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The effectiveness of integrative neurocognitive therapy on hopelessness and depression in major depressive disorder patients

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Abstract

Introduction: Considering the relatively high prevalence of depression, the present study aimed to investigate the effectiveness of Integrative Neurocognitive Therapy (INT) in reducing the symptoms and clinical signs in patients with major depressive disorder.

Materials and Methods: In this cross-sectional study, 25 patients with major depressive disorder referred to psychiatric and rehabilitation clinics in Mashhad, Iran, were selected using a purposive sampling method. All patients completed the Beck Depression Inventory-II (BDI-II) and the Beck Hopelessness Scale (BHS) in the pre-test, post-test, and 3-month follow-up phases. The experimental group received 20 ninety-minute sessions of INT (twice a week). Data were analyzed using repeated measures, such as variance analysis and Bonferroni post-hoc test.

Results: The results showed a significant interaction effect between depression and group (F= 103.39, $P< 0.001$). In the experimental group, the mean depression scores in the post-test and follow-up phases significantly decreased compared to the pre-test ($P< 0.001$). Furthermore, there was a significant interaction effect between hopelessness and group (F= 117.80, $P< 0.001$), and the mean hopelessness scores in the post-test and follow-up phases significantly decreased compared to the pre-test ($P< 0.001$).

Conclusion: Based on the results, integrative neurocognitive therapy effectively reduces depression and hopelessness of patients with major depressive disorder and it can be used as an effective and accessible method.

Keywords: Clinical symptoms, Integrative neurocognitive therapy, Hopelessness, Major depressive disorder

Introduction

Human resources are the main factors in advancing the health care system. The sufficient, competent, and satisfied healthcare professionals are necessary factors to achieving international and national health-related goals (1). Health worker motivation is an important determinant of health worker satisfaction and performance and, consequently, the quality, efficacy, efficiency, accessibility, and viability

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of health services. Therefore, it is crucial to consider personnel motivation as a critical issue in health policy (2,3).

Motivation is defined as a person's degree of willingness to achieve and maintain an effort along with organizational goals, and the underlying behavior for this can be intrinsic or extrinsic (3,4). The job motivation of health system workers has been widely evaluated (2,5-9). The results of study in Tanzania indicated that 45% of the healthcare workers had low job motivation. They stated that major factors for dissatisfaction were low salaries, work environment conditions, and insufficient facilities for doing professional tasks (2).

Herzberg's two-factor theory of motivation drives total job motivation. Intrinsic motivational factors include recognition for achievement, achievement, responsibility, work features, and personal advancement. Extrinsic motivational factors are referred to context of work and include supervision, interpersonal relationships, policies and administration, status, working conditions, security, personal life, and remuneration (1).

The evidences have also indicated that professionals' sociodemographic characteristics are associated with healthcare workers' job motivation (1,2,10,11). The findings of a study in central Ethiopia revealed that healthcare workers with master's or doctorate degrees had the highest motivation. Professionals with job history less than five years had less motivation (2). The impact of age varies extensively, and there is no consensus in the studies about age as a determinant factor of job motivation. Some studies suggest that job motivation increases with age (3-5), whereas others indicated no relationship between age and motivation (4,7), and even others concluded that job motivation reduces with age (6,7). Regarding gender, some evidences suggest higher motivation among men than women (12), and other studies depict similar motivation level for both genders. However, some studies reveal that gender does not affect job motivation (13,14).

Evaluating motivation is complex due to various determinant factors (3). The job motivation of healthcare workers has been widely studied, but past studies have focused on physicians and nurses working at hospitals, mostly in high-income countries (1). In addition, there is no consensus in the literature about determinant factors of job satisfaction (14).

Thus, this study aimed to investigate the job motivation among healthcare workers in comprehensive health centers and the factors related to job motivation.

Materials and Methods

The study population of this cross-sectional study which conducted from April 10 to June 10, 2024, consists of all healthcare professionals of Mashhad University of Medical Sciences, including physicians, healthcare providers, nurses, laboratory personnel, nutrition, mental, and environmental health experts working in comprehensive health service centers, as well as employees who had administrative and management responsibilities and employed at Public Health Department. We selected the participants using a three-stage (clustered-proportional-convenient) sampling design. First, clusters of comprehensive health service centers in the area covered by Mashhad University of Medical Sciences were selected in urban, suburban, and rural areas. Then, the sample size was included in proportion to the number of employees working in each area using a convenience sample method. The sample size was estimated using the formula for estimating a mean. A pilot study determined the sample size of 30 healthcare personnel, and the standard deviation was estimated as 21.7. The precision (d) of this study was considered 0.12 standard deviations. Thus, considering a confidence level of 95% and after adjusting for a 10% non-response rate, the calculated sample size was 325 people. Inclusion criteria were health care professionals working full-time in the Public Health Department and comprehensive health service centers for more than three months. The exclusion criteria included incomplete questionnaires and unwillingness to participate.

Research instruments

A) The Demographic Checklist: This checklist includes questions of sociodemographic status (such as age, sex, marital status, educational status, work position, and years of work experience).

B) Herzberg Job Motivation Questionnaire: This questionnaire consists of 40 closed-ended items based on a five-point Likert scale (1= strongly disagree to 5= strongly agree). The

total score was gained by summing up the answer points for each question (range of 40 to 200). A higher score indicates greater motivation. Subscales included recognition, professional development, promotion, responsibility, features of the work itself, remuneration, supervision, interpersonal relationships, health and safety, organizational policies, work conditions, and living conditions items. The responses were coded into three levels (40 to 80= poor motivation, 80 to 160= moderate motivation, and 160 to 200= good motivation) (3,12). Bakhshi et al. validated this questionnaire in Iranian population. The Cronbach's alpha of scale and subscales ranged from 0.71 to 0.96 and α=0.92 for the total scale (12). Data were exported to SPSS (v.16) statistical software for analysis. First, the characteristics of all participants and each group were described with central and dispersion indices and were presented by tables.

Then, for quantitative variables, the K-S test assessed the normality of data. Independent sample t-tests and ANOVA were used to evaluate associations between workers' characteristics (age, gender, education, and job-related subgroups such as work experience, marital status, workplace type, and work experience) and composite mean scores on motivation total score and subscales. In the case of non-normal distribution, the equivalent non-parametric tests (Mann-Whitney and Kruskal-Wallis) were used.

Results

Demographic and work-related characteristics of all participants are shown in Table 1. The total score of job motivation and its subscales in all participants are shown in Table 2. Scores by demographic and work-related variables are displayed in Table 3.

Table 1. Integrative neurocognitive therapy protocol

Session	Content
1	To determine the severity of depression and provide treatment recommendations, diagnostic assessments are conducted using psychological tests.
2	To identify cognitive issues in the patient's behavior and adapt to abilities, as well as assess executive functions through cognitive-psychological evaluations.
3	The logic of treatment is described to the patients using specific forms; the goal is to familiarize them with the general content of sessions, create hope and motivation for starting and continuing treatment, and conclude with the principles of therapy relating to confidentiality and privacy of information.
4	Establishing a warm and effective therapeutic relationship (attuned communication between therapist and patient) and training on how to use Captain Log software. The therapist assigns the patient to write treatment goals in the goals and expectations worksheet for the next session.
5	Training on attention stabilization skills, enhancing attention and concentration abilities, problem-solving, and conceptual reasoning. As a therapeutic task, the patient is instructed to regularly practice one type of meditation provided in the worksheet.
6	Strengthening synaptic integration, enhancing attention and focus skills, problem-solving, and conceptual reasoning. identifying disrupted situations and inflexible or poor emotional regulation: (Awareness of bodily cues, emotions, and non-verbal experiences in early interactions, and using language to describe them). Homework: Record thoughts, feelings, and mental images.
7	Opening emotional connection pathways, enhancing attention and focus skills, problem-solving, and conceptual reasoning. Building and strengthening internal resources: (Using safe place exercises and relaxation exercises). Homework: Regular mindfulness practice suited to the capacity for attention-awareness: (Mindfulness of breath/walking meditation).
8	Exploring feelings of helplessness, aimed at improving overall executive functions. Repeating exercises are performed and upon mastery the next exercise is introduced. Expanding the window of tolerance: ("Stay with it," the healing power of presence/repeat body scan). In this session, in addition to repeating the exercises from the previous session, games are used to encourage improved/compensated for impaired performance. Homework: Regular mindfulness practice suited to the capacity for attention-awareness: (Mindfulness of breath/walking meditation).
9	Identifying unresolved memory representations, enhancing attention and active memory skills. Understanding traumatic memories in the presence of an empathetic other: (Filing cabinet technique and creating a safe place image). Homework: Regular mindfulness practice suited to the capacity for attention-awareness: (Mindfulness of breath/walking meditation).
10	Benefiting from a "securely earned" life narrative, enhancing attention and active memory skills. Understanding and creating meaning from childhood experiences: (Adult Attachment Interview (AAI)). Homework: Regular

	mindfulness practice suited to the capacity for attention-awareness: (Mindfulness of breath/walking meditation).
11	Achieving a coherent life story narrative, enhancing attention and active memory skills. Bringing life to life, self-compassion: (Entering into the qualities of presence - curiosity, openness, and acceptance) in relationship. Regular mindfulness practice to capacity of attention - awareness: Loving-kindness meditation.
12	Examining how mental states are formed and accepting them by identifying multiple selves or self-states: (Adopting a neutral stance). In order to fully improve executive functions, exercises are repeated and upon mastery the next exercise is presented. Homework: Regular mindfulness practice suited to the capacity for attention-awareness, observing different states of Self, or unresolved conflicts (shame and fear).
13	Trauma reconstruction, enhancing inhibition skills, attention shifting, and visual processing speed. Finding a foundation or central self: (Being centered in the mind). Regular mindfulness practice appropriate to the capacity of attention-awareness, record experience of the newborn mind.
14	Feeling safe and connected with each other/strengthening receptivity skills, enhancing inhibition skills, attention shifting, and visual processing speed. Deciding to change; acceptance vs. reactivity (technique: No-Yes). Homework: Regular mindfulness practice suited to the capacity for attention-awareness, identifying and recording reactivity.
15	Focusing the mind to change the brain, enhancing inhibition skills, attention shifting, and visual processing speed. Abandoning the illusion of certainty: (By creating soothing connections). Homework: Regular mindfulness practice suited to the capacity for attention-awareness.
16	Expanding the inner domain: Broadening identity, addressing remaining potential weaknesses. Familiarity with the concept of transpiration: (cultivating reflective mindsight). Homework: Regular mindfulness practice suited to the capacity for attention-awareness.
17	If anything from previous sessions remains unclear in the client's mind, it is explained, and the therapist encourages the client to continue daily meditation. The importance of meditation in calming the mind and body is explained to them. Bridging technique is performed as in previous sessions. The method of performing the exercises is reviewed with the client to ensure that the client has learned and applied the exercises. In the case of relapse, in order to support the client and prepare him/her for returning to everyday life, acceptance of conditions and its management will be discussed. Homework: The therapist asks the client to write down their favorite exercises after the session and to write their experience of the state of neurological integration in the emotion and mood recording worksheet.
18	Discussing remaining conflicts, continuing to encourage the client to perform the techniques and homework assignments, reflecting on the progress made, emphasizing the continued use of techniques that have been helpful to the client, strengthening cognitive skills learned. Homework: The worksheet of exercises that are of interest and trainings that have been helpful to the client and prioritized by himself/herself are given to him/her as homework.
19	Assessment of the severity of symptoms and signs and the Level of Depression (Post-Test).
20	Assessment of Neuropsychological Functions (Post-Test)

Analysis of variance with repeated measurement (ANOVA) and Bonferroni post hoc tests were used to analyze the research data.

Results

In the experimental group, 9 (69%) and 8 (67%) were married in the control group. No significant difference in marital status was observed between the two groups ($P= 1.000$). The mean and standard deviation of age in the experimental and control groups were 38.85 ± 9.04 and 36.58 ± 9.73 years, respectively, which was not statistically significant ($P= 0.552$). Similarly, the mean age of disease onset in the experimental and control groups was 34.54 ± 7.74 and 36.58 ± 9.73 years, respectively, which was also not significant ($P= 0.608$). The mean duration of illness in the experimental and control groups was 3.22 ± 4.31 and 2.39 ± 3.33 years, respectively, which was not statistically significant ($P= 0.337$). Based on these results, it can be assumed that the two groups, experimental and control, are homogeneous regarding marital status, age, age of disease onset, and duration of illness. Table 2 shows the mean and standard deviation of depression and hopelessness scores in the experimental and control groups at the pre-test, post-test, and follow-up stages.

Table 2. Descriptive statistics of clinical symptoms

Variable	Group	N	Pre-test	Post-test	Follow-up
Depression	Experimental	13	34.46 ± 3.31	5.54 ± 4.50	5.08 ± 3.97
	Control	12	34.58 ± 3.63	28.58 ± 4.70	23.58 ± 4.89
Hopelessness	Experimental	13	11.23 ± 1.59	1.69 ± 2.14	1.08 ± 1.85
	Control	12	13.42 ± 2.31	12.00 ± 2.45	10.01 ± 2.30

The mean depression scores in the post-test decreased compared to the pre-test in both the control and experimental groups. Similarly, hopelessness scores in the post-test decreased compared to the pre-test in both the control and experimental groups. However, the decrease in scores was greater in the experimental group. To generalize the results from the sample to the research population, it is necessary to perform statistical tests using repeated measures analysis of variance and, if significant, Bonferroni post-hoc tests for comparison. However, before performing repeated measures ANOVA, it is necessary to check the assumptions of normality of distribution of variables, homogeneity of variances, and sphericity. The normality of the variables assumption was approved. Levene's test was used to examine the homogeneity of variances. So, the homogeneity of variances in the two groups, control and experimental, is accepted. Finally, based on Mauchly's test of sphericity, the homogeneity of variances within the groups is also approved. Therefore, there is no need to correct epsilon. Given the acceptance of the assumptions of ANOVA for repeated measures, it can be investigated whether integrative cognitive-behavioral therapy is effective in reducing clinical symptoms based on depression and hopelessness scores in patients with major depressive disorder.

As seen in Table 3, the effect of stages on depression scores was significant (F= 336.85, $P< 0.001$). Therefore, regardless of the experimental group, there was a significant difference between the mean scores in the pre-test, post-test, and follow-up. Also, in the within-group test, it can be seen that the interaction effect between depression and the group was also significant (F= 103.39, $P< 0.001$). Therefore, it can be stated that the difference in the mean depression scores at different times varies according to the levels of the group variable. It is also observed that the effect of the group on depression scores is significant (F= 103.20, $P< 0.001$). Therefore, it can be concluded that, regardless of the measurement time, there was a significant difference between the mean depression scores in the experimental groups.

Table 3. Analysis of variance for repeated measures for the effect of treatment on depression

Source of variation	SS	df	MS	F	P	Effect size	Observed power
Within-group							
Stages	5991.1	2	2995.5	336.85	< 0.001	0.936	1.000
Stages × Group	1838.8	2	919.42	103.39	< 0.001	0.818	1.000
Error	409.08	46	8.89				
Between-group							
Group	3612.2	1	3612.2	103.20	< 0.001	0.818	1.000
Error	805.06	23	35.00				

In Table 4, the amount of change in the mean depression score in the pre-test, post-test, and follow-up was examined using the Bonferroni statistical test. The mean depression scores in the post-test and follow-up decreased significantly compared to the pre-test ($P< 0.001$), and the scores in the follow-up also decreased compared to the post-test ($P= 0.005$).

Table 4. Comparison of depression scores in pre-test, post-test, and follow-up using Bonferroni test

Stage	Mean difference	Standard error	P
Pre-test - Post-test	17.462	0.864	< 0.001
Pre-test - Follow-up	20.192	0.896	< 0.001
Post-test - Follow-up	2.731	0.766	0.005

As seen in Table 5, the effect of stages on hopelessness scores was significant (F= 323.45, $P<$ 0.001). Therefore, regardless of the experimental group, there was a significant difference between the mean scores in the pre-test, post-test, and follow-up. Also, in the within-group test, it can be seen that the interaction effect between hopelessness and the group was also significant (F= 117.80, $P<$ 0.001). Therefore, the difference in the mean hopelessness scores at different times varies according to the group level. The effect of the group on hopelessness scores was significant (F= 954.04, $P<$ 0.001). Therefore, regardless of the measurement time, there was a significant difference between the mean hopelessness scores in the groups.

Table 5. Analysis of variance for repeated measures for the effect of treatment on hopelessness

Source of variation	SS	df	F	MS	P	Effect size	Observed power
Within-group							
Stages	646.910	2	323.45	187.68	< 0.001	0.891	1.000
Stages × Group	235.60	2	117.80	68.350	< 0.001	0.748	1.000
Error	79.280	46	1.720				
Between-group							
Group	954.04	1	954.00	95.550	< 0.001	0.806	1.000
Error	229.64	23	9.980				

In Table 6, the amount of change in the mean hopelessness score in the pre-test, post-test, and follow-up was examined using the Bonferroni statistical test. The mean hopelessness scores in the post-test and follow-up decreased significantly compared to the pre-test ($P<$ 0.001), and the scores in the follow-up also decreased compared to the post-test ($P<$ 0.001).

Table 6. Comparison of hopelessness scores in pre-test, post-test, and follow-up using Bonferroni test

Stage	Mean difference	Standard error	P
Pre-test - Post-test	5.478	0.387	< 0.001
Pre-test - Follow-up	6.785	0.427	< 0.001
Post-test - Follow-up	1.308	0.286	< 0.001

Discussion

The present study was conducted on 25 individuals with major depressive disorder to investigate the effectiveness of integrative neurocognitive therapy on depression and hopelessness in individuals with major depression. The results showed that this therapy reduced the clinical symptoms of major depression.

In a study by Poulou et al., they implemented the effectiveness of this treatment in a hospital setting with 44 middle-aged patients with schizophrenia, along with additional interventions, including INT therapy. Twenty-one people received INT treatment, and 23 received supportive treatment and medication during a 12-month follow-up. The instruments used were the Matrix Consensus Cognitive Battery, the Social Perception Scale, the Positive and Negative Syndrome Scale, and the Global Assessment of Functioning. The results showed that positive and negative symptoms significantly improved. Changes were achieved in the scores of processing speed, attention, and awareness of the patients. In addition, it had more effectiveness in reducing the established symptoms and signs of the subjects, and patients with stable symptoms maintained the follow-up effects of IPT for up to 8 months after treatment (12).

In another study in 2017, Muller evaluated the reduction of severe negative symptoms of schizophrenia using this treatment method. In this research, 61 outpatients with schizophrenia with severe negative symptoms participated. Twenty-eight people were divided into the INT group and 33 into the control group (usual treatments). The remission rates of negative symptoms were greater significantly in the group who received INT (27).

Meanwhile, the findings of the study by Wafadar-e-Asghari and Sarami also support the results of the present study. In this study, eight obsessive-compulsive patients with a contamination/washing pattern were selected from among those referred to psychological centers in Mashhad, Iran. The Yale-Brown Obsessive-Compulsive Questionnaire, the Maudsley Obsessive-Compulsive Inventory, the Thought-Action Fusion Questionnaire, Wisconsin Cards, the Stroop Test, Working Memory Tests, and Captain Log Cognitive Rehabilitation Software (version 2022) were used in this study. Integrative neurocognitive therapy was used for 12 sessions twice a week, and the follow-up phase was followed three weeks after the end of the treatment. The findings showed that integrative neurocognitive therapy had sufficient effectiveness in reducing the clinical symptoms of obsessive-compulsive disorder and improving the neuropsychological functions of patients with obsessive-compulsive disorder with a contamination/washing pattern (28).

Azhdari et al. also conducted cognitive interventions, attention, and memory exercises on 30 samples with major depression aged 19 to 40 years in 12 45-minute sessions, 3 times a week, and argued that the computer-based cognitive rehabilitation program, in addition to improving executive functions, also reduced the severity of depression symptoms (29).

Given the assumption of previous research, and also considering the persistence of cognitive deficits even after recovery in depressed patients, integrative neurocognitive therapy for major depressive disorder can be used as an effective and efficient treatment strategy in treating the mental problems of these patients and in this regard, it can outperform other treatments in treating the symptoms of the disease. While these findings increase our understanding of how this treatment reduces clinical symptoms, more research is needed to confirm the current findings and examine the

clinical relationship of variables in greater depth. Also, future studies should use a larger sample size, and to ensure the effectiveness of subscales with greater reliability, it is necessary to revise the findings in more clinical settings such as public hospitals, private psychiatric clinics, and daily mental health centers.

This research, like other research, faced limitations, including the fact that this research was conducted only on patients with major depression in Mashhad. Therefore, caution should be taken when generalizing the results. Also, although the replacement of individuals in the experimental and control groups was random, their selection in a convenient way creates limitations.

Also, the moderating role of demographic factors has not been considered, which was one of the limitations of the research. Therefore, it is suggested that, if possible, future research should consider the moderating role of demographic factors such as education level, socio-economic status, and severity of depression for more comprehensive studies on the effectiveness of integrative interventions in treating depressed individuals.

Conclusion

The results indicate that integrative cognitive therapy is effective in reducing clinical symptoms among patients with major depressive disorder. Therefore, it is recommended to utilize this approach to address various psychological facets of treatment, potentially enhancing outcomes for individuals with MDD.

Ethical Considerations
This article derives from the first author's doctoral thesis in general psychology at the Islamic Azad University of Ardabil. Participants were informed about the study's objectives, involvement, benefits, and treatment sessions. Informed consent was obtained, and privacy systems were assured.
Code of Ethics
1401.118REC.ARDABIL.IAU.IR
Authors' Contributions

This article is derived from the first author's doctoral thesis. The second author oversaw the study design, with the first author conducting research and executing interventions. All authors contributed to the writing and revision of the manuscript, and approved the final manuscript.

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