

# Effect of Jacobson's Progressive Muscle Relaxation on Anxiety and Happiness of Older Adults in the Nursing Home

## Abstract

**Background:** Older adults encounter serious psychological challenges in addition to physical problems. Reducing stress and anxiety, along with promoting happiness, is critical to maintaining the mental health of the elderly. Jacobson's Progressive Muscle Relaxation (JPMR) will lead to peace of mind by relieving physical stress. The present study aimed to investigate the effect of JPMR on the anxiety and happiness of older adults. **Materials and Methods:** A single-group pretest-posttest design as a type of quasi-experimental study was conducted on 34 older adults living in a nursing home in Rasht, the north of Iran, in 2021. The intervention was performed one session per week, for 8 weeks. The research instruments included the Geriatric Anxiety Inventory (GAI) and the Oxford Happiness Inventory (OHI). Descriptive statistics and the Wilcoxon test were used for data analysis. **Results:** After the intervention, the Mean (Standard Deviation [SD]) of anxiety was 4.91 (1.96), and the Mean (SD) of happiness was 37.18 (7.92). The mean score of anxiety among older adults after the intervention was significantly lower compared to the before intervention ( $Z = -4.73, p < 0.001$ ). In addition, the mean score of happiness of the samples after the intervention was significantly higher compared to the before intervention ( $Z = -5.09, p < 0.001$ ). **Conclusions:** JPMR has a positive effect on reducing anxiety and promoting happiness in the elderly. Developing training programs and allocating time to non-pharmacological treatments such as JPMR for the elderly living in nursing homes will help make them happier and healthier.

**Keywords:** Aged, anxiety, happiness, nursing homes, progressive muscle relaxation

## Introduction

Anxiety is one of the most prevalent mental disorders among older adults.<sup>[1]</sup> The prevalence of anxiety disorders in older adults living in nursing homes is higher than others and varies from 3.2 to 20%.<sup>[2]</sup> Typical amounts of anxiety increase attention, but if not controlled, in addition to negative impacts on physical health, it could have adverse consequences such as reduced quality of life, emotional suffering, loss of interest,<sup>[3]</sup> and also disruption of performance.<sup>[4]</sup> As most countries around the world have entered the status of aging society, anxiety as a prevalent and important challenge in late-life raises the numbers accessing health care, and individual and social costs.<sup>[5]</sup> In contrast, happiness could be a barricade against the impact of negative feelings among the elderly, especially residents living in nursing homes.<sup>[6]</sup> This is while physical deprivation and anxiety in old age could induce

unhappiness and trigger depression in the elderly.<sup>[7]</sup> Happiness as a positive emotion increases the ability to cope with mental burdens,<sup>[8]</sup> plays a vital role in raising physical and mental health,<sup>[9]</sup> and can predict longevity and survival among older adults by correlating with life satisfaction and quality of life.<sup>[10]</sup> Despite the significant advances in human comfort facilities, his happiness could be negatively affected by age and functional limitations.<sup>[11]</sup>

Avoiding stress and anxiety concurrent with increasing happiness, especially in old age, is on the public health agenda around the world.<sup>[12]</sup> Therefore, it is important to investigate interventions that reduce anxiety and increase happiness in older adults as, the most vulnerable group. A previous study indicated that physical activity could diminish negative feelings and improve positive ones, such as happiness.<sup>[13]</sup> One of the most common relaxation techniques is progressive muscle relaxation, developed by

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Edmund Jacobson in the 1920s.<sup>[14]</sup> Jacobson's progressive muscle relaxation (JPMR) involves exercises in which selected muscle groups respectively first contract and then expand to achieve a state of deep relaxation. In fact, JPMR is based on the rule that muscle relaxation brings peace of mind.<sup>[15]</sup> With low muscle strength, no need for special equipment, easy learning, and low cost,<sup>[16]</sup> JPMR as a non-pharmacological intervention can be utilized in elderly care, treatment, and education programs.<sup>[15,17]</sup> Previous studies conducted on JPMR have shown its effectiveness in reducing depression<sup>[18]</sup> and insomnia in older adults,<sup>[19]</sup> increasing the quality of life, and adaptation to old age.<sup>[20]</sup> Despite JPMR studies, the knowledge about the effect of this technique on psychological indicators such as anxiety and happiness of older adults living in nursing homes is limited. Therefore, considering the different structures of nursing homes in different countries and the accelerating trend of the aging population, the present study aimed to investigate the effect of JPMR on the anxiety and happiness of older adults living in a nursing home. It was hypothesized that JPMR would decrease anxiety and increase the happiness of the elderly living in the nursing home.

## Materials and Methods

This is a clinical trial study of quasi-experimental type (IRCT20190315043062N3) with a single-group pretest-posttest design, which was conducted in a nursing home in Rasht, the north of Iran, in 2021. This type of study is commonly used to study design. First, a single pretest measurement is taken, followed by an intervention, and then a posttest measurement is taken.<sup>[21]</sup>

The subjects in this study were older adults living in a nursing home. Due to the limited number of elderly people who met the entry criteria, the sample size was not calculated, and as shown in the Consolidated Standards of Reporting Trials (CONSORT) flowchart in Figure 1, finally, the information of 34 older adults was analyzed. Inclusion criteria included age of 60 years and older, having normal cognition status (a score of eight or more on the Abbreviated Mental Test (AMT)),<sup>[22]</sup> informed consent to participate in the study, physical ability to perform JPMR, no use of anti-anxiety drugs, absence of cardiopulmonary, and no previous experience with the technique. The exclusion criterion was the absence from training sessions. Figure 1 shows the number of participants who reached the final stage of data analysis.

As shown in Figure 1, out of 182 elderly people living in a nursing home, 174 who were older than 60 years with normal cognition status and physically able to perform JPMR were recruited. The study protocol was announced to the older adults by one of the researchers of our research team. One hundred thirty-eight of the older adults were excluded from the research because of using anti-anxiety drugs and having a cardiopulmonary disease that would

affect undertaking JPMR training during the program or any cognitive problems that could impede the elderly from understanding and answering the content of the informed consent and questionnaires. Therefore, 36 of the samples entered the JPMR training. During the 8 weeks of the training, two of the samples were not willing to continue the exercise and quit the research, so 34 samples completed the JPMR exercise.

The tools included three questionnaires. The Geriatric Anxiety Inventory (GAI) was designed by Pachana *et al.*<sup>[23]</sup> was used to measure anxiety. This scale has 20 items based on a 2-point scale (agree = score 1, disagree = score zero). The total score varied between zero and 20, and a score of 0–7 was considered as mild to moderate anxiety, and a score of 8 or 9 and above was considered severe anxiety. The validity and reliability of this scale were confirmed in a study on Iranian older adults. The exploratory factor analysis showed the questionnaire that jointly explained 59.48% of the overall variance observed. The findings indicated a positive and significant correlation between the two measures, lending support to its concurrent validity ( $r = 0.67$ ,  $P < .001$ ). Ultimately, the GAI was found to have a favorable internal consistency.<sup>[24]</sup> The Oxford Happiness Inventory (OHI) is used to measure happiness. This tool has 29 items based on a 4-point Likert scale (not at all = score zero, low = score 1, high = score 2, and very high = score 3). The total score range varied from 0 to 87. A score of 0–25 was considered poor happiness, a score of 26–50 was considered moderate happiness, a score of 51–75 was considered good happiness, and a score of 76 and above was considered high happiness. In previous studies, the validity and reliability of this scale in Iran have been confirmed.<sup>[25]</sup> In the present study, the reliability of the tools was calculated by internal consistency in 20 older adults living in nursing homes. Cronbach's alpha coefficient was 0.89 for GAI and 0.86 for OHI.

The cognitive status of the samples was investigated using the AMT, and a score of 7 or higher was considered as having no cognitive problem. The findings of a study conducted among Iranian older adults confirmed that the Persian version of the AMT is a valid tool for assessing cognitive function. The Cronbach's alpha coefficient of this scale was 0.90. Scores 6 and 7 showed the optimum balance between sensitivity (99% and 94%, respectively) and specificity (85% and 86%, respectively).<sup>[22]</sup>

Before the intervention and in the 8 weeks of the intervention, the researcher, through face-to-face interviews using the tools, measured the anxiety and happiness of the samples. Each question was read to the samples, and the options were selected based on their responses. To avoid participant fatigue, data were collected at intervals and over time.

In this study, first, a training session was held for each of the subjects to introduce the JPMR technique, its effects, and how to do it. Then, for 8 consecutive weeks, a session

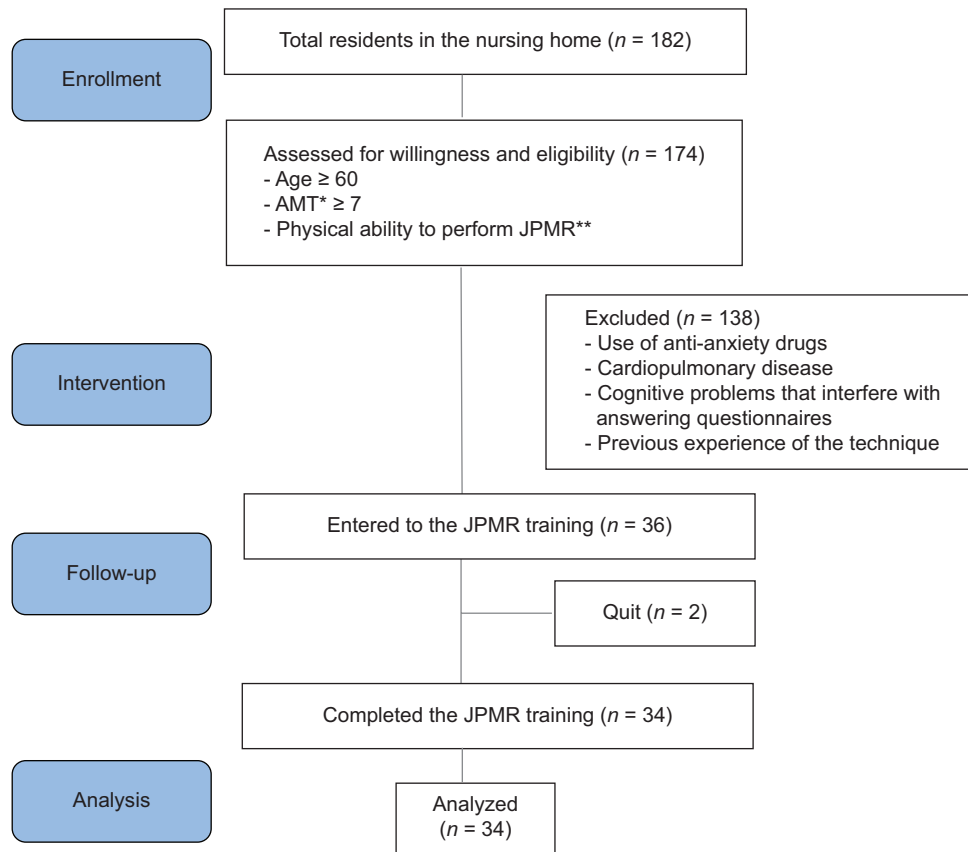


Figure 1: Consolidated Standards of Reporting Trials (CONSORT) flow diagram of participants. \* Abbreviated Mental Test. \*\*Jacobson Progressive Muscle

of the JPMR technique was performed per week for 20 min individually in a room in the nursing home under the supervision of the researcher. When the individual was put in where his/her head and back were in a comfortable position (sitting), he/she was asked to close the eyes and take a few deep breaths. Then, the muscle groups (wrist, arm, forehead, eyes, jaw, shoulders, back, chest, abdomen, legs, and toes, respectively) contract symmetrically for approximately 10–15 s (inhalation) and then expand for 15–20 s (exhalation). The exercise was repeated two to three times for each muscle group. In the end, with a few deep breaths and the researcher countdown, five to one, the exercise was completed.<sup>[15]</sup>

The intervention (JPMR) was designed by the research team based on valid references.<sup>[14,26,27]</sup> One researcher (Master of Elderly Nursing) devoted a month to learning and studying the JPMR technique, about how it works, its effects, and possible side effects, and took steps to gain acceptable mastery of the technique. Therefore, she provided the intervention. After choosing a specific day of the week, she was at the nursing home at certain times during that day to perform the JPMR technique for the samples under the supervision of an ergo therapist at the nursing home. She taught the JPMR technique to the participants, and the progressive muscle relaxation (PMR) was done under her supervision. She had full control over how the intervention (JPMR technique) was performed by the

samples in the training session and then through the whole eight intervention sessions.

After selecting the eligible samples to enter, the study informed consent to participate in the research was obtained from them. To obtain informed consent, the researcher first explained the purpose and method of the study to the participants. The researcher then gave the consent form, which was written in plain language, to the samples that agreed to participate in the study, and asked the samples to read it. For the illiterate, the researcher read this form. After confirming that the samples understood the content of the consent form, they were asked to participate in the study and sign the consent form. To implement the intervention, at first, an individual training session was held for each sample in their room. During the training session, sufficient explanations were given to the samples about the JPMR technique, its effects, and implementation steps. In addition to practicing the JPMR technique, the contents were repeated several times, and the researcher answered the samples' questions. By ensuring that the samples had learned the JPMR technique correctly, a fixed day per week (Saturdays) was set aside to perform the intervention, which ensured equal and comparable conditions for all samples.

The JPMR technique was performed for 8 weeks, one session per week, with a fixed duration (20 min),

individually, by the elderly on their bed in a nursing home in Rasht, with the supervision of the responsible researcher for the intervention. The educational content, intervention method, frequency, and duration of the intervention sessions were the same for all samples. The frequency and duration of intervention were monitored using a stopwatch and finger counting.

Data analysis was conducted using SPSS (Statistical Package for the Social Sciences) software version 22 (IBM, Chicago, USA), descriptive statistics (mean, standard deviation), and inferential statistics. The Wilcoxon test was used to compare the level of anxiety and happiness before and after the intervention.

To compare the mean scores of anxiety and happiness before and after the intervention, due to the abnormal distribution of anxiety, the Wilcoxon test was used, and, according to the normal distribution of happiness, a paired *t*-test was used. The significance level in all tests was considered 0.05.

### Ethical consideration

This study is the result of a master's thesis approved by the Ethics Committee of Guilan University of Medical Sciences in Rasht, Iran (Ethics code No: IR.GUMS.REC. 1399.399). According to the principles of research ethics, all ethical principles are observed in this article. Participants were reminded that at each stage of the study, they could refuse to continue their cooperation if they did not want to. They were also reminded that, if they wished, the results of the research would be made available to them and that their information would be kept confidential.

### Results

Most of the subjects were 60 to 74 years old (70.60%), male (58.80%), and illiterate (55.90%). Half of them had lost their spouse (50%), and more than half of them had been living in a nursing home for 1 to 5 years (52.90%). The majority of the subjects had at least one underlying disease (70.60%) and reported their economic situation as moderate-income (61.80%) [Table 1].

Before performing the JPMR technique, all subjects had anxiety; 58.80% had severe levels of anxiety, and 41.20% had mild to moderate levels of anxiety. Before performing the JPMR technique, the total Mean (Standard Deviation (SD)) of anxiety in subjects was 10.41 (5.24). After performing the JPMR technique, this value reached 4.91 (1.96). JPMR caused a statistically significant difference in the anxiety mean score of subjects after the intervention. The mean scores of anxiety in older adults were reduced significantly after the intervention ( $Z = -4.73$ ,  $p < 0.001$ ) [Table 2].

Before performing the JPMR technique, 52.9% of the subjects had poor levels of happiness, 47.10% of them

had moderate levels of happiness, and none of them had a good or excellent level of happiness. Before performing the JPMR technique, the total Mean (SD) of happiness in subjects was 26.59 (8.86). After performing the JPMR

**Table 1: Demographic characteristics of the older adults living in the nursing home (n=34)**

Variable	n (%)
Age	
60–74	24 (70.67)
75–90	9 (26.53)
>90	1 (2.93)
Total	34 (100)
Gender	
Female	14 (41.2)
Male	20 (58.86)
Total	34 (100)
Marital status	
Single	4 (11.81)
Married	9 (26.53)
Divorced	4 (11.81)
Dead spouse	17 (50)
Total	34 (100)
Living in the nursing home	
<1 year	12 (35.34)
1–5 year	18 (52.95)
>5 year	4 (11.81)
Total	34 (100)
Accommodation before living in the nursing home	
City	28 (82.48)
Village	6 (17.62)
Total	34 (100)
Education	
Illiterate	19 (55.96)
Primary	9 (26.53)
Diploma	3 (8.89)
Bachelor's degree and above	3 (8.89)
Total	34 (100)
Job	
Employed	2 (5.96)
Worker	1 (2.93)
Self-employed	12 (35.34)
Retired	5 (14.72)
Farmer	5 (14.72)
Unemployed	1 (2.93)
Housewife	8 (23.53)
Total	34 (100)
Economic status	
Adequate income	3 (8.89)
Moderate income	21 (61.86)
Low income	10 (29.4)
Total	34 (100)
Underlying disease	
Yes	24 (70.67)
No	10 (29.4)
Total	34 (100)



technique, this value reached 37.18 (7.92). JPMR caused a statistically significant difference in the mean score of happiness in subjects after the intervention. The mean scores of happiness in older adults increased significantly after the intervention ( $p < 0.001$ ) [Table 3].

## Discussion

The present study investigated the effect of the JPMR technique on the anxiety and happiness of older adults living in a nursing home. Regarding the level of anxiety of older adults living in nursing homes, the results of the present study showed that before performing the JPMR technique, all the older adults were anxious, so more than half of them had severe anxiety, and the rest had mild to moderate anxiety. In general, the level of anxiety in older adults was high, according to their scores. These results are consistent with the findings of previous studies. In the study by Levina *et al.*,<sup>[28]</sup> an evaluation of self-mental conditions of older adults living in a nursing home, it indicated a high level of anxiety among 51% of the subjects, and average anxiety rates among 27% of them. In a study by Elias *et al.*<sup>[29]</sup> on the prevalence of loneliness, anxiety, and depression in older adults living in care centers in various populations, including the United States, Norway, and Malaysia, the prevalence of anxiety was generally high among them.

In the present study, the implementation of the JPMR technique decreased the level of anxiety of older adults living in the nursing home. These results are consistent with the study results of Ghodela *et al.*<sup>[30]</sup> and Tak *et al.*<sup>[31]</sup> The results of the present study also support the findings of previous studies related to the effectiveness of JPMR in reducing the anxiety of COVID-19,<sup>[15]</sup> and leprosy patients.<sup>[14]</sup>

Regarding the happiness of older adults living in nursing homes, the results of the present study showed that before the implementation of the JPMR technique, the level of happiness of the study samples was weak and moderate, and none of them had a good or excellent level of happiness. In general, the overall happiness status of the older adults was evaluated as moderate according to the mean scores. These results are consistent with the findings of previous studies.<sup>[32,33]</sup> Although Hong *et al.*<sup>[34]</sup> found that happiness in older adults depended on a variety of individual and social factors, including income, health level, and literacy. However, it is agreed that educational and welfare programs play an important role in increasing happiness in old age.

In the present study, after performing the JPMR technique, the level of happiness of the older adults increased from weak to moderate. In addition, after the intervention, a group of the samples enjoyed a good level of happiness. In other words, the JPMR technique was useful for increasing the happiness of older adults living in the nursing home. These results are largely consistent with the findings of Alphonsa *et al.*<sup>[35]</sup> and Bostani *et al.*<sup>[36]</sup> Gaiswinkler *et al.*<sup>[37]</sup> also compared the effectiveness of the 6-week Mindful Self-Compassion (MSC) and PMR programs for psychiatric patients and found the MSC program more successful for increasing happiness. The results of the present study also support the results of studies related to the effectiveness of JPMR in improving the quality of life of older adults with cancer<sup>[38]</sup> and reducing depressive symptoms of aging living in nursing homes.<sup>[39]</sup> Nevertheless, Meister *et al.*<sup>[40]</sup> found no impact of anaerobic training on mental indices. Furthermore, Kianian *et al.*<sup>[41]</sup> did not find any significant differences in depression symptoms or happiness levels

**Table 2: Levels and mean scores of anxiety in older adults before and after the intervention Jacobson Progressive Muscle (JPMR)**

Variable	Before intervention (n=34)		After intervention (n=34)		Relative* percentage changes	p
	n (%)	Mean (SD)	n (%)	Mean (SD)		
Anxiety						
Mild to moderate level of anxiety	14 (41.2)	10.41 (5.24)	30 (88.2)	4.91 (1.96)	52.83%	$p < 0.001$ , $Z^{**} = -4.731$
Severe level of anxiety	20 (58.8)		4 (11.7)			
Total	34 (100)		34 (100)			

Note: \*Relative percentage changes in mean scores before and after the intervention  $((\text{After}-\text{Before})/\text{Before}) \times 100$ , \*\*Wilcoxon JPMR=Jacobson's progressive muscle relaxation JPMR, SD=Standard deviation

**Table 3: Levels and mean scores of happiness in older adults before and after the intervention (JPMR)**

Variable	Before intervention (n=34)		After intervention (n=34)		Relative* percentage changes	p
	n (%)	Mean (SD)	n (%)	Mean (SD)		
Happiness						
Poor level of happiness	18 (52.90)	26.59 (8.86)	2 (5.90)	37.18 (7.92)	39.83%	$p < 0.001$ , $Z^{**} = -5.094$
Moderate level of happiness	16 (47.10)		30 (88.20)			
Good level of happiness	0 (0)		2 (5.9)			
Total	34 (100)		34 (100)			

Note: \*Relative percentage changes in mean scores before and after the intervention  $((\text{After}-\text{Before})/\text{Before}) \times 100$ , \*\* Wilcoxon JPMR=Jacobson's progressive muscle relaxation JPMR, SD=Standard deviation

between aerobic and nonaerobic physical activity in nonathletic men. Differences in samples, duration of the course, and measurement tools could explain the inconsistencies with the current research.

Since the high prevalence of anxiety disorders among adults in nursing homes<sup>[42]</sup> could increase disability and diminish well-being,<sup>[43]</sup> it is necessary to pay more attention to the implementation of operational strategies that could affect psychological indicators of them. Using JPMR, which is based on the principle of muscle relaxation preceding mind relaxation, could decrease anxiety gradually in older adults, which contributes to their happiness. In particular, those living in nursing homes or hospitals could benefit from JPMR's mental health output.

The main limitation of this study was the absence of a control group. There is only one non-profit, a public nursing home in Rasht, the capital of the Guilan province, that operates free for the elderly and disabled, and the rest are small and private. Therefore, because of this and the quarantine due to the COVID-19 pandemic, which made access to the samples difficult, the present research has been conducted in a single research environment with one group. Sampling was conducted by coordinating with nursing home officials, following health protocols, using protective equipment, and performing polymerase chain reaction (PCR) tests. Other limitations were fatigue and the unwillingness of some study samples to cooperate. By explaining the purpose and significance of the study and observing rest intervals, the researcher encouraged subjects to cooperate until the end.

## Conclusion

The present study provides non-invasive interventions that have been demonstrated to be effective in reducing anxiety and enhancing happiness in older adults. It was found that JPMR reduced anxiety and increased happiness among the elderly living in nursing homes. The use of JPMR by trained nurses in the daily care of the elderly in nursing homes could promote healthy and active aging. Therefore, older adults will be healthier and happier, reducing overhead costs for families and society as a whole.

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## Conflicts of interest

Nothing to declare.

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