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Computerized Cognitive Training Interventions in Major Depression

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Dear Editor,

Major depressive disorder (MDD) is a common and severe mental disorder with a high rate of incurability and recurrence. Numerous studies have suggested that one of the characteristics of MDD is cognitive deficits, such as deficiency in executive function (EF), leading to disturbance in a number of higher-order mental processes that control cognition, emotion, and behavior, essential for flexible thinking and actions (1). Accordingly, a significant number of individuals with MDD report their cognitive symptoms during and after a depression episode, and despite established treatments, such as psychotherapy and antidepressant drugs, cognitive deficits persist even after recovery (2). Imaging studies on individuals with depression have also shown structural and functional changes in the prefrontal areas critical for executive processes with a general pattern of hypofrontality (3). Previous studies have also emphasized the significance of EF in a wide range of related clinical factors in MDD and deficiency in EF that is associated with less improvement in long-term depression (4) and reduced impact of antidepressant drugs (5).

A review of prior studies confirms that interventions targeting executive processes can reduce depressive symptoms (6). Accordingly, an increasing number of cognitive remediation (CR) interventions have been investigated to improve cognitive processes with persistent and general impact on depressed cases. Although CR interventions are highly diverse, most of them have used computerized cognitive training (CCT) that targets one or more cognitive domains, emphasizing repeated and controlled training of cognitive tasks, and neuroplasticity has been used as their theoretical basis (7). It is thought that CCT activates the neural networks related to cognitive defects and target areas of the prefrontal cortex in the case of EF (8). The CCT is inherently safe, is usually compatible with individual needs, provides continuous feedback, and can be presented in a wide range of social and healthcare services in an inexpensive way (9).

Several studies have shown that CCT has had positive short- to mid-term or mid- to long-term impacts on the severity of depressive symptoms (7). The CCT significantly improves depressive mood; however, the mechanism resulting in this effect is relatively unknown due to the treatments conducted along with CCT in numerous studies (10) because the participants in these trials were under treatment with antidepressant drugs, psychotherapy, or transcranial direct current stimulation as a part of the experiment, or they were allowed to simultaneously use such treatments from external sources. Moreover, positive changes in cognitive function might directly or indirectly improve mood by increasing the impacts of other therapies. In sum, the effects of CCT on the reduction of depressive symptoms cannot be ignored (7).

It has been a long time that despite numerous and long-term prescriptions of antidepressants and psychotherapy sessions, in numerous cases, the treatment for MDD remains incomplete, and cognitive and mood problems persist. Accordingly, it seems that complementary therapeutic interventions, such as CCT, are required to treat depression and, especially, its cognitive symptoms. New interventions, such as CCT, along with psychological therapies for the improvement of depression, can increase the effectiveness of the therapy. Based on the conducted studies, the long-term effects of CCT have not been established yet, a reason for which can be the novelty of this therapeutic method. Therefore, it can be said that according to the progress and prevalence of technology among the public and the simplicity and availability of computerized tools, it would be better if this therapeutic approach would be examined in more detail in the forthcoming studies to be used alongside other therapies. On the other hand, using this complementary intervention in the present era seems to be beneficial and adaptive since

individuals do not have the possibility of visiting hospitals or clinics due to various reasons, such as the prevalence of some diseases (e.g., coronavirus disease 2019 and physical and motor diseases).

Footnotes

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