

# Comparison of the Effects of the Three Methods of Massage, Selected Yoga Exercises and Massage-Yoga Combination on the Depression in Elderly Women

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## Research Article

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# Abstract

## Purpose

The present study aims to compare the effects of massage, selected yoga exercises and massage-yoga combination methods on the depression in depressed elderly women.

## Methods

According to the research criteria, 60 available samples were selected and randomly divided into three experimental groups and single control one. The Beck Depression Inventory (BDI) was completed by the examinees before the intervention, two months after its beginning and one month after ending. Each experimental group received one of the massage interventions, selected yoga exercises and massage-yoga combination for eight weeks, three sessions per week and for a period of 40 minutes per session. The data were analyzed using 4 (group) × 3 (measurement) factorial analysis of variance method (ANOVA) and Bonferroni post hoc test was employed to compare the intragroup differences in the measurement steps and intergroup ones. The significance level of alpha was considered to be 0.05.

## Results

The results showed that there was a significant difference in the level of depression within the three experimental groups of massage (0.001), yoga (0.00) and combination (0.00). There was also a significant difference between the four groups in the depression variable (0.001).

## Conclusion

The results indicated that all three intervention methods of massage, selected yoga exercises and a combination of massage and yoga improve the depression in depressed elderly women. However, there was a significant difference between the three approaches and the massage-yoga combinative exercise program was found to have the greatest effect on improving the depression in depressed elderly women.

## Introduction

Due to the medical advances and reduced mortality during the recent decades, the elderly population has increased. This increase is especially significant in the women population because life expectancy in women is higher than men to the extent of 6–8 years [1]. In fact, depression is still a major cause of disability worldwide [2]. Cognitive impairment, dysfunction, physical illness, insufficient or lack of social support, sleep disorders, grief or depression in adolescence and middle age, are considered as the risk factors for the depression in elderly people [3]. Almost all over the world and in all countries and cultures, the prevalence of major depressive disorder in women is twice as high as in men [4]. Depression is a

mood disorder followed by a combination of emotional, cognitive and physical symptoms [5–7]. Depression in the elderly people might lead to other health effects such as malnutrition, decreased physical activity, decreased performance, decreased life quality, increased drug use and health costs, illness, increased hospital staying length, increased risk of suicide and eventually death [8]. This disorder imposes an economic burden on the government, reduces the productivity and increases the health costs [9].

Nowadays, use of non-pharmaceutical methods in the treatment of mental health issues in the elderly people, has attracted much attention because most of the elders are under treatment with several drugs due to multiple diseases which might pose the greater risk of the side effects [10].

In addition, the influence of physical activity on reducing the depression in the elderly people has been investigated in various studies and the positive effect of this factor has been mentioned on reducing the depression [11, 12]. However, elderly people are not able to perform any type of activity due to some physiological, physical and motor limitations [13].

Yoga is one of the suggested exercises for reducing the depression [14]. It is a set of posture-based physical (asana), controlled breathing (pranayama) as well as relaxation (shavasana) exercises [15]. Yoshihara et al (2014) examined the effect of 12-week yoga exercising on the physical and psychological symptoms of healthy women. The results of this study showed that yoga significantly reduces the depression scores after 12 weeks [16]. Devi et al (2015) found that yoga has positive impact on the depression in female laborers [17]. Also Schuver et al (2016) examined the effects of yoga on old women with depression and indicated that yoga improves their depression [18]. However, the findings of research by Oken et al (2004) contradicted the above studies [19].

Massage therapy is another novel treatment for the depression. Researchers have recommended this method to be used as an effective and complementary one along with other techniques in the rehabilitation process of depressed patients [20, 21]. Massage therapy has been reported to reduce the depression by many researchers [22–25]. However, some researchers have not found a significant difference between the rate of depression in patients before and after the massage therapy intervention [26, 27]. Despite previous research which has reported that massage is effective in treating depression Coelho et al (2008) indicated in a review study that incomplete evidence are available to support this claim [28].

In general, there seems to be no general agreement on the effects of massage therapy and yoga on the depression. Therefore, considering the above-mentioned points, increasing the elders' life quality as well as using non-pharmaceutical methods as a complementary treatment for mental illnesses, especially depression, are of high prominence. So far, no study has been conducted on studying the effects of the three methods of massage, selected yoga exercises and a massage/yoga combination on the depression in elderly women. In this regard, the present study seeks to answer the question whether the above-mentioned approaches affect the depression level in depressed elderly women? And is there a difference between these three methods?

# Method

## Participants

The statistical population of the present study consisted of depressed 60-85-year old elderly women from the centers of Farhikhtegan and Jahandidehgan Senior Sanatoria of Shahrekord. A total number of 60 depressed elderly people were purposefully selected based on the inclusion criteria of the research from these centers in 2021 and random allocation classified into four 15-membered groups including three experimental groups and a control one. The mean age of the present participants was  $74.33 \pm 5.86$  years. The inclusion criteria included the age range of 60-85 years, BDI score of 20-30, no auditory, visual and speech problems, being aware of the place, time, objects and individuals, no history of hospitalization in psychiatric hospitals, no history of psychotherapy and experience of grief in the past six months, not receiving any treatment which could impair the mental ability, memory or thinking, no history of mental illness, psychosis and physical diseases affecting the psyche such as the thyroid, no depression and no use of antidepressants and sedatives.

## Materials and design

The current research is an experimental study with three experimental groups and a control one together with pre-test, post-test and follow-up designs.

## Apparatus

The BDI is a 21-item self-report questionnaire whose purpose is to assess the depressive symptoms on a Likert scale ranging from 0 to 3 with anchors to each scale value. This scale is a self-assessment tool which is used in order to determine the severity of depression. Its content has been validated by many studies [30]. Furthermore, most researchers have reported the alpha coefficient for this questionnaire to be higher than 0.75 on average [31]. In this study, the Cronbach's alpha coefficient for this tool has been considered to be 0.78 to arrive at higher reliability.

## Procedure

The elderly people of four groups completed the medical background and BDI questionnaires prior to the research beginning. In the first experimental group, after assuring the samples about the safety of massaging and obtaining their consent and permission, the massage course was carried out for them by massage specialists in a quiet and silent atmosphere with appropriate light and ventilation under perfectly hygienic conditions. Also, the massaging conditions were the same for all examinees and it was performed lying on the bed in one of the sanatorium rooms, using the lavender oil. The massage group underwent a classic Russian massage on the back, neck, upper and lower organs three times a week for 40 minutes for a total period of eight weeks. The second experimental group practiced yoga relaxation and breathing exercises for eight weeks. These exercises were performed three times a week for 40 minutes by an instructor at the gym center of the sanatorium. The yoga relaxation and breathing exercises included the controlled breathing (pranayama) as well as release and relaxation (shavasana)

exercises. In each session, 30 and 10 minutes were devoted to the breathing and meditation exercises, respectively. The third experimental group underwent the combinative program of massage and selected yoga exercises three sessions per week, 40 minutes per session and for a total period of eight weeks. For this group, the massage program was performed as 20-minute sessions while the breathing and yoga relaxation exercise protocols lasted about 20 minutes, 15 and 5 minutes of which were devoted to the breathing and meditation exercises, respectively. The control group had a normal life for eight weeks. 48 hours after the last practice session of the experimental groups, the BDI questionnaire was completed through face-to-face interviews with the elders of all groups. After finishing the massage and yoga sessions, the researcher monitored all four groups by attending the centers for a period of one month. Then, the researcher performed the follow-up test again by completing the BDI questionnaire.

## Analyses

The central tendency and standard deviation indices were employed in order to describe the data. The data were analyzed using 4 (group) × 3 (measurement) factorial analysis of variance method (ANOVA) and Bonferroni post hoc test was employed to compare the intragroup differences in the measurement steps and intergroup ones. The significance level of alpha was considered to be 0.05.

## Results

Table 1 lists the mean and standard deviation of elderly women's depression scores associated with the three stages of pre-test, post-test and follow-up for the experimental and control groups.

Table 1  
Mean and standard deviation of depression scores associated with four groups at three stages of pre-test, post-test and follow-up in

Groups	Pre-test		Post-test		Follow-up	
	M	SD	M	SD	M	SD
Massage	24.20	3.14	16.66	2.87	17.33	2.74
Yoga exercises	23.90	3.03	19.80	3.09	20.13	3.24
Yoga/massage combination	23.50	3.34	13.80	2.70	14.33	2.35
Control	24.26	3.12	23.86	3.33	23.40	3.24

As can be seen from Table 1, at the pre-test stage, the average depression scores of the elderly people in the four groups are close to each other. However, at the post-test stage, the depression has decreased in the three groups of massage, selected yoga exercises and massage/yoga combination. Also, no significant difference was observed between the mean values of the control group. Furthermore, the results indicated that the durability of the Effects of massage, yoga and yoga-massage combination is established in the follow-up test so that the mean of scores in this test for all three experimental groups is

close to that in the post-test phase. The results of 4 (group) × 3 (measurement) factorial ANOVA associated with the three measurement stages of the depression variable are presented in Table 2.

Table 2  
Results of the intragroup factorial ANOVA associated with the three measurement stages of the depression variable

Source of changes	Total squares	Degree of freedom	Mean squares	F-statistic	Significance level	η-squared
Depression	27.09	1.22	22.07	8.67	0.003	0.14
Group-depression interaction	182.79	3.86	49.64	19.50	0.00	0.52

According to the results of Table 2, the depression variables associated with the three measurement stages met a significant difference ( $P = 0.003$ ). Therefore, there was a significant difference between the test, post-test and follow-up in the depression variable. Also, the interaction effect of the depression and group on the depression variable was found to be significant ( $P = 0.00$ ). In addition, ANOVA was used to determine the interaction effect in each group, the results of which are listed in Table 3.

Table 3  
Repeated measure of ANOVA results related to the time of depression measurement

Source of changes	Group	Total squares	Degree of freedom	Mean squares	F-statistic	Significance level	η-squared
Time to measure depression	Massage	534.53	1.20	445.46	106.70	0.001*	0.88
	Yoga	185.73	1.25	148.50	120.38	0.00*	0.89
	Combination	1042.53	1.13	917.31	196.88	0.00*	0.93
	Control	5.64	1.28	4.39	4.64	0.37	0.24

As would be observed from Table 3, the group\*depression interaction effect was significant in the massage ( $P = 0.001$ ), yoga ( $P = 0.00$ ) and massage/yoga combination ( $P = 0.00$ ) groups. Therefore, the Bonferroni test was used to compare the measurement stages for each group and the corresponding results are presented in Table 4.

Table 4

Results of Bonferroni post hoc test for the comparison of depression measurement stages associated with each group

Groups	Pre- and post-test			Pre-test and follow-up			Post-test and follow-up		
	M	SD	Sign	M	SD	Sign	M	SD	Sign
Massage	7.53	0.65	0.00*	7.06	0.71	0.00*	-0.46	0.25	0.26
Yoga exercises	4.64	0.21	0.001*	4.13	0.42	0.00*	-0.33	0.28	0.79
Yoga/massage combination	10.64	0.69	0.00*	9.93	0.72	0.00*	-0.53	0.21	0.80

As illustrated by the results of Table 4 for the massage group, there is a significant difference between the pre- and post-test ( $P = 0.00$ ), pre-test and follow-up ( $P = 0.00$ ) measurement stages in terms of the depression variable. A significant difference was observed in the yoga group between the pre- and post-test ( $P = 0.001$ ), pre-test and follow-up ( $P = 0.00$ ) measurement stages in terms of the depression variable. Furthermore, there was a significant difference between the depression levels in the combination group corresponding to the pre- and post-test ( $P = 0.00$ ), pre-test and follow-up ( $P = 0.00$ ) measurement stages. In order to compare the depression status between the four groups, the intergroup ANOVA was used, the results of which are given in Table 5.

Table 5

Results of between group ANOVA of the depression variable associated with various groups

Source of changes	Total squares	Degree of freedom	Mean squares	F	Significance level
Group	527.35	3	175.74	9.45	0.001*

Based on the results of Table 5, a significant difference exists between the depression variables of the four above-mentioned groups ( $P = 0.001$ ). Due to the significance of the depression variable in the four groups ( $P = 0.001$ ), the Bonferroni post hoc test was employed in order to make a comparison between the groups whose results are presented in Table 6.

Table 6  
Results of Bonferroni post hoc test, pairwise comparison of the groups in terms of the depression variable

Paired groups	Mean difference	Standard deviation	Significance
Massage and yoga	-1.64	1.07	0.791
Massage and combination	3.16	1.42	0.186
Massage and control	-4.92	1.18	0.001*
Yoga and combination	4.81	1.20	0.001*
Yoga and control	-3.28	1.08	0.023*
Combination and control	-8.09	1.65	0.00*

According to the results of Table 6, there are significant differences between the depression levels of the massage and control ( $P = 0.001$ ), yoga and combination ( $P = 0.001$ ), yoga and control ( $P = 0.023$ ), combination and control ( $P = 0.001$ ) groups.

## Discussion

The present results indicated that in the selected yoga exercises group, there is a significant difference between the three measurement stages in terms of the depression variable in such a way that the depression levels in the post-test and follow-up stages were less compared to the pre-test one. Several researches have been conducted in this field which are consistent or inconsistent with the present study. Naveen et al (2016), Yoshihara et al (2014), Telles et al (2015), Devi et al (2015) and Schuver and Lewis (2016) The results of all the mentioned researches are in line with those of the present research [32, 16, 33, 17, 18].

### The effect of yoga on depression

Yoga affect the body and mind by changing the internal environment which control nervous system ultimately affecting sympathetic, parasympathetic system, release of neurotransmitters, hormonal outflow, mind and brain functioning, thought process i.e. affect the whole homeostasis of body. So it has very diverse effect on the body and mind physiology [34]. One of the physiological hypotheses about the causes of depression is the monoamine hypothesis. This hypothesis states that an imbalance in dopamine (a neurotransmitter related to the reward and pleasure) and serotonin (neurotransmitter related to happiness) causes depression. The recent positron emission tomography studies indicate that yoga exercises increase the dopamine levels in the striatum by 65% [35]. In addition, the regular yoga exercise leads to an increment in the serotonin level along with a decrease in the monoamine oxidase one and improves the mood and state of well-being [36]. Another cause of depression is associated with the decreased neural balance in the hippocampus and hypothalamic-pituitary-adrenal axis [37]. Brain-derived neurotrophic factor (BDNF) is an available factor in most tissues which is produced in the hippocampus

and cortex and found in the blood [38, 39]. Clinical studies focusing on the BDNF measurement in the blood, have reported lower levels of this factor in patients with depression [38]. Yoga exercises may act as a powerful stimulant for the hypothalamic-pituitary-adrenal and noradrenergic systems and reduce depression by reducing the cortisol and increasing BDNF [32]. Dalgas et al (2008) concluded that the yoga exercises control the mind and central nervous system by nature, which, unlike other exercises, has a moderating effect on the functioning of the internal nervous system, secretion of internal hormones, physiological factors, regulation of nervous messages, etc [40]. According to this viewpoint, in addition to music, yoga, exercise, study and meditation also leads to the happiness and relaxation and thus reduces the depression [41]. On the other hand, increasing brain activity improves the concentration and social relationships and consequently the depression reduction [15].

In fact, yoga practice techniques both exercise the body and stimulate the mind. Yoga helps one in increasing adaptation by reducing stress and brings body and mind relaxation through limiting the stress and reducing arousal of the cerebral cortex and thus reduces anxiety and depression [42]. However, Oken et al (2004) arrived at results being inconsistent with the present achievements [19]. However, this inconsistency might be related to the type of selected yoga exercises that focus only on physical exercises, as well as the intensity of the practices and the stress induced by the research conditions.

### **The effect of massage on depression**

The present results further indicated that in the massage group, there is a significant difference between the three stages of depression measurement in such a way that the depression levels in the post-test and follow-up stages were less compared to the pre-test one.

On the effect of massage therapy on depression, Hassan et al (2019), Alves et al (2017), Zadkhosh et al (2015), Field et al (2012) and Imanishi et al (2009) examined the influence of massage therapy on the depression in patients with cardiac catheterization, cancer patients, adolescent wrestlers, pregnant women and patients with breast cancer, respectively. They also mentioned the positive effect of massage therapy on reducing the depression. The results of these studies are consistent with the present achievements in terms of the effect of massage on the depression. massage reduces the secretion amount of cortisol hormone in the body and depression as a consequence [46, 47]. However, some researchers have not found any significant difference between the depression rates of patients before and after the massage therapy intervention [26, 27]. Coelho et al (2008) illustrated in a review study that there is incomplete evidence to testify this [28]. However, the discrepancies between the results of the above-mentioned studies and the present research might be due to the type of massage therapy protocol.

Other results of the present study illustrated that the rate of depression associated with the massage/yoga combination group at the post-test and follow-up stages decreases compared to that of the pre-test one. To the best of the present authors' knowledge, no study has concerned with examining the effect of a combination of massage and yoga on the depression level in elders. Further to these, the present results indicated that there is a significant difference between the pre-test and follow-up stages of the massage, yoga and massage/yoga combination groups in terms of the depression variable. The

reason for the durability of the physiological and mental effects of these protocols is attributed to the massage executive protocol, nature of breathing and relaxation exercises of yoga, conditions and duration of the programs.

Finally, the present results indicated that there is a significant difference between the four groups of massage, yoga, massage/yoga combination and control in terms of the depression variable. There was also significant differences between the experimental groups separately and the control one and also between the yoga and massage/yoga combination groups. Also, comparing the three experimental groups, the combinative, massage therapy and selected yoga exercise protocols, had the most to the least effects in improving the depression in the elders, respectively. In this regard, no research has been found to compare these three treatment methods for the depression.

## Limitations

The limitations of the present study were sampling among women in sanatoria of Shahrekord city due to the unavailability of all depressed elders, lack of control over factors such as genetics, individual discrepancies, elderly behaviors and their sleep outside the intervention time, mental and emotional conditions and their socio-economic and family status. On the other hand, since the present study has been conducted on the elders, its results can not be generalized to all depressed people. The authors suggests that these three methods be used as effective and complementary techniques along with other methods in the depression improving process in the elderly women.

## Conclusion

The results illustrated that all three intervention methods of massage, selected yoga Massage-yoga combinative exercise and improve the depression in depressed elderly women and there was a significant difference between the three approaches. Also, the massage/yoga combinative exercise program was found to have the greatest effect on improving the depression level in depressed elderly women.

## Declarations

### Compliance with ethical standards

**Conflict of interest** No potential conflict of interest was reported by the authors. No conflict of interest exists in the submission of this manuscript, and manuscript is approved by all authors for publication.

**Ethical approval** Ethical approval for the study was given by the School. Ethics Committee of Shahrekord University (Iran) Faculty of Sports Sciences.

**Informed** All participants signed informed consent.

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