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The effect of progressive muscle relaxation technique for anxiety among menopause women: Meta-analysis

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Abstract--This study aimed to analyze the effect of muscle relaxation for anxiety among menopause women. This study is a systematic review and meta-analysis. The articles used in this study were obtained from three database, namely PubMed, Science Direct, and Google Scholar. The articles included are full-text article with a study design of randomized controlled trial from 2013 to 2022. Articles were analyzed using the Review Manager 5.3 application. A total of 9 articles from Asia (India, Taiwan & Turkey), Africa (Ethiopia), Europe (Spain), and North America (Canada). The data collected showed that anxiety in menopausal women who do PMRT will decrease by 0.37 units compared to menopausal women who do not do PMRT, and the results were statistically significant (SMD= -0.37; 95% CI= -0.63 to -0.12; p= 0.004).

Keywords--progressive muscle relaxation, anxiety, menopause, women.

Introduction

Menopause is a universal and physiological event in women around the age of 50. Menopause is a sign of the end of the menstrual cycle that occurs 12 months after the last menstrual period (Jenabi et al., 2015). Mood swings often occur during periods of hormonal change, especially events surrounding a woman's life history such as puberty, the perinatal period, and the menopausal transition (Halbreich, 2003). The symptoms often comprise interactive syndromes such as autonomic neurological disorders and metabolic disorders (Azarbal et al., 2016). The main manifestations of female menopause include insomnia, dreaminess, dizziness, fever, palpitation, sweating, fatigue, depression, anxiety, fear, nervousness, sensitivity, suspiciousness, and irritability, collectively known as menopausal syndrome (Zhao et al., 2018).

Anxiety, and sleep quality problems gradually affect each other, forming either a vicious or a benign cycle. Thus, active external intervention plays an important role in regulating this cycle (Lampio et al., 2017). Relaxation is one technique to help reduce anxiety and muscle tension. Progressive muscle relaxation technique (PMRT) is a therapy used since implementation of Edmond Jacobson in 1938. PMRT will help stretch the muscles, it is due to the psychological claim that people with stress and anxiety have tight muscles (Rodríguez-Fuentes et al., 2014). Progressive muscle relaxation technique can reduce tension levels and improve autonomic nervous function, cardiopulmonary performance and lipid profile. Research has been done that shows positive effects of PMRT in cardiac patients, insomnia, chronic pain, and anxiety (Chaudhuri et al., 2015). Based on this background, a comprehensive study is needed from various primary studies on the effect of the progressive muscle relaxation on reducing the anxiety. This study aimed to analyze the effect of progressive muscle relaxation on reducing the anxiety among menopause women.

Method

Data Source and Search Strategy

This study was carried out in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) (Mikolajewicz & Komarova, 2019). The electronic searches used were PubMed, Science Direct, and Google Scholar, conducted from inception to June 16, 2022. The inclusion criteria in this research are full-text article with Indonesian and English language using randomized controlled trial study design, the keywords to search article were as follow "Progressive Muscle Relaxation" OR "PMRT" AND "anxiety" OR "stress" AND "menopause" AND "women outcome" AND "Randomized Controlled Trial" OR "RCT". In addition, articles were manually screened from primary studies conducted previously with a randomized controlled trial design, and relevant articles were reviewed according to the PICO formulation.

Study Selection

Search for studies or articles based on eligibility criteria, namely inclusion and exclusion criteria. The inclusion criteria in this research are: a) full text article; b)

the article uses Indonesian and English language; c) population: menopause women; d) intervention: progressive muscle relaxation; e) comparison: conventional method care; f) outcome: anxiety; g) randomized controlled trial design; h) effect size used is Mean and SD. The exclusion criteria are articles published in languages other than English and Indonesian, articles before 2008, and articles that are not free access.

Data Extraction and Study Quality Assessment

The research is guided by the PRISMA flowchart and the assessment of the quality of research articles using critical appraisal by Centre for Evidence Based Medicine (CEBM, 2014).

- Does this study address a clear research focus?
- Is the Randomized Controlled Trial research method appropriate to answer the research question?
- Are there enough subjects in the study to establish that the findings were not coincidental?
- Were the subjects randomly divided into the experimental and control groups? If not, can this be biased?
- Does the study use inclusion/exclusion criteria?
- Were the two groups comparable at the start of the study?
- Were objective and unbiased outcome criteria used?
- Is the measurement method used objective and valid to measure the results? If not, is there any blinding in the study?
- Is effect size practically relevant?
- Is the estimated effect, correct? Is there a confidence level interval?
- Are there any confounding factors that have not been taken into account?
- Can the results be applied to your research?

Table 1
Assessment of study quality using critical appraisal by Center for Evidence Based Medicine (CEBM, 2014)

Primary Study	Criteria												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Chaudhuri et al. (2015)	1	1	1	1	1	1	1	1	1	1	1	1	12
Shirzadi et al. (2021)	1	1	1	1	1	0	1	1	1	1	1	1	11
Pelit Aksu & Erenel (2022)	1	1	1	1	1	1	1	1	1	1	1	1	12
Huang & Zhao (2020)	1	1	1	1	1	1	1	1	0	1	1	1	11
Batra & Shiju (2022)	1	1	1	1	1	1	1	1	0	1	1	1	11
Saensak et al. (2014)	1	1	1	1	1	1	1	1	1	1	1	1	12
Malathi & Padmavathi (2022)	1	1	1	1	1	1	1	1	1	1	1	1	12
Lin et al. (2022)	1	1	1	1	1	1	1	1	1	1	1	1	12
Chellew et al. (2015)	1	1	1	1	1	1	1	1	1	1	1	1	12

Note: Answer: Yes=1, No =0

Statistical Analysis

Review Manager (RevMan) is software used to analyze data. RevMan is issued by The Cochrane Collaboration created to prepare and maintain Cochrane affairs. RevMan facilitates the preparation of a full protocol and review, including text, study characteristics, comparison tables, and study data. RevMan can perform meta-analysis of the entered data, and present the results graphically (Cohrane, 2014). This software has been used since 2014, RevMan helped authors make a systematic review or meta-analysis that is used to present the results of the overall mean difference, describing the 95% Confidence Interval (CI) using the effect model and data heterogeneity (I^2).

Results

An initial search of the database returned 1,297 articles. After screening the articles by removing articles based on the eligibility criteria, 9 articles were found that were included in the meta-analysis synthesis (figure 1).

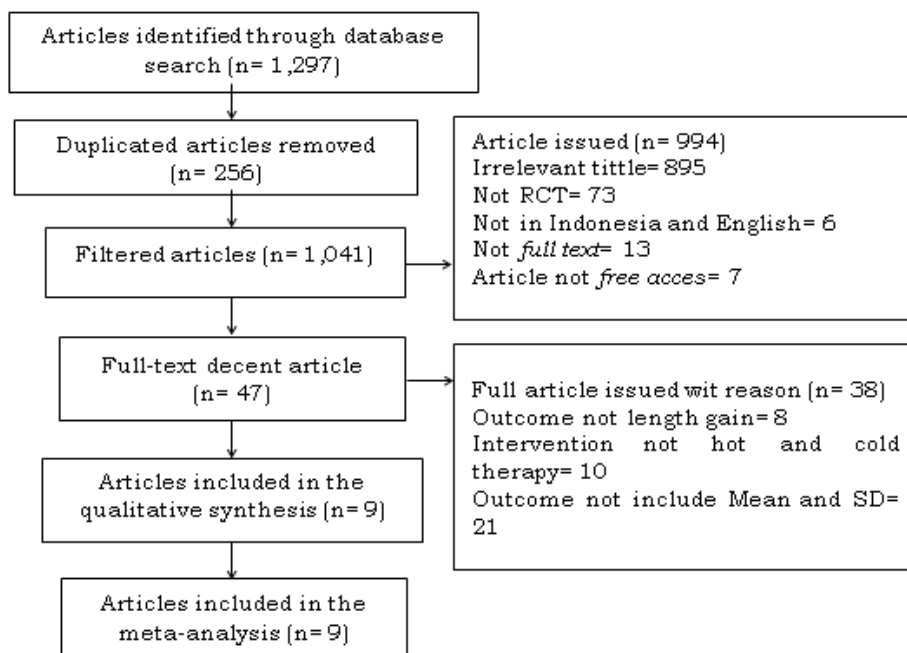


Figure 1. Result of Prisma Flow Diagrams

Table 2
Description of Primary Studies

Auth or (Year)	Country	Study Design	Sample	P		I	C	O	IG		CG	
				IC	CG				Mean	SD	Mean	SD
Chau dhuri et al.	India	RCT	30	30	30	PMRT	Conv entio nal	Anxie ty, sleep	8.1	1.6	8.90	2.20

Author (Year)	Country	Study Design	Sample		I	C	O	IG		CG		
			IC	CG				Mean	SD	Mean	SD	
(2015)					pausal women		Method Care	quality, depression.				
Shirzadi et al. (2021)	India	RCT	26	28	Menopausal women diagnosed to have primary breast cancer	PMRT	Conventional Method Care	Anxiety, hot flashes.	8.5	1.5	8.50	1.40
Pelit Aksu & Şentürk Erenel (2022)	Turkey	RCT	36	36	Menopausal women	PMRT	Conventional Method Care	Vasomotor, insomnia, anxiety.	8.73	1.72	8.94	1.68
Huang & Zhao (2020)	Canada	RCT	68	68	Women aged 50-55 years old	PMRT	Conventional Method Care	QoL, anxiety, insomnia.	9.19	2.10	9.20	2.00
Batra & Shiju (2022)	India	RCT	60	60	Postmenopausal women	PMRT	Conventional Method Care	Anxiety, stress.	7.84	1.96	8.87	1.81
Saensak et al. (2014)	Ethiopia	RCT	140	140	Women aged 50-55 years old	PMRT	Conventional Method Care	Anxiety and depression.	9.64	1.74	10.36	1.85
Malat	India	RCT	30	30	perimenopausal	PMRT	Conventional	Skin,	9.80	5.70	11.00	7.00

Author (Year)	Country	Study Design	Sample		I	C	O	IG		CG		
			IC	CG				Mean	SD	Mean	SD	
hi & Padm avath i (2022)					enop ausal and post- meno pau- sal wome n		entio nal Meth od Care	anxie ty, depre ssion, sleep qualit y.				
Lin et al. (2022)	Taiwa n	RCT	60	60	aged 45- 55 years , diag- nosed with meno pau se by obste tricia n	PMRT	Conv entio nal Meth od Care	Sleep qualit y and ancxi ety	10.4	2.50	12.10	9.00
Chell ew et al. (2015)	Spani sh	RCT	50	51	Wom en aged 50-55 years old	PMRT	Conv entio nal Meth od Care	Anxie ty, hot flash es.	7.90	1.70	10.20	1.60

Study Characteristics

Figure 1 provides information on the baseline characteristics of the studies included in the meta-analysis. There are 9 primary study articles originating from the Asian (India, Taiwan, and Turkey), Africa (Ethiopia), Europe (Spain), and North America (Canada) with a randomized controlled trial study design that were included in this study.

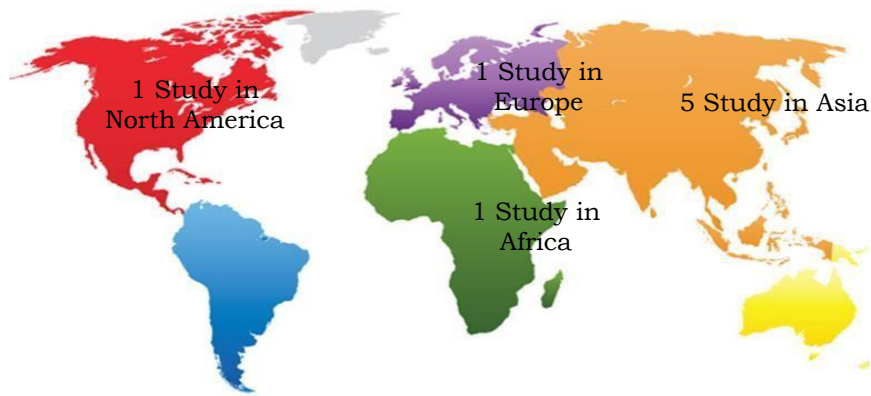


Figure 2. Research Distribution Map

Result of Meta-Analysis

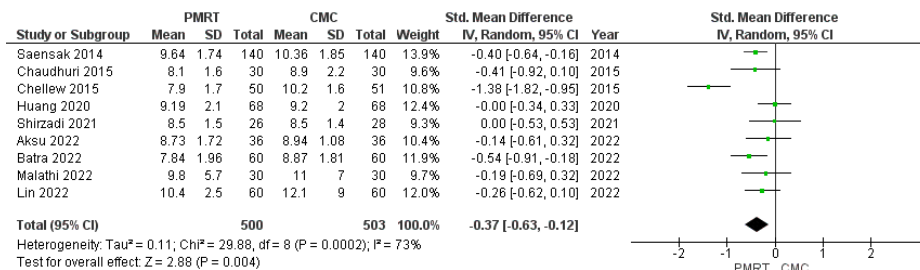


Figure 3. Forest Plot the Effect of Progressive Muscle Relaxation Technique on Anxiety among Menopause Women

Based on figure 3, the forest plot showed that there is high heterogeneity between experiments (I²= 73%; p<0.001) so the analysis using Random Effect Model (REM). Anxiety in menopausal women who do PMRT will decrease by 0.37 units compared to menopausal women who do not do PMRT, and the results were statistically significant (SMD= -0.37; 95% CI= -0.63 to -0.12; p= 0.004).

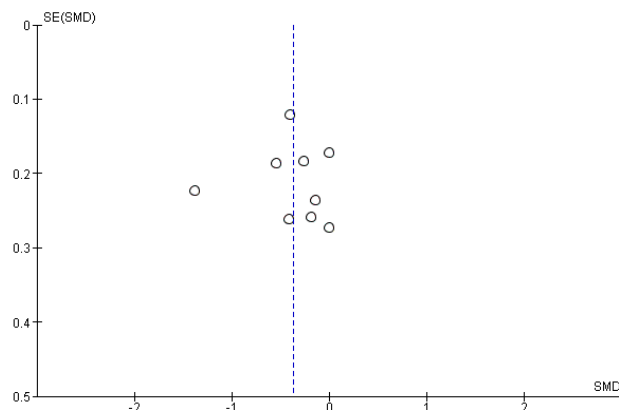


Figure 4. Funnel Plot of the Effect of Progressive Muscle Relaxation Technique on Anxiety among Menopause Women

Based on Figure 4, the funnel plot graph looks asymmetrical between the right and left plots, this showed that there is publication bias. Publication bias in this study was marked with an overestimated (exaggerating the actual effect) with an asymmetric distribution between right and left plots. The plot on the left is 2 plots with standard error between 0.1 to 0.3, while the left plot totalling 5 plots with a standard error between 0.1 and 0.3, and 2 plots touch the vertical line.

Discussion

This meta-analysis raised the topic related to the effect of progressive muscle relaxation technique on anxiety among menopause women. This study discusses the progressive muscle relaxation technique method which is considered important because it can be one of the treatments that can be carried out on menopause women for anxiety problems. Menopause is a biological process that marks the end of a woman's fertile period, namely the cessation of the menstrual cycle. The cessation of menstruation will have a direct and indirect impact on the physical and psychological health consequences. Stop menstruation is associated with increasing age in women, ovarian function will decrease in forming follicles, resulting in changes in several hormones such as increased levels of follicle stimulating hormone (FSH) with normal oestrogen levels. Follicles that can no longer develop, resulting in oestrogen levels will decline so that women stop menstruating (Irianto, 2015).

Menopause increases anxiety which results in stress levels among women. Menopause is a substantial life event and causes women to reflect on the past, think about the future, and perhaps even face some issues of their own mortality (Chaudhuri et al., 2015). Hormonal changes in menopausal women can change a person's emotions and feelings. The most common mental disorders during menopause are anxiety and depression. Relaxation is one of the interventions that increases comfort through the influence of the sympathetic system, and is likely to reduce psychological tension in pregnant women.

Difficulty sleeping is a disturbing health problem that needs to be anticipated during menopause. The physical and psychological changes experienced during menopause cause anxiety, fear, and anxiety which can cause insomnia or sleep disturbances (Bankar et al., 2013). Changes in oestrogen levels during menopause also affect other body functions that are controlled by oestrogen. Estrogen has an effect on the quality of sleep, oestrogen receptors are found in the brain that regulate sleep. One symptom of a decrease in the amount of oestrogen is a hot flush, during menopause this symptom is also accompanied by night sweats which cause women wake up from sleep. These symptoms will interfere with anxiety and affect with sleep quality (Lestari, 2010)

The stages of the exercise consist of successively tensing and relaxing the major muscle groups, starting with the upper body and moving on to the lower body. Tensing and relaxing each muscle group is practiced twice before moving on to the next muscle group, thereby ensuring that the participant receives the full benefits of muscle relaxation (Lin et al., 2022). The analgesic effect of PMR is thought to occur when decreased afferent nerve impulses from skeletal muscle contribute to decreased sympathetic activity and decreased activity of the

neuromuscular circuits associated with the experience of pain. PMR also reduces the tension in the accessory muscles that can cause pain. So that the decrease in pain will also affect the decrease in anxiety in menopausal women (Hoga et al., 2014).

Relaxation especially in this study progressive muscle relaxation technique can stimulate relaxation responses both physically and psychologically. This response resulted in an increase in serotonin which causes the body to relax so as to improve the quality of sleep and reduce the anxiety (Shirzadi et al., 2021). Widiyanto et al. (2022) also stated that Physical exercise can improve the body's sensitivity and muscle coordination, and the speed of response and effective action of the human brain. Feelings of relaxation and calm as well as feelings of comfort can lead to sleepiness so that parents can easily start sleeping and anxiety will decrease. The ease of starting sleep will have an impact on the length of sleep, by going to bed earlier than usual and the time to enter shorter sleep will immediately prolong sleep, this sufficient rest time can make menopausal women feel calmer and avoid excessive anxiety (Ohayon et al., 2010). So, PMRT is effective for reducing anxiety in menopausal women.

Limitation

This study has a search bias because the researcher only uses 4 databases, namely PubMed, SpringerLink, ScienceDirect, and Google Scholar so that it ignores other database sources, besides that there is also a language bias, due to limitations in translating the language of the researcher so that only published articles using Indonesian and English and ignore articles published in other languages.

Conclusion

This meta-analysis is a study that discusses the effect of progressive muscle relaxation technique on anxiety among menopause women, and the results show of progressive muscle relaxation technique is statistically significant for reducing anxiety in menopause women. The studies that were included in the meta-analysis have been critically appraised by the researchers, then this study highlights the non-pharmacological therapies that can be carried out in the management of menopause women, especially for dealing with anxiety. Health promotion, literacy and counselling activities for both health workers and patients need to be carried out to increase knowledge of problem management in postmenopausal women using non-pharmacological therapies to minimize complications due to drugs,

Conflict of interest

There is no conflict of interest.

Funding and Sponsorship

This study is self-funded.

Research ethic

There was no ethical agreement, as the study design used a meta-analysis.

Author Contribution

All authors contributed equally in the search, screening, and rating of articles as well as writing and compiling articles with a meta-analytical study design.

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