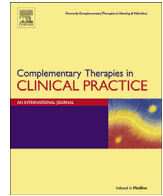




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## Effect of 'Exercise Without Movement' yoga method on mindfulness, anxiety and depression



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### ABSTRACT

**Objective:** To analyze the effect of the 'Exercise Without Movement' (E.W.M) yoga method on mindfulness and on the improvement of anxiety and depression symptoms.

**Methods:** A quasi-experimental study examined the effect of one month E.W.M. intervention among 38 participants who were enrolled voluntarily to both groups, study (n = 16) and control (n = 22). Five participants dropped out during the study.

The State Mindfulness Scale (SMS) was used to measure mindfulness. The Anxiety Inventory Beck (BAI) and the Beck Depression Inventory (BDI-II) were used to measure the anxiety and depression symptoms, respectively, before and after the intervention.

**Results:** Study group showed both a statistically significant increase in mindfulness and decrease in anxiety and depression symptoms, compared with the control group.

**Conclusions:** The E.W.M. has been useful in the development of mindfulness and in the treatment of anxiety and depression symptoms and may represent a new method in the mindfulness-based therapeutic application.

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## 1. Introduction

### 1.1. 'Exercise Without Movement' (E.W.M.)

'Exercise Without Movement' (E.W.M.) is a systematic yoga method which focuses on the development of attention and a greater consciousness and control of the autonomic nervous system process, through attention, relaxation and meditation practices, specific yoga postures and breathing practices [39].

The origin of this method lies in the tradition of the Himalayan Rishis who were sages of ancient India who collected their teachings in sacred books known as the Vedas, written in Sanskrit between 1500 and 1000 BCE. Based on these teachings, Swami Rama who was a renowned spiritual teacher, doctor and Indian scientist, promoter of yoga and meditation in the West, designed and developed this series of exercises and practices, which he called 'Exercise Without Movement'.

The E.W.M. method consists of the practice of various body

awareness and relaxation techniques: (1) Corpse Pose Relaxation or Shavasana, a relaxation technique based on a progressive mental body scan; (2) Systematic Tensing and Relaxing in Corpse Pose; (3) Standing Tension/Relaxation; and (4) Shavayatra or 61 Points Relaxation, one of the central practices of this group of techniques, which is based on the focusing of attention to specific points and vital centres. Through the Shavayatra it is possible to detect and become aware of the weak and tense body points [40].

In addition to the techniques mentioned, this method is also composed of meditation techniques based on attention to the body and its sensations, which is the core of Buddhist Vipassana meditation. Vipassana means insight, observation of reality within oneself, through attention to one's own physical sensations [19]. The alternate breathing pranayama technique known as Nadi Sodhana, which favours a state of meditation and internalization, is also included in this meditative practice [41].

E.W.M. further includes specific practice of yoga postures which are aimed mainly at promoting the proper functioning of the abdominal organs and, therefore, digestive function. They also stimulate the endocrine system, through the massaging caused by the postures in the endocrine glands. This stimulation improves the assimilation of nutrients, the detoxification, cleansing and revitalization of the body.

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Moreover, the practice of diaphragmatic or abdominal breathing in different postures or asanas is emphasized. This type of breathing promotes the proper oxygenation of the blood, facilitates the flow of arterial blood to the abdominal organs and benefits heart function.

### 1.2. Mindfulness and body awareness

The original concept of mindfulness is based on the development of Buddhist Vipassana meditation, in a regular and systematic way, over an extended period of time. From this perspective, mindfulness is considered a mental state of consciousness in the present moment, with an attitude of lack of judgment and reactivity. The practice and development of this capacity leads to an improved knowledge of self and one's states and emotions, as well as an attitude of openness and curiosity about experiences, a decrease in emotional reactivity and negative affect and a higher sense of compassion and connection with others [7]. In the study about the development and initial validation of the State Mindfulness Scale, Tanay & Bernstein [51] define mindfulness such as a unique and integral mental state that includes various qualities or properties such as awareness, perceptual sensitivity to stimuli, deliberate attention to the present moment, intimacy or closeness to one's subjective experience, and curiosity.

In recent years, the Buddhist concept of mindfulness has become an important school of thought and practice by Western cognitive behavioural therapists. The most significant intervention programs that have been developed to effect are Mindfulness-Based Stress Reduction (MBSR [27]; and Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2002) which have been used in most of the published research on mindfulness. Currently, the MBSR program is implemented in more than 700 medical centres, hospitals and clinics around the world and has spread to the general public through various means, transcending its application in therapy and research.

The development of mindfulness is closely linked to the development of body awareness and its sensations. It is a fact that we use the same brain circuits for mental activities and physical actions [43]. It has been shown that certain areas of the central nervous system are involved in autonomic regulation. One is the central autonomic network (CAN; [3,4], which receives and integrates visceral and humoral information and environment information and coordinates autonomic, endocrine and behavioural responses to external challenges [52]. This network includes structures such as the anterior cingulate cortex and the insular cortex, structures that have been, also, related to interoceptive awareness and its relationship with the emotions [37]. More specifically, there is evidence that insula is involved in visceral awareness and cingulate and prefrontal cortex intervene in perception of emotions [31].

### 1.3. Yoga and meditation on the management of anxiety and depression

The practice of yoga has positive effects on stress management, as well as on emotional regulation and on impulse control. A study of the application of an integrative yoga therapy program in cases of essential arterial hypertension in public healthcare found significant differences, between the study group and a control group, in the decrease of the negative affect, anxiety symptoms and degree of stress, as well as a significant decrease of blood pressure [53]. In addition, Yoshihara et al. [57] found that the continued practice of yoga has a stable effect on its practitioners, as indicated by a lower level of experienced anxiety and anger-hostility (both factors measured by the Profile of Mood States, POMS), in comparison with beginning practitioners. Also, in the study of [13]; with anxiety

diagnosed patients, to which a yoga program was applied, participants showed a large and significant reduction of anxiety symptoms.

Regarding depression, there is abundant literature about the beneficial effects of yoga in its management. The ruminative style, which plays an important role in the etiology and maintenance of depressive disorders [56], can be reduced in depressed patients who practice yoga. A group of 27 women with Major Depressive Disorder, who followed a yoga program, had a trend in decreased ruminations and reported experiencing increased connectedness and gaining a coping strategy through yoga [28]. Likewise, in a studies review on the benefits of yoga in depression conducted by Mentha & Sharma [34]; using the Medline, the CINAHL and the ERIC Databases, demonstrated that in 17 of the 18 studies analyzed, depressive symptoms of patients were significantly reduced by yoga practice. Also, Shapiro et al. [47] examined the effect of yoga postures as adjunctive therapy for symptoms remission patients who were medicated and diagnosed with Major Unipolar Depression. In this study, the practice of yogic postures such as standing poses, inversions and chest expansion poses, decreased depression and anxiety symptoms. Patients increased their experiences of positive mood, such as happiness, optimism, confidence and contentedness, simultaneously increasing energy and attention levels, while decreasing negative mood states such as frustration and pessimism.

Additionally, in people diagnosed with both disorders, anxiety and depression, yoga practice improves the results of qualitative clinical evaluations and specific self-report of anxiety and depression [25,29,30]. Furthermore, Forfylow [17] conducted a studies review on the application of yoga as a clinical intervention in cases of anxiety and depression, which was carried out between 2003 and 2010, proposing several hypotheses in order to explain why yoga produces physiological and cognitive changes. Among these studies, Streeter et al. [50] found a 25% increase in GABA (gamma-aminobutyric acid) levels, after an hour yoga session. In this regard, it is important to consider the negative correlation between the level of GABA and the degree of depression and anxiety [5]. In the same way, yoga practice has a positive effect on neurotransmitters associated with mood, increasing the level of melatonin, dopamine, and serotonin and reducing the level of cortisol [15].

In addition, the practice of yoga techniques, specifically the respiratory practices, reduced the anxiety and depression symptoms of people diagnosed with posttraumatic stress [14].

Regarding meditation, there is strong evidence of the association of meditation practices with neurophysiological changes, i.e. in the neuroplasticity of various structures such as the anterior cingulate cortex, the insula, the temporoparietal junction and the network structures, such as fronto-limbic structures [16]; [21,22].

The "Mindfulness Based Stress Reduction" program (MBSR [27], based on the application of mindfulness meditation, yoga practice and relaxation, has shown positive physiological effects, improving immune function and reducing blood pressure and cortisol levels [9] and positive emotional changes, reducing the degree of stress [18] and improving anxiety and mood symptoms [20].

### 1.4. Major aims

The main objectives of this study are a) to analyze the effect of the E.W.M. method on the development of mindfulness state and on the improvement of anxiety and depression symptoms, b) to elaborate on the description of the mechanisms that lead to this effect and on the relationship between the changes in mindfulness and the improvements in anxiety and depression.

This set of yogic techniques is based on attention to the body and breathing as a way of exploring the body with its possibilities

and limitations. In this method, body awareness, relaxation, meditation and yoga postures, form a set of a sequential series of exercises practiced internally, with little movement, approaching a greater understanding of the mind and its relations with the body and breathing.

Yogic relaxation develops mindfulness and increases the capacity for body awareness, promoting control over it [8] and the practice of meditation increases attention and body awareness [26]. The practice of yoga postures (asanas) improves body awareness through attention to the body and the somatic and autonomic processes involved in its execution, leading to greater control over them [42].

Raising awareness from this cognitive level can allow a certain degree of control over the autonomic processes and provide an opportunity to rectify and model the body memory, reduce emotional reactivity and understand and accept the nature of our perceptions, thoughts and actions. 'E.W.M. is a systematic method of exercise that allows the practitioner to travel along the pathways of action, from mind to muscle' [39]. This statement implies a person can obtain increased knowledge and control of the Autonomic Nervous System, through the stabilization of the same, therefore achieving relaxation and rest levels that allow reaching a mental state of wellness and tranquility. The proper development of attention and body awareness leads the practitioner to a state of deep and conscious relaxation. By becoming aware of the physical and mental stress and experience the feeling of relaxation as opposed to stress, a person can learn to let go and relax and the internalization of this state is facilitated.

There are clear similarities between the E.W.M. method and Body Scan practice, which is included in the MBSR program [27], such as Jacobson's progressive relaxation [24] and Isometric Relaxation [49]. However, 'Exercise Without Movement' has a number of advantages over the aforementioned techniques.

Firstly, our method includes the above mentioned techniques, organized in a progressive series: body scan through Corpse Pose Relaxation (Shavasana), progressive relaxation via Systematic Tensing and Relaxing in Corpse Pose and Standing Tension/Relaxation. The practice of body attention Shavayatra or 61 Points Relaxation, one of the cornerstones of the E.W.M., is also integrated into these practices.

Secondly, our method includes 4 specific body awareness practices that are designed to be developed as a whole in a period shorter than the techniques aforementioned.

Thirdly, both Systematic Tensing and Relaxing in Corpse Pose and Standing Tension/Relaxation, affect the development of the ability to discriminate very subtle levels of tension and relaxation, as much as in regard to the intensity as in the specificity and localization of the sensations in each body part. They are mutually complementary practices which guide the development of these capabilities not only in the supine position, customary in such practices, but also in the standing posture, leading to an improvement in awareness and development in relaxation and its implementation in different situations of daily life.

Finally, Shavayatra or 61 Points Relaxation represents an ordered revision of these vital points that facilitates body awareness systematization, helping to maintain the practitioner's attention throughout the course, by forcing them to number each point to complete the aforementioned review.

## 2. Methods

### 2.1. Participants

The initial sample of the study consisted of 38 women volunteers from the Universidad Popular, Ciudad Alta District of Las

Palmas de Gran Canaria (Spain), sociocultural center under the direction of Las Palmas de Gran Canaria Council. Men were excluded because only one male volunteered. The participants were between 26 and 74 years old. None of the participants were familiar with the yoga method developed in this work.

Participants decided voluntarily to participate in either of both groups: study and control. A maximum of 16 participants was established in the study group to ensure the proper training during the study. The control group consisted of 22 participants. During the course of the study 5 participants left the training.

All participants completed informed consent prior to commencement of the study. The mean age in the study group was 56.09 (SD 7.87) and in the control group was 51.27 (SD 12.38).

No statistically significant differences between groups in age, marital status, education level and occupation were found, as well as in the anxiety and depression levels in relation to the baseline.

### 2.2. Instruments

Mindfulness state was measured with the Spanish version of the State Mindfulness Scale (SMS), which consists of 21 items, with a very high reliability in its original version, Cronbach's alpha of 0.95 [51].

The Spanish adaptation of Beck Anxiety Inventory (BAI) [1]; was used to measure the anxiety symptoms. This inventory contains 21 items, with a high level of internal consistency, Cronbach's alpha of 0.88 [44].

To measure the depression symptoms the Spanish adaptation of the Beck Depression Inventory-Second Edition (BDI) [2] was used. It is a 21 question multiple-choice self-report inventory. For this inventory a Cronbach's alpha of 0.89 [45] has been obtained.

### 2.3. Procedure

After giving their signed consent to participate in the study, and before starting the practice, both groups of participants completed the mentioned questionnaires (pre test measures).

The study group participants followed the E.W.M. method over the course of a month, twice a week, undergoing a total of 8 × 90-min sessions. The practices were conducted in a properly enabled room. Participants were encouraged to practice at home and to bring the mindfulness practice to daily life.

Questionnaires were completed again, after having finished the training (post test measures).

### 2.4. Statistic analysis

The statistics package SPSS, version 15.0, was used for the data analysis.

Firstly, one-way ANOVA was executed for testing the equality of the means between the groups in the pre-test measurement of each psychological variable.

Secondly, a mixed ANOVA was performed to analyze the interaction between the measures of the psychological variables and the treatment groups. A significance level of  $p \leq 0.05$  was established.

Finally, the correlations between the psychological variables, represented by the Pearson correlation coefficient, were calculated. This analysis was performed for the changes in the pre and post test scores of the psychological variables.

## 3. Results

Firstly, the descriptive statistics of the pre and post test scores in the psychological variables are detailed in Table 1.

The results of the one-way ANOVA showed no statistically

significant differences between the groups in the pre test scores of each psychological variable: Mindfulness-SMS ( $F = 3.34$ ;  $p = 0.077$ ), Anxiety-BAI ( $F = 3.37$ ;  $p = 0.076$ ), Depression-BDI ( $F = 0.935$ ;  $p = 0.339$ ). In spite of this is a nonrandomized study, these results showed the homogeneity of the groups in the pre-test measurements in each psychological variable.

Below, the results of the mixed ANOVA contrast analyses are shown in Table 2. The analyses showed statistically significant differences between the groups in the pre and post test scores for every psychological variable. In the study group, a significant increase was observed between the means of pre and post test mindfulness state scores and significant decreases were observed between the means of pre and post test anxiety and depression scores. These results indicate that, after training in the E.W.M. method, participants of the study group showed a significant increase in mindfulness state and a decrease in anxiety and depression symptoms compared with the participants of the control group.

Subsequently, the results of the Pearson correlations between the changes in the pre and post test scores in the measurements of the psychological variables are detailed in Table 3. A statistically significant negative correlation between Anxiety-BAI and Mindfulness-SMS ( $p \leq 0.001$ ) and between Depression-BDI and Mindfulness-SMS ( $p \leq 0.05$ ) were found. Conversely, a statistically significant positive correlation between Anxiety-BAI and Depression-BDI ( $p \leq 0.001$ ) were found.

#### 4. Discussion

The main objectives of this study were to analyze the effect of the E.W.M method on mindfulness state, anxiety and depression and to elaborate on the description of the mechanisms that lead to this effect and on the relationship between the changes in mindfulness state and the improvements in anxiety and depression.

**Table 1**  
Descriptive statistics of the psychological variables studied in both groups.

		MD (SD)	MD (SD)
		Pre	Post
BAI	Study	20.18 (12.12)	12.45 (9.30)
	Control	12.59 (10.73)	13.68 (12.32)
BDI	Study	11.45 (9.74)	6.55 (8.50)
	Control	8.36 (8.06)	7.77 (9.66)
SMS	Study	53.82 (15.93)	65.73 (22.09)
	Control	67.68 (20.08)	70.09 (21.57)

**Table 2**  
Mixed ANOVA analysis of the interaction between measurement (pre- and post-test) and treatment (study group and control group) for the psychological variables.

	F	Signif.	Partial Eta <sup>2</sup>	Power
BAI	5.737	0.022*	0.158	0.647
BDI	14.214	0.043*	0.125	0.533
SMS	2.094	0.043*	0.125	0.533

\* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .

**Table 3**  
Pearson correlations between the changes in the pre and post test scores on the measurements of the psychological variables.

	BAI	BDI	SMS
BAI	–		
BDI	0.621***	–	
SMS	–0.569***	0.355*	–

$p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .

First of all, an increase of mindfulness in the participants after the intervention has been found. This result supports those found in other studies, in which interventions, based on the application of a yoga program, resulted in an increase of mindfulness in the participants [6,35,46,48]. The E.W.M. method has been focused on developing a state of mindfulness through observing the body and the mind: sensations, body image, posture, thoughts and emotions. This method also encourages deep and conscious relaxation and the practice of meditation techniques. A silencing of the body and the mind is achieved through these techniques. In contrast, automatic or unconscious actions, movements and thoughts produce a permanent state of mental speed and confusion that prevents developing both the capacity of observation of body sensations and movements, such as thoughts and emotions. In this intervention the body awareness has been promoted as much as the awareness of mental processes, thoughts and emotions and their relationship with body sensations. Previously and in this regard, Palomo, Vara, Cebolla, y Baños [36] had already found a correlation between body awareness and mindfulness. It has been shown that a yoga program increases body and feeling awareness [23]. In a similar way, in their study with chronic neck pain patients, Cramer et al. [10] found an increase of the body awareness of the participants with an increase of their perceived health control, a greater capacity of establishing an emotional distance in exhausting situations and a greater acceptance of pain and daily life burdens. Also in this sense, in the study carried out by Tulle, Unruh & Dick [54]; in which a yoga program for patients with chronic pain was applied, participants improved their ability to control the extent to which pain interfered with their daily lives, through the development of body awareness. Participants also expressed fewer episodes of pain or less pain suffered because they could recognize body signs and they were cognitively prepared to relieve pain sensations.

Secondly, after the intervention, an improvement on the anxiety and depression symptoms has been found. These results confirm those found in the related studies, cited above, and are in line with those found in the systematic review of 25 randomized control studies that provided preliminary evidence to suggest that yoga practice leads to better regulation of the sympathetic nervous system and hypothalamic-pituitary-adrenal system, as well as a decrease in depressive and anxious symptoms in a range of populations [38].

It has been shown that the practice of meditation increases the synaptic plasticity [55]. Moreover, the neural circuits that underlie social behavior, emotional self-regulation and well-being can be favored by these practices [12]. The brain circuits that underlie the differences in emotional responses and emotional regulation are highly plastic and can be altered in response to different interventions that have been carried out, meaning they are modified in light of experience. As situations and early adverse experiences may lead to alterations in brain function, with adverse health effects, and can lead to the development of psychopathology, this brain plasticity can also be the source of a potential positive change [11]. Therefore, it would be possible to use this brain plasticity to cultivate healthy mental habits through yoga practice, meditation and development of mindfulness, while promoting positive cognitive and behavioural changes aimed at improving the well-being and the resilience.

Finally, the statistical significance found in the correlations between the increase in mindfulness state and the improvements on the anxiety and depression symptoms, after the intervention, sustains the idea that the increase of the awareness could lead to the emotional self-regulation. Mehling et al. [33] describe the body awareness process 'in terms of shifts in awareness of physical sensations and negative emotions, of engagement in self-regulation, emotion regulation and self-care, integration of mind,



body and lifeworld context'. This awareness can have a transformative effect. When the person becomes aware of certain unpleasant inner feelings, they often become more tolerable sensations [32].

Although positive results have been found, it would be interesting to study the effects of this yoga method for a longer period of time to review the scope and the depth of the findings and to see if they indeed are more reliable. It would also be interesting to establish a follow-up to check its consistency over time.

In summary, the results obtained in this study support the idea that the training in the E.W.M. method is a valuable contribution to the set of techniques which develops mindfulness and may represent a new method in the research studies and in the mindfulness-based therapeutic application. Accordingly, future investigations designed to broaden and deepen its study are proposed.

### Ethical approval

The procedure performed in this study was in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Informed consent

Informed consent was obtained from all individual participants included in the study.

### Conflict of interest

None.

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