Effectiveness of progressive muscle relaxation training for adults diagnosed with schizophrenia: a systematic review protocol

Carlos Melo-Dias¹
João Luís Alves Apóstolo¹
Daniela Filipa Batista Cardoso¹

¹ Health Sciences Research Unit: Nursing, Nursing School of Coimbra; The Portugal Centre for Evidence-Based Practice: an Affiliate Centre of the Joanna Briggs Institute, Portugal

Corresponding author:
Carlos Melo-Dias,
cmelodias@esenfc.pt

Review question/objective

The objective of this review is to systematically search, appraise and synthesize the best available evidence on the effectiveness of Progressive Muscle Relaxation (PMR) in the human responses of adults with schizophrenia and no positive symptoms of disease, in any setting, regarding anxiety, social isolation, personal and social functioning, cognition, sadness, conversation, and well-being.

More specifically, the review will focus on the following question:

What is the effectiveness of Progressive Muscle Relaxation training on anxiety, social isolation, personal and social functioning, cognition, conversation, and well-being in adults with schizophrenia?

Background

Schizophrenia is often characterized by a long prodromal phase and a gradual change in psychosocial functioning, with symptoms that could include changes in affect (such as anxiety, irritability and depression), cognition (such as difficulty in concentration or memory), thought content (such as preoccupation with new ideas), physical changes (such as sleep disturbance and loss of energy), social withdrawal and impairment of role functioning.¹,²

Anxiety is a prominent symptom, early in the course of schizophrenia, and is viewed both as a comorbidity and a clinical expression of schizophrenia.³ Anxiety can be a stress factor that worsens existing prodromes or symptoms, leading to a vicious circle of growing stress and increased symptoms.⁴

Overall, the consequences alone or in combination of these components of anxiety generate a reduced efficiency of behaviour. The anxious individual, in addition to avoiding or escaping from
situations, also shows inhibition in many other activities such as establishing contact and performing professional activities outside his/her routine.\textsuperscript{5,6}

The physiological and cognitive aspects can create a vicious circle with negative thoughts leading to sympathetic changes, which are themselves interpreted in a negative way. The result can be a spiraling of anxiety.\textsuperscript{6}

“Stress is an everyday fact of life, and we can’t avoid it”.\textsuperscript{8(p.1)} “Nervous tension is a more frequent ailment than the common cold. It is a greater danger because tension can reduce your efficiency, destroy your health and shorten your life”\textsuperscript{7(p.1)}

We consider that day-to-day living confronts the person with a continuous stream of potentially stressful situations. If stress is acknowledged as reasonable, it becomes propulsive, constituting an impulse that causes the individual to make decisions, solve problems, and improve his/her functioning and abilities. In this sense, stress will help motivate the individual to achieve desirable goals, giving some flavor to life and providing an incentive for personal and professional achievement.\textsuperscript{8,9}

We can experience stress from four basic sources: the Environment (the environment besieges you with demands to adjust); Social Stressors (the demands of the different social roles we play); Physiological Sources (transitions affecting our body); and Thoughts (our brain interprets and perceives complex changes in our environment and body, and determines whether they are a problem for us and when to turn to “emergency responses”).\textsuperscript{6}

The anxiety experienced in day-to-day life situations is, therefore, interpreted as a complex set of emotions, and a personality trait or a state of the individual which combines three components: cognitive, vegetative, and motor.

The cognitive component relates to all thoughts and feelings developed by someone who is anxious, and relates to what the person states that he/she feels.

The vegetative component translates the physiological arousal of the individual when he/she is anxious. This activation is specific to each person so it may present great variability of responses such as increased heart rate and blood pressure, changes in gastric motility, urinary emergency, sweating, and increased muscle tension.

The motor component refers to the previously addressed avoidance and escape responses determined by anxiety, limiting the individual’s purview expressed through tense postures and different types of unrelaxed activities.\textsuperscript{5}

One way of breaking the anxiety circle would be to reinterpret bodily changes in a positive thoughts form (cognitive approach). Another way would be to use relaxation techniques such as progressive muscle relaxation (physiological theory). A third way would be to introduce graded exposure to the feared situation (behavioural approach).\textsuperscript{6}

Relaxation is conceptualized as a complex response class involving motor, visceral, observational responses and verbal behaviour. Motor behaviour involves action of the skeletal muscles. Visceral responding is concerned with homeostatic functions including breathing, temperature, and muscle tension. Observational responses seek out stimuli in the environment (e.g. a quiet park setting) or generate discriminative stimuli (e.g. “seeing” a quiet park setting). Verbal behaviour is concerned with overt or covert vocal behaviour (e.g. “I am tense”) in relation to relaxed behaviour.\textsuperscript{10}
Many relaxation techniques aim to increase awareness of areas of chronic unconscious muscle tension. They often involve a conscious attempt to release and relax during exhalation. Frequently, habituation occurs with repeated exposure, but some people continue to react as if they were seeing this particular stressor for the first time. Mental escape techniques, such as imagery or relaxation therapy, can help decrease arousal, but learning is essential to adaptation. Most relaxation techniques are enjoyable, and many healthy individuals practice them without having particular health problems.\textsuperscript{11,12}

There are two general purposes of tension control: prophylactic and therapeutic. By learning to relax differentially 24 hours a day, a person can increase the likelihood of preventing a stress or tension disorder. For a person already thus victimized, clinical PMR can often ease or eliminate the condition.\textsuperscript{11}

Most relaxation techniques need to be practiced daily. Typically, patients learn a relaxation technique over the course of eight weekly classes, each lasting an hour or so. Between classes, they practice by themselves for 15 to 30 minutes a day. After the course is over, patients are encouraged to continue on their own, though they may take further classes to learn advanced techniques or to maintain group support.\textsuperscript{12}

PMR was originally developed by Edmund Jacobson, and his original method required dozens of sessions where the participant was taught to relax 30 different muscle groups. Training consisted of successive tensing and relaxing of muscle groups, beginning with the upper body and proceeding to the lower parts.\textsuperscript{13}

Based on different sources, we can state that recently there has been a growing interest in relaxation techniques in the multidisciplinary treatment of patient’s response to schizophrenia symptomatology.

The only existing revision, within this topic, “Progressive muscle relaxation in persons with schizophrenia: a systematic review of randomized controlled trials”, aims to assess the effectiveness of progressive muscle relaxation (PMR) on psychological distress and anxiety symptoms and on response/remission for people with schizophrenia. The three selected randomized controlled trials (RCT) involved 146 patients, and authors concluded that PMR can acutely reduce state anxiety and psychological distress, and improve subjective well-being. No studies investigated the evidence for PMR as an add-on treatment for psychopathology, or for positive or negative symptoms, or for relapse prevention. This review demonstrates that PMR might be a useful add-on treatment to reduce state anxiety and psychological distress, and improve subjective well-being in persons with schizophrenia. It further demonstrates that PMR may be offered in both acute and chronic inpatient treatment settings.\textsuperscript{6}

The recent research “Acute effects of progressive muscle relaxation on state anxiety and subjective well-being in chronic Bulgarian patients with schizophrenia” aimed to provide evidence on the effectiveness of PMR as means of alleviating the state anxiety and psychological distress and a way to increase subjective well-being in chronic patients with schizophrenia. Sixty-four schizophrenia patients underwent two PMR sessions which were offered once a week and lasted approximately 25 minutes\textsuperscript{13}

Results revealed significant decreased state anxiety and psychological stress, and increased subjective well-being within the experimental group, and it is noteworthy that both groups differed
significantly in all post-measures. Therefore, this study provides scientific evidence for the use of PMR in patients with schizophrenia in chronic psychiatric settings, offering an easy method to learn healthy alternatives to cope with subjective stress and state anxiety.

A recent RCT on effects of progressive muscle relaxation on state anxiety aimed to examine the efficacy of a single progressive muscle relaxation session compared with a control condition on state anxiety, psychological stress, fatigue and subjective well-being in patients with acute inpatient schizophrenia. Sixty-four patients were randomly assigned to either a single progressive muscle relaxation session of 25 minutes or a resting control condition with the opportunity to read for an equal amount of time.\(^\text{14}\)

The results show that the 27 PMR group participants showed decreased state anxiety, psychological stress and fatigue and increased subjective well-being. Between-group differences in post scores were found for state anxiety, subjective well-being and psychological stress, but not for fatigue.

The authors state that PMR is highly effective in reducing acute feelings of stress and anxiety in patients with schizophrenia. A reduction in stress and state anxiety is associated with an increase in subjective well-being.\(^\text{14}\)

Another recent RCT on efficacy of progressive muscle relaxation training in reducing anxiety assigned 18 randomized patients to experimental and control groups. The experimental group received PMR training and the control group received a placebo intervention. Results show that the anxiety level improvement was significantly higher in the PMR training group after intervention and at follow-up, and the mean Beck Anxiety Inventory score fell from moderate anxiety on the pre-test to normal anxiety on the post-test.\(^\text{15}\) Therefore, the authors state that PMR training is a potentially effective nursing intervention to reduce anxiety in patients diagnosed with schizophrenia, depending on the quality of their mental status at the time of intervention.\(^\text{15}\)

The recent research about development of self-control strategies and stress management aimed to verify the impact of self-control skills and a stress management programme. During nine months, 14 participants with schizophrenia took part in a psycho-educative programme based on the relaxation principles of Jacobson, Shultz, and Desoille.\(^\text{16}\)

Significant differences were found between pre- and post-test evaluations, revealing a decrease in stress levels and an increase in coping strategies, especially related with “self-control”, “assuming responsibility”, and “positive re-evaluation”.

Furthermore, it is relevant to comprise all possible limitations of this therapy. Despite the fact that PMR sessions were experienced with satisfaction and wellness, a certain degree of motivation is necessary to embrace the regular use of this technique on a daily or weekly basis.

Most publications indicate that adverse events resulting from relaxation techniques seem to be extremely uncommon; however, patients with heart and cardiovascular diseases, as well as patients with psychiatric disorders who present positive symptoms and risk of disorientation or confusion should be treated carefully.

Although there already exists a systematic review on this topic, it only includes RCT design studies, and the outcomes of psychological distress and anxiety.
In this JBI protocol for Systematic Review, we intend to go beyond that, as defined in the inclusion criteria, and consider any quantitative study design, setting, and outcome that will include all scientific/standardized assessments (questionnaires or scales) of anxiety, social isolation, personal and social functioning, cognition, conversation, and well-being.

Thus, this systematic literature review is considered to be timely and relevant.

Keywords
Schizophrenia; Progressive Muscle Relaxation

Inclusion criteria

Types of participants
This review will consider studies that include:
1) Adults (aged 18 and over), with no upper age limit.
2) Current DSM-IV Schizophrenia diagnosis, but excluding those with positive psychotic symptoms (namely delusional thinking and/or hallucinations).
3) Any setting where participants live (namely their own house, family house, psychiatric hospitals [acute units], day care hospitals, halfway houses, long-term care facilities, and forensic hospitals).

Types of intervention(s)
This review will consider studies that assess Progressive Muscle Relaxation (PMR) (Jacobson’s Model) as an intervention (regardless of the number and duration of sessions, and of the participant’s positioning model).

A comparison will be made between patient group/individual PMR treatment versus no intervention, or another type of intervention referred to as relaxation intervention.

Types of outcomes
This review will consider studies that include the following outcome measures (using any scientific/standardized measurement scales or questionnaires):

Primary outcomes - anxiety, social isolation, personal and social functioning, cognition, sadness, conversation and well-being;

Secondary outcomes - physiological measurement (respiratory rate, blood pressure, heart rate, skin temperature), self-rating (self-report from participants using preset descriptive phrases), and observation (structured observation of postures), and also attended training sessions.

Types of studies
This review will consider both experimental and epidemiological study designs including randomized controlled trials, non-randomized controlled trials, quasi-experimental, before and after studies, prospective and retrospective cohort studies, case control studies, and analytical cross sectional studies for inclusion.
This review will also consider descriptive epidemiological study designs including case series, individual case reports, and descriptive cross sectional studies for inclusion.

**Search strategy**

The search strategy aims to find both published and unpublished studies. A three-step search strategy will be used in this review. An initial limited search of MEDLINE and CINAHL will be undertaken, followed by an analysis of the text words in the title and abstract and the index terms used to describe the article. A second search using all identified keywords and index terms will then be undertaken across all included databases. Thirdly, the reference list of all identified reports and articles will be searched for additional studies. Studies published in Portuguese, English, Spanish, Italian, French will be considered for inclusion in this review. All studies published with no time limits will be considered for inclusion in this review in order to cover all existing studies about this topic.

The databases to be searched include:

- CINAHL (EBSCO)
- Directory of Open Access Journals (DOAJ)
- ERIC
- Medline (EBSCO)
- PsycNET
- Scielo Citation Index
- The Cochrane Central Register of Controlled Trials
- Embase
- PEDro

The search for unpublished studies will include:

- ProQuest – Nursing and Allied Health Source Dissertations
- CAPES (www.capes.gov.br)
- RCAAP – Scientific Open Access Repository of Portugal (http://www.rcaap.pt/)

The initial keywords to be used are:

- Schizophrenia
- "Progressive Muscle Relaxation"
Assessment of methodological quality

Papers selected for retrieval will be assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI-MAStARI) (Appendix I). Any disagreements that arise between the reviewers will be resolved through discussion, or with a third reviewer.

Data collection

Data will be extracted from papers included in the review using the standardized data extraction tool from JBI-MAStARI (Appendix II). The data extracted will include specific details about the interventions, populations, study methods and outcomes of significance to the review question and specific objectives.

The reviewers will extract data from studies independently. In order to find any missing data or information, the authors will be contacted.

Data synthesis

Quantitative data will, where possible, be pooled in statistical meta-analysis using JBI-MAStARI. All results will be subject to double data entry. Effect sizes expressed as odds ratio (for categorical data) and weighted mean differences (for continuous data) and their 95% confidence intervals will be calculated for analysis. Heterogeneity will be assessed statistically using the standard Chi-square and explored using subgroup analyses based on the different study designs included in this review. Where statistical pooling is not possible, the findings will be presented in narrative form including tables and figures to aid in data presentation where appropriate.

Conflicts of interest

There are no conflicts of interest.

Acknowledgements

The authors would like to thank the support provided by the Health Sciences Research Unit: Nursing (UICISA: E), hosted by the Nursing School of Coimbra (ESEnC).
References


Appendix I: Appraisal instruments

MAStARI appraisal instrument

### JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial

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<tr>
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<td>1</td>
<td>Was the assignment to treatment groups truly random?</td>
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<td>Were participants blinded to treatment allocation?</td>
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<td>3</td>
<td>Was allocation to treatment groups concealed from the allocator?</td>
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<td>4</td>
<td>Were the outcomes of people who withdrew described and included in the analysis?</td>
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<td>Were those assessing outcomes blind to the treatment allocation?</td>
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<td>6</td>
<td>Were the control and treatment groups comparable at entry?</td>
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<td>Were groups treated identically other than for the named interventions</td>
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<td>8</td>
<td>Were outcomes measured in the same way for all groups?</td>
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<td>9</td>
<td>Were outcomes measured in a reliable way?</td>
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<td>10</td>
<td>Was appropriate statistical analysis used?</td>
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Overall appraisal: Include [ ] Exclude [ ] Seek further Info. [ ]

Comments (Including reason for exclusion)

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# JBI Critical Appraisal Checklist for Descriptive / Case Series

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<td>1.</td>
<td>Was study based on a random or pseudo-random sample?</td>
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<td>Were the criteria for inclusion in the sample clearly defined?</td>
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<td>Were confounding factors identified and strategies to deal with them stated?</td>
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<td>Were outcomes assessed using objective criteria?</td>
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<td>5.</td>
<td>If comparisons are being made, was there sufficient descriptions of the groups?</td>
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<td>Was follow up carried out over a sufficient time period?</td>
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Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

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JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

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<td>3. Has bias been minimised in relation to selection of cases and of controls?</td>
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<td>4. Are confounding factors identified and strategies to deal with them stated?</td>
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<td>5. Are outcomes assessed using objective criteria?</td>
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Appendix II: Data extraction instruments

MAStARI data extraction instrument

**MAStARI data extraction instrument**

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**Participants**

Setting

Population

**Sample size**

Group A ___________________________ Group B ___________________________

**Interventions**

Intervention A

Intervention B

Authors' Conclusions:

Reviewers' Conclusions:
Study results

Dichotomous data

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