive dysfunction) that may have important implications for treatment. Indeed cognitive difficulties may have an adverse effect on use of community resources, independent living and social relationships thereby resulting in poorer long-term functional outcomes (**Wykes et al 2009, Brekke et al 2005**).

In light of the aforementioned therefore, it appears that the treatment of schizophrenia or schizophrenia spectrum disorders should not be limited to medications. Indeed while they may be effective for positive symptoms and in some cases for negative symptoms, cognitive deficits have not been shown to be amenable to pharmacotherapy**. Bell and Bryson 2001** have described impaired cognition as a 'rate limiting factor' in the success of psychosocial interventions for schizophrenia. Different psychotherapeutic sills are increasingly being adopted in order to remedy cognitive deficits in schizophrenia including cognitive behavioural therapy and cognitive remediation techniques. Our focus hereon in shall be on cognitive remediation therapy.

Cognitive remediation in its simplest form is a rehabilitation approach designed to improve cognitive abilities such as attention, memory and executive functioning (**Wykes et al., 1999**). By improving cognitive abilities it has been reported to have a positive effect on daily-living functioning and positive and negative symptoms of schizophrenia (**Wykes and van der Gaag, 2001; Pilling et al., 2002; McGurk et al., 2007**). **Wykes and Huddy (2009)** suggest that the integration of cognitive remediation into psychosocial rehabilitation programmes allows for cognitive improvements to be identified in everyday tasks. This will also help to improve generalisability of improvements (**Craig, Doherty, Jamieson-Craig 2004**). In order to achieve the implementation of cognitive remediation techniques in a variety of settings, nurses who are in greatest contact with patients are an invaluable resource. Indeed nurses in the community are described as being uniquely positioned to assist people with schizophrenia in dealing with the challenges of the condition arising from having to negotiate the world as it is (**Coffey, Higgon, Kinnear 2004**).

It was against a backdrop of the discussions above that members of the Cavan Rehabilitation Team in conjunction with the psychology department decided to implement a cognitive remediation programme/intervention which would be integrated into the day to day activities of the nurses of the assertive outreach team. We hoped that this would be an ongoing intervention delivered to patients regularly, thus overcome issues such as reductions in cognitive function post

intervention(**Ritch et al 2008**) as has been identified in programmes delivered within the context of a study and implemented once. Additionally we hoped that this would ensure the maintenance of treatment gains as described by **Twamley (2008**) and improve functioning **(Wykes et al 2011**). In essence we aimed to integrate cognitive remediation intervention into the service already being provided by the assertive outreach team of the Cavan rehabilitation service, so as to ensure that this was an ongoing intervention.

Patients targeted and included in the programme included those with a diagnosis of schizophrenia and schizoaffective disorder, who were aged 18 years and above and under the care of the Cavan assertive outreach team. Patents with a similar diagnosis and demographic profile attending the Monaghan assertive outreach team were recruited as controls. Five Nurses of the Cavan assertive outreach team receive training in cognitive remediation therapy and techniques on how to deliver this intervention. This training was provided by the principal psychologist within the service in conjunction with a psychology PhD student over a four week period. Group training was provided to maximise learning with cross fertilisation of ideas. The outline of staff training included, introduction to the project, review of cognitive impairments and functional consequences, feedback and assessment, attentional difficulties, memory, executive functioning, applying strategies, translating to the real world and supportive supervision. Patients in the Cavan AOT group receiving cognitive remediation were then assessed before and after a six month period of cognitive remedial intervention. Patients in the Monaghan AOT control group also received two assessments at a similar time interval but while receiving treatment as usual with no cognitive remediation. Assessments administered to both groups includes WAIS-III, WTAR, RBANS, D-KEFS, Independent Living Skills, SANS and SAPS, HADS, Rosenberg Self Esteem Scale, Becks Cognitive Insight Scale, Prospective and Retrospective Memory Quest.

The intervention proceeded in three stages with each participant receiving an individualised training manual. The three stages were a psychologist led session with each patient and their key- worker, Key-working nurse led sessions with psychologists present and lastly, key-worker led sessions. Interventions were designed to be based on principles and techniques of established manualised programmes and evidenced-based approached to rehabilitation including Goal management training (**Robertson et al., 2005**), cognitive remediation therapy (**Delahunt and Morice, 1993**; **Wykes and Reader, 2005**), cognitive adaptation training **(Velligan and Bow-Thomas, 2000**), cognitive enhancement therapy (**Hogarty and Flesher, 1991, 1995**), errorless learning, workbook for memory Skills (**Kennedy, 1996**). Activities were designed to be engaging, providing an interesting, interactive context for learning. For example Memory tasks used images from areas of interest such as musicians, TV personalities, local place names. Resources such as local newspapers and local radio stations were used for a range of tasks. Activities included completing a score card from football results by listening to the sports news on radio of auditory attention tasks such as listening to a song on radio to complete the lyrics of a song. Activities were goal-based. Examples of a goals set by patients include 'improving my concentration so I can watch TV', 'learning to send a text message' and 'not losing my bag'. Interventions were contextualised and based in patients' everyday environment and opportunities for application were identified by key-worker. For example, tasks were undertaken in coffee shops, supermarkets, and/or in the home. Find detailed below examples of cognitive targets and cognitive remediation techniques used.

Table1: Cognitive impairment and remediation targets

Cognitive impairment	Importance for everyday function	Specific strategies
Memory	Remembering to take medications	Daily calendar use
	Remembering to go to work	Encoding strategies(write things down, association, chunking, use of acronyms)
Attention	Paying attention during communication with others	Conversation vigilance skills(eye contact, reduce distractions, asking questions, paraphrasing)
Executive functioning	Problem solving and coping with unexpected situations	Six-step problem solving method (define problem, brainstorm solutions, evaluate systematically, select a solution, try it, evaluate how it worked)

Results

There were 16 patients in the Cavan group (intervention group) and 12 in the Monaghan group (control group). 31%(5) of the intervention group were male while males accounted for 42% of the control group. The mean age in the intervention group was 41.1yrs and 39.9yrs in the control group. 69%(11) of the intervention group had a diagnosis of Schizophrenia and the others diagnosis of Schizoaffective disorder. In the control group, 75%(9) had a diagnosis of schizophrenia. The results of primary outcome measures are detailed below in table 2.

Table 2: Results of Primary outcome measures

	Intervention (n = 16)			TAU (n = 12)		
	Time 1	**Time 2**	**p**	**Time 1**	**Time 2**	**p**
Immed	65.19 (18.519)	76.06 (15.567)	.001* z = 3.412	67.5 (15.635)	71.50 (14.657)	.056 z = 1.912
Visuo	85.56 (22.533)	85.56 (17.197)	1.000 t = .000	84.08 (15.174)	84.33 (17.180)	.954 t = -.058
Lang	75.44 (15.020)	80.38 (14.207)	.167 z = -1.382	80.33 (11.396)	81.42 (12.781)	.777 -.284
Atten	67.13 (17.966)	74.69 (17.308)	.001* t = -3.514	69.50 (14.132)	70.75 (12.009)	.704 t = .390
Delayed Memory	69.38 (25.984)	80.13 (18.586)	.008* z = 2.643	71.42 (18.519)	73.92 (16.054)	.482 z = .704
RBANSTtl	66.69 (16.451)	74.44 (17.142)	<.001* z = 3.240	67.58 (12.551)	69.75 (11.005)	.440 z = .440

Discussion

The results revealed significant improvements immediate memory, delayed memory, attention, cognitive flexibility, and abstraction in the intervention group. Patients' at interview remarked that they had noticed an improvement in their memory. There was also a reduction in the anxiety scale of the HADS. The interventions had no impact on self-esteem, level of insight or positive and negative symptoms. The intervention also had a beneficial impact on the nursing staff who reported that they had derived increased knowledge, and new insights into the behaviour of their patients. Indeed one of the results from qualitative interview of nurses, a nurse reported that "It *really made me think. You know we wouldn't really have taken the cognitive deficits into account in our work. You'd be getting frustrated because a patient wasn't taking things on board or doing certain tasks and you think they should have because you discussed it. But now I think I am much more aware of the difficulties and prepared to go over things again because I know that they need it. Like with X. We now have a list with all the jobs and so each time we go through it instead of just expecting things to be done."* Another reported that *"It was good to have something to work on together, you know a project. And some of the patients responded to that well, you know. The activity and having something clear to work on. It's all about keeping their brain active and doing something and motivating them and getting their brain working, exercising their brain".* Yet other staff reported that they had noticed improvements in the functioning of their patients with some participating patients reportedly needing less reminding regarding their routine appointments. In order to fully evaluate the full implications of the intervention in the real world, we plan to undertake a detailed assessment of functioning in the coming months. However, it appears anecdotally that the intervention was successfully implemented as designed and did achieve some significant

results while increasing greater patient staff engagement, which can only be a good thing for a rehabilitation service.

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