Addressing Cognitive Challenges in Schizophrenia: A Public Health Perspective

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Cognitive Deficits and Disability in Schizophrenia

Deficits in cognitive functions are ubiquitous in schizophrenia. Nearly all patients with this disorder experience deficits in neurocognitive domains including attention, memory, speed of processing, reasoning and problem solving and social cognitive domains including theory of mind, emotion recognition, social cue recognition, etc. [1]. These deficits precede the onset of first psychotic episode [2] and persist through episodes of psychotic exacerbation [3] and relative quiescence [4]. Importantly, they are consistently associated with patients' social and occupational functioning—nearly 20–60 % of the variance in their functioning is explained by their performance on tests of cognitive functions [5]. Schizophrenia causes substantial disability—indeed it accounts for 0.5 % of all-cause disability adjusted life years (DALY) [6]. Given that cognitive deficits associated with schizophrenia contribute considerably to disability, public health significance of addressing the challenge of cognitive deficits of schizophrenia cannot be overemphasized.

Cognitive Training in Schizophrenia

A number of treatment approaches have shown promise in improving cognitive functions in schizophrenia. Several terms have been used interchangeably to describe these approaches—these include cognitive remediation, cognitive enhancement training, cognitive training, cognitive rehabilitation, etc. Most of these aim to effect learning and adaptive plastic changes in neural systems using specifically defined and controlled learning exercises [7]. Meta-analyses have shown that these approaches are effective in improving cognitive abilities of patients with schizophrenia with small to moderate effect sizes [8, 9]. Improvements have been noted not just in cognitive functions that the training methods targeted, but also in cognitive domains that were not directly targeted as well as measures of global cognitive abilities. Not surprisingly, the response to cognitive training response is associated with structural and functional changes in prefrontal area of the brain [10, 11]. The gains of cognitive training are likely to be durable for several months beyond the training period [12, 13]. The gains of cognitive training interventions go beyond mere improvement in performance in cognitive tests—patients show improvement in measures of everyday functioning also. What's more, improvement in global functioning were indeed attributable to improvement in cognitive performance [14].

Cognitive Training in Schizophrenia: Public Health Perspective

Targeting cognitive deficits of schizophrenia forms an important aspect of management of schizophrenia, specifically in order to reduce the disability due to the disorder.

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However, there are a number of challenges in making the gains of cognitive training available to most of those who need them. Nearly all studies have been conducted in academic settings using highly trained staff as part of research initiatives. Their utility is yet to be tested in the real-world situation in places where there is no access to academic settings and trained manpower. Attempts of delivering cognitive training in public health systems using less trained staff have highlighted a number of problems at the implementation level—these included lack of protected time to deliver the intervention, lack of resources like therapy rooms, equipment, etc., poor funding and lack of organizational support [15].

In this context, it is useful to note a few attempts to develop low-cost alternatives to “conventional” cognitive training. There is evidence that internet-based targeted cognitive training targeting neurocognition and social cognition is feasible and useful in improving cognitive performance of individuals at clinically high risk to develop psychosis [16]. There is preliminary evidence that such training is useful in improving cognitive abilities of elderly individuals with mild cognitive impairment [17]. Research exploring such interventions are lacking in the field of cognitive rehabilitation of schizophrenia. These are relatively low-cost interventions, which have higher likelihood of acceptability and adherence. These qualities of such interventions make them promising strategies to be explored as cognitive training tools in schizophrenia.

Majority of patients with schizophrenia live in the developing world, with traditional family systems. Family caregivers have been the de-facto case managers in many cultures. There is evidence that low-cost, home-based cognitive training, in which family members actively supervised patients’ engagement with training tasks with minimal assistance from professionals, improved performance of schizophrenia patients on a range of cognitive tasks [18]. If replicated, such strategies can be potential game-changers in providing cognitive training for individuals with schizophrenia in low-resource settings. Cognitive adaptation training aims to bypass the cognitive deficits that adversely affect patients’ everyday functioning [19]. Research is under way to explore if such interventions, delivered by nurses, could be cost-effective strategies to improve functionality of patients [20]. Such strategies could become additional public health tools to address the challenge cognitive disability of schizophrenia.

An interesting finding of the meta-analyses of cognitive training in schizophrenia was that the interventions generally worked better if they were combined with other measures of psychiatric rehabilitation like vocational training and/or supported employment services [8, 13, 21]. This suggests an interesting interaction between psychiatric rehabilitative interventions and cognitive training. The

exact nature of such an interaction remains to be explored. However, it is conceivable that cognitive training works better when the intervention happens in conjunction with active exposure to situations where cognitive abilities are put to practice in real-life situations. It also posits an interesting possibility that exposure to real-life challenges, within the context of therapeutic engagement by professionals, may lead to amelioration of cognitive deficits. Results of a randomized controlled trial of cognitive adaptive training by Fredrick and colleagues [22] lends some support to this. Their mediational analysis showed that improvement in real-world functioning resulted in improvement in performance in cognitive tasks, suggesting that attaining functional outcomes can improve cognitive functioning. This opens up another alternative to “conventional” cognitive training—providing psychiatric rehabilitation interventions targeting patients’ everyday functioning. The latter may, in turn, result in better cognitive functioning. At this juncture, this proposition is speculative, requiring validation by empirical evidence. Public health strategies for improving the outcome of major psychiatric illnesses naturally include comprehensive, community-based rehabilitation interventions. Such interventions can potentially double up as alternative strategies to improve cognitive abilities of patients. Research exploring the role of different rehabilitative efforts in possibly ameliorating cognitive deficits of schizophrenia is of immense public health importance and need attention of researchers and funding agencies alike.

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