



African Journal of Biological Sciences



Assessing Various Relaxation Technique Components For Stress And Quality Of Life– A Systematic Review

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Article History

Volume 6, Issue Si4, July 2024

Received: 20 June 2024

Accepted: 5 July 2024

Published: 27 July 2024

doi:

10.48047/AFJBS.6.Si4.2024.4395-4400

Introduction: There are countless methods used to achieve relaxation such as • Deep Breathing: This involves taking slow, deep breaths to calm the mind and relax the body. Techniques like diaphragmatic breathing or box breathing are often used to regulate breathing patterns.

- Progressive Muscle Relaxation (PMR): PMR involves tensing and then relaxing each muscle group sequentially, promoting awareness of tension and release throughout the body.
- Mindfulness Meditation: Focuses on cultivating present-moment awareness without judgment. It often involves paying attention to breath, bodily sensations, thoughts, and emotions.
- Visualization: Involves imagining a peaceful scene or experience to evoke a sense of relaxation and reduce stress. It can be guided or self-directed.
- Yoga and Tai Chi: Both combine physical postures, breathing exercises, and meditation to promote relaxation, flexibility, and mindfulness.
- Autogenic Training: A self-relaxation technique that involves repeating a set of visualizations and body awareness exercises to induce a state of relaxation.
- Guided Imagery: Similar to visualization, but typically involves a narrator or guide who helps direct mental images and sensations toward relaxation and healing.
- Biofeedback: Uses sensors to monitor bodily functions such as heart rate and muscle tension, providing real-time feedback to help learn how to control these responses.

These techniques stimulate the parasympathetic nervous system, also known as the "rest and digest" response¹. This counters the effects of the sympathetic nervous system, which is responsible for the body's stress response (fight-or-flight). Reduces Stress Hormones: By triggering the relaxation response, deep breathing helps lower levels of cortisol, a stress hormone

associated with anxiety and tension. **Increases Oxygen Flow:** delivers more oxygen to the body, which can help improve overall brain function and promote feelings of calmness and clarity. **Promotes Mindfulness:** Focusing on deep breathing encourages mindfulness, as it directs attention to the present moment and away from anxious or stressful thoughts. **Relieves Physical Tension:** helps relax the muscles, particularly in the chest and abdomen, reducing physical symptoms of stress like tightness and pain. **Improves Respiratory Efficiency:** Regular practice of deep breathing can enhance lung capacity and efficiency, leading to better overall respiratory health. **Enhances Emotional Regulation:** Deep breathing can help regulate emotions by promoting a sense of control over one's physiological responses, leading to improved emotional stability and resilience. **Supports Relaxation Techniques:** Deep breathing is often a foundational element in many relaxation techniques, such as progressive muscle relaxation, meditation, and guided imagery. It serves as a starting point for achieving deeper states of relaxation. The aim of this meta-analytic study was to investigate the efficacy of relaxation training programs which are currently used to treat anxiety disorders and to reduce anxiety in general. This idea derived from a need we had in our clinical practice, to collect some information about the relaxation methods recently most used in clinical trials, both randomized or observational, and about their relative efficacy in reducing anxiety in different samples. During the preliminary search of the literature, we decided to organize a review of the studies published in the last ten years. We chose this span of time because we thought that ten years are an appropriate timeframe to make a picture of the current situation in the field of relaxation techniques for anxiety management. Further, we thought that in ten years there would have been enough studies to allow meta-analytical calculations. Studies can help refine and optimize relaxation techniques by identifying which techniques are most effective for different populations (e.g., children, elderly, patients with specific medical conditions) and under different circumstances (e.g., acute stress, chronic stress).

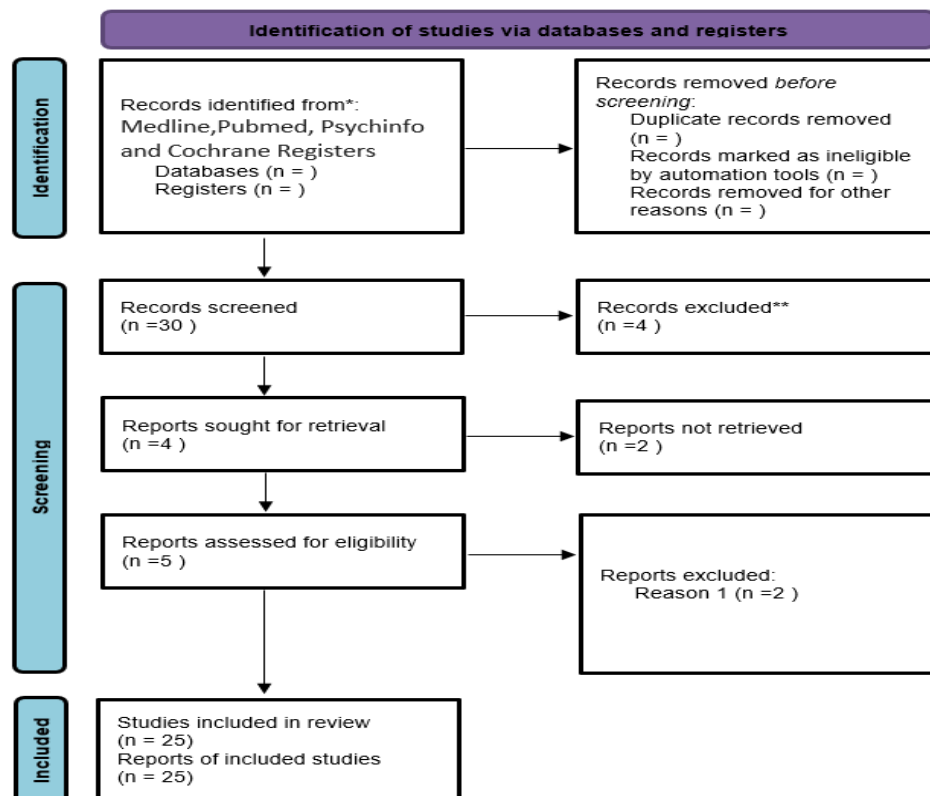
Methodology–

Study selection– The overall objective of study selection was to collect published journal articles that examined anxiety level before and after relaxation training for reduction of anxiety both in clinical and non-clinical population. We searched the following databases: PsycINFO, MEDLINE and the Cochrane Central Register of Controlled Trials. The searches were restricted to the past ten years (2013–2023) and included the following terms: relaxation training, relaxation exercise(s), relaxation therapy, autogenic training, relaxation AND meditation, relaxation. These words were searched as key words, title, abstract, and MeSH subject heading terms. Also, citation maps were examined and the "cited by" search tools was used. These findings were cross referenced with references from reviews. Findings were limited to human adults and English language studies. We didn't consider unpublished works. **Study eligibility.**

Studies meeting the following inclusion criteria were selected for the meta-analysis:

- (a) at least one relaxation training condition (no matter if it was the object of the paper or the treatment of the control group)
- (b) reporting of interval or ratio data
- (c) use of psychometrical questionnaires
- (d) anxiety level data presented before and after relaxation training
- (e) sufficient reporting of study results (e.g. means and standard deviations) to allow for effect size computation.

A distinction was not made among studies in which relaxation training alone or in combination was compared to a comparison/ control group, studies in which relaxation training was examined without a control element and observational trials. The absence of a control group was not an exclusion criterion, because effect size's calculation can be done also on pre–post modifications. However, since between group and within group analyses are methodologically different, two separated analyses were conducted



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

Results

Between groups analysis We located 25 studies (see table 1) with a random allocation of subjects into a relaxation training treatment or in a control/comparison group. The pooled sample was composed by 1005 subjects, whose 568 were allocated in the experimental training groups, while 437 were included in control/comparison groups. The mean age is 33,27 years, mostly women (62,75%). In 8 studies (42%), the sample is composed by people with physical diseases, in 6 (31,6%) by volunteers or students, in 5 (26,3%) by psychological or psychosomatic patients. Progressive relaxation was used in 10 works (41,7%), autogenic training and meditation in 2 (8,3%). Only one study used applied relaxation. The other researches evaluated the effects of multi-methods training (3 studies, 12,5%) or other techniques (6, 25%). Half the papers were North American publications (9, 47,4%), 5 were Asian (26,3%), 3 European (15,8%) and 2 Oceanian (10,5%). The most used instrument was the state form of the STAI (14 studies, 73,7%). Only one study used the trait Scale, so as the Beck Anxiety Inventory. Two works assessed the level of anxiety with the

Hospital Anxiety and Depression Scale. The context of training was equally divided between individual (52,6%) and group sessions (47,4%). The most part (68,4%) of the trainings required (or, at least, recommended) implementing some activities at home or outside the clinical setting

The context of implementation doesn't seem to influence significantly the efficacy of treatment, even if group sessions have an higher average score than the individual ones.

At study level there is a positive correlation ($p < .05$) between the length of treatment and its effect size. Homework increases effect size in comparison to the therapist's sessions alone ($p < .001$). There are also differences of effect size among the instruments used for psychometric assessment. Studies that used the Hospital Anxiety and Depression Scale show lower results ($p < .001$) in comparison to the other questionnaires, which don't differ significantly from each other

This analysis is based on 25 studies (see table 1), with a total sample of 748 participants. The mean age of the sample is 32–65 years, with a higher percentage of women (59,5%). In 10 studies (40%) the sample was composed by patients with psychological or psychosomatic diseases, 9 (36%) by patients with somatic troubles and 6 by volunteers or students. Progressive relaxation is the most studied training among the papers included in this meta-analysis of observational studies (33,3%). Autogenic training, meditation and applied relaxation were implemented in 3 studies each (11,1%). In 4 papers (14,8%) a multi-methods training was implemented, while in others 5 (18,5%) other techniques

Discussion–

There is a great heterogeneity of effect sizes. In order to reduce this variability, some distinctions have been made. All the relaxation techniques considered show a good potential in the reduction of anxiety. Applied relaxation and meditation have very high effect scores both in within and between analyses. However, in latter analysis, applied relaxation is used only in one study, making this result not valid. Progressive relaxation produced high effect sizes, with a within group reduction superior to the other techniques. The decrease in anxiety obtained with autogenic training is a little lower (but still positive) than other techniques in the between groups comparison, but its within group effect size is aligned with the general average. A multi-techniques approach does not increase relaxation training efficacy on anxiety reduction, showing an effect size level relatively low in both analysis. The selection of the best relaxation technique is quite hard. The high effect size levels reached by meditation, applied relaxation and progressive relaxation may indicate a good efficacy in the reduction of anxiety from all of them. An indication that seems to rise from those data is to apply just one model, avoiding the use of more techniques together. There is a difference between the two analyses concerning the typology of participants. Within group analysis indicates a good efficacy for this category, despite a lower score than the former one. Patients with psychological or psychosomatic diseases present different results between the two analyses. In controlled studies, the average effect size is medium-low, while open trials without control group indicate a really higher effect size. Globally, at baseline, participants with psychological or psychosomatic diseases show higher anxiety levels in comparison with the other and this can explain greater differences between pre and post assessment in within group studies. Control groups of studies with psychological diseases may help to understand the data of the between group analysis. In fact, there seems to be a waiting list effect², because people often improve just by being in a waiting list. Moreover, some people could have been under an unknown treatment (psychotherapy, pharmacological...) leading to an uncontrolled anxiety decreasing. Differently, people without a particular disease (students or volunteers) present a stable level of

anxiety along time and treatment effect is "pure", because not related to an expected "physiological" decreasing of anxiety from higher levels in clinical samples.

An opposite correlation between effect size and percentage of women emerged between the two meta-analyses. This correlation is negative in the between group analysis, while it's positive in the within group one. This result is hard to explain. Maybe it is related to an heterogeneous percentage of women in the different groups of subjects. For example, in the samples with psychological or psychosomatic problems there is a significantly greater presence of women. So, this result may depend mostly on samples composition, and must be taken with caution. Further research is needed.

We decided to include all studies published and relevant to our aim, independently from their research design, in order to increase the number of studies and participants. However, within group meta-analysis we conducted is very limited because it is impossible to state if anxiety enhancements were directly related to or caused by relaxation training. As in any review of studies in a given area, it is possible that studies with non significant results are underreported. The practice of publishing only studies with significant outcomes may create a distortion of the subject under investigation, especially if a meta-analysis is done [49]. It is important to note that, for some variables, meta-analyses were based on relatively few subjects. We searched studies in the most important databases for psychology (PsychInfo) and medicine (Medline). Other databases (e.g. CINAHL) were not screened and this may be a limitation to the generalizability of our results.

Conclusion –

Notwithstanding its limitations, the present meta-analytical study show consistent and significant efficacy of relaxation training in reducing anxiety, coherently with past studies and reviews [26,30,28,27]. The first hypothesis is then confirmed: post-treatment anxiety is lower than baseline level and relaxation training outperforms control conditions on anxiety-specific measures. While all relaxation trainings reduced anxiety, applied relaxation, progressive relaxation and meditation showed greater effect sizes than other techniques. In particular, this meta-analysis evidences the lower potential of multimethods relaxation. The use of one of the main relaxation techniques is preferable, at least for anxiety reduction. Both psychological or psychosomatic patients and volunteer subjects gain more benefits from relaxation training. The reduction of anxiety for medical patients is lower in comparison to the others categories, but relaxation training still has good efficacy. It is possible, even if it should be investigated by further studies, that young people can have a better decreasing of anxiety levels, compared to old people. The potential of the training increase together with its intensity. The most effective trainings are long-lasting, especially with the practice of the exercises at home. The context of application results to be irrelevant. Treatments are equally effective in anxiety reduction, both for in-group or individual sessions. Different anxiety questionnaires present different sensitivity to anxiety changing. Trait anxiety reductions were lower than state anxiety, assessed with the two scales of the STAI. Studies that used the BAI obtained higher effect sizes, maybe due to a greater sensitivity of this instrument. This meta-analysis deals with scores obtained by anxiety questionnaires and cannot be generalized to other aspects, even if anxiety can be considered as a construct related to a lot of human dimensions. For this reason, this work does not speak about general efficacy of relaxation trainings, but it is limited to the anxiety dimensions. The meta-analytic findings parallel qualitative reviews revealing that relaxation training has potential for the treatment of anxiety in different populations. Further, this meta-analysis extends the existing literature through facilitation of a

better understanding of the variability and clinical significance of anxiety improvement subsequent to relaxation.

Competing interests– The authors declare that they have no competing interests

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