Behavioral Activation (BA) Treatment for Depression Comorbid with Insomnia Improves Sleep Quality and Sleep-Dependent Memory Consolidation

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Background and Introduction

Patients with major depressive disorder (MDD) often complain of insomnia and generalized memory problems. Nearly 90% of patients with major depressive disorder (MDD) report sleep disturbance; also, co-morbid insomnia exacerbates MDD severity. Behavioral activation (BA) interventions have accumulated sufficient empirical evidence as an effective treatment for depressive disorders and symptoms; however, its effect on insomnia symptoms in depression patients have not been well established.

Objective

The aim of present study was to examine the effects of additional BA treatment to the antidepressant medication for depression on sleep quality and memory consolidation.

Materials and Methods

Subjects: Eleven inpatients (42.6±7.5 years, 7 female, averaged IQ was 89.82±3.92) with MDD and insomnia who were under medication were included.

Measures: A word-pair association task with two lists of 20 semantically related word pairs, the Beck Depression Inventory (BDI) and the Insomnia Severity Index (ISI)

BA treatment: Treatment protocol was following a standard BA manual (Lejuez, Hopko, and Hopko, 2001).

Procedures: At the end of the first week of hospitalization (pre-treatment session), participants were asked to memorize 20 semantically related word pairs, and followed by pre- and post-test with cued-recall task prior and after a night of sleep. Post-treatment session was conducted following completion of eight BA sessions twice a week over the course of 4 weeks. The subjects underwent learning, pre- and post-test again at the end of BA treatment. All participants completed The Beck Depression Inventory (BDI) and Insomnia Severity Index (ISI) during both pre-treatment and post-treatment sessions. (Figure 1)

Statistical Analysis:

- Memory performance was analyzed by two-way ANOVAs.
- The correlation of memory improvement and subjective rating was analyzed through Pearson correlation coefficient.

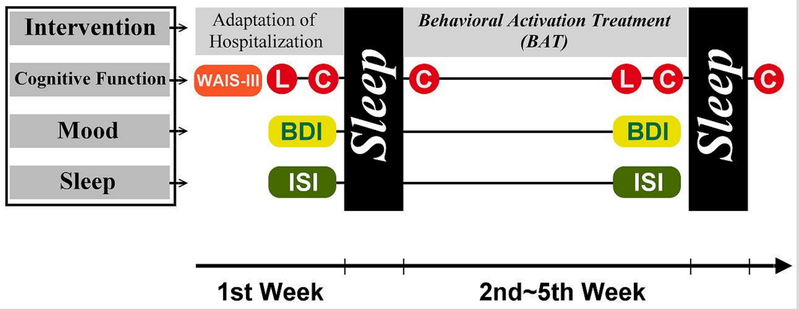

Figure 1: The procedure of present experiment
L: Learning related word-pairs; C: Cued-recall test; BDI: Beck Depression Inventory; ISI: Insomnia Severity Index

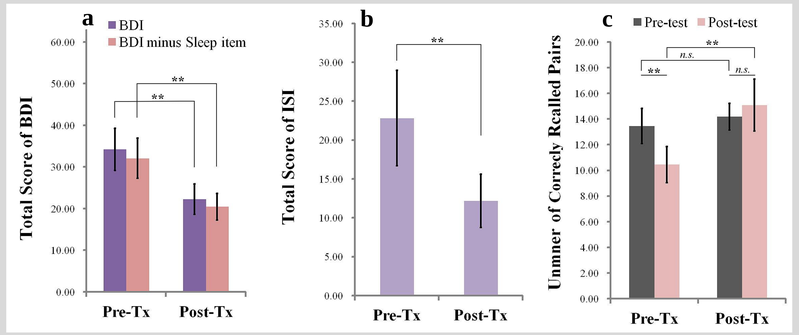

Figure 2: BDI (a) and ISI (b) scores at pre- and post-treatment. Figure 2c: Percentage of correct recall at pre- and post-test between pre- and post-treatment.
(Tx: treatment; n.s.: no significance; ** P<.01)

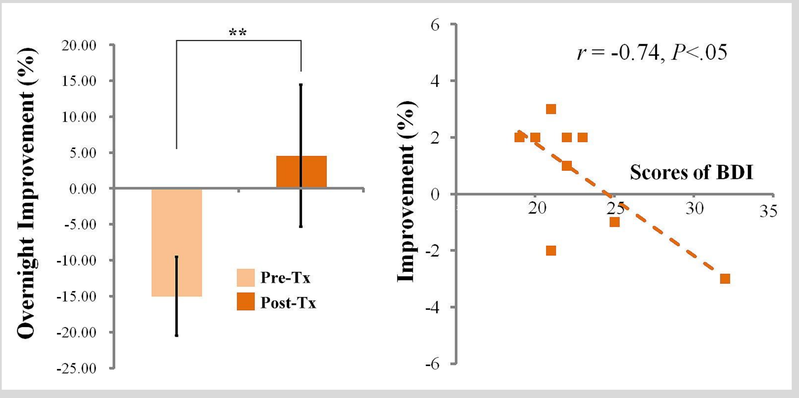

Figure 3: Improvement of correctly recall in memory test from pre- to post-test. And right figure shows correlation between overnight changes of memory in post-treatment and BDI scores.

Results

Subjective Rating:
t-tests showed that BDI as well as ISI scores were significant reduced after BA treatment (t=9.24 and 6.76, respectively, Ps<.001). (Figure 2a & 2b)

Memory Performance:
A 2 intervention (Pre- and Post-treatment) x 2 test sessions (Pre-test and Post-test) two-way ANOVA revealed a significant intervention effect [F(1,10)=9.83, ρ<.05], a significant effect for test sessions [F(1,10)=43.62, ρ<.01], and statistically significant interaction[F(1,10)=31.78, ρ<.01]. The number of correct recalled pairs in post-test was significantly less than those in pre-test at baseline [F(1,10)=82.50, ρ<.01]. However, there was no significant effect between test sessions at post-treatment [F(1,10)=2.34, ρ=0.16]. (Figure 2c)

Correlation:
Overnight improvement of memory in post-treatment session were negatively correlated to BDI scores (r=-0.74, P<.05). (Figure 3)

Discussions

Although there was a statistically significant reduction in both BDI and ISI scores with BA treatment, the scores of subjective rating were still in the range of clinical significance. The results demonstrated the tendency of recovery from depressive symptoms as well as insomnia through BA treatment.

The number of correctly recalled pairs in post-treatment was more than those in pre-treatment, but overnight improvement was not significant in post-treatment. One possibility is that sleep may play a role of passive protection rather than permissive consolidation after BA treatment. The other possibility is that BA treatment in present study was a short-term intervention which may not fully restore the processes of sleep-dependent consolidation.

Conclusions

This pilot study demonstrated that BA could reduce symptoms of both depression and insomnia, as well as shelter memory from interference during sleep.