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Comparison between benson relaxation and progressive muscle relaxation technique on sleep quality and fatigue reduction in patient with modified radical mastectomy

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Abstract
Background: Breast cancer is one of the most common malignancies among women, and Modified Radical Mastectomy (MRM) remains a frequently performed surgical procedure. Post-operative patients often experience significant sleep disturbances and cancer-related fatigue, which negatively affect recovery and quality of life. Non-pharmacological relaxation techniques such as Benson Relaxation and Progressive Muscle Relaxation (PMR) have shown potential benefits in managing these symptoms.
Aim: To compare the effectiveness of Benson Relaxation Technique and Progressive Muscle Relaxation Technique on sleep quality and fatigue reduction in patients following Modified Radical Mastectomy.
Materials and Methods: An experimental study was conducted on 38 female patient's post-MRM, aged above 18 years, selected through convenient sampling from the cancer department of SJS Hospital. Participants were randomly divided into two groups (n=19 each). Group a received Progressive Muscle Relaxation and Group B received Benson Relaxation Technique, administered four sessions per week for four weeks. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) and fatigue was evaluated using the Multidimensional Fatigue Inventory (MFI-20). Pre- and post-intervention data were analyzed using paired and unpaired t-tests.
Results: Both groups demonstrated statistically significant improvement in sleep quality and fatigue levels following intervention. However, the PMR group showed a greater reduction in PSQI and MFI-20 scores compared to the Benson relaxation group, indicating superior effectiveness in improving sleep quality and reducing fatigue.
Conclusion: Both Benson Relaxation and Progressive Muscle Relaxation are effective non-pharmacological interventions for managing sleep disturbances and fatigue in post-MRM patients. Progressive Muscle Relaxation was found to be more effective and can be recommended as a preferred intervention in postoperative physiotherapy rehabilitation for MRM patients.

Keywords: Modified radical mastectomy, progressive muscle relaxation, benson relaxation technique, sleep quality, fatigue, PSQI, MFI-20

Introduction

Breast cancer is the most common cancer among women worldwide. In 2020, it overtook lung cancer as the leading cause of global cancer incidence, with approximately 2.3 million new cases accounting for 11.7% of all cancer diagnosis. Projections indicate that the global burden of breast cancer could exceed 2 million cases annually by 2030. In India, the incidence of breast cancer has seen a sharp rise almost 50% between 1965 and 1985. In 2016, an estimated 118000 new cases were reported in the country with women making up 98.1%of these cases. The total number of existing cases was around 526000. Between 1990 and 2016, the age standardized incidence rate among Indian women increased by 39.1%, with all states showing an upward trend. According to the Globocan 2020 data, breast cancer in India accounted for 13.5% of all cancer cases and 10.6% of all cancer related deaths [1]. Advancements in early diagnosis and treatment have significantly improved 10-year survival rates for nearly 80% of breast cancer patient [2]. Breast cancer is a chronic condition, it presents numerous challenges for patients, who undergo a range of treatment including chemotherapy, radiation therapy, and surgery.

Chemotherapy, often administered over multiple cycles, can lead to various side effects by harming both healthy and cancerous cell. The most common side effects include fatigue, loss of appetite, sleep disturbance [3]. Modified radical mastectomy (MRM) is one of the most frequently performed surgical interventions for breast cancer, particularly in patients with axillary lymph node involvement or large tumors. While MRM can be life saving, it often leads to a variety of post surgical complications including pain, lymphedema, restricted shoulder mobility, psychological distress, fatigue and sleep disturbance [4]. Sleep disturbance and fatigue are among the most commonly reported issues by women undergoing breast cancer treatment, including post surgical recovery. Cancer related fatigue is a multidimensional symptom characterized by an overwhelming sense of tiredness that is not proportional to activity and is not relieved by rest. Poor sleep quality further compounds fatigue and can negatively affect immune function, mental health, and over all quality of life [5]. Sleep disturbance are significantly more common in cancer patients, with rates ranging from 23% to 61%, compared to approximately 15% in control Groups and 9% to 30% in the general population. These sleep issues often include frequent nighttime awakenings, reduced total sleep time, difficulty falling asleep, trouble returning to sleep, and impaired day time functioning. 51% of women treated for breast cancer report general sleep difficulties, with 19% meeting the clinical criteria for insomnia. 61% of breast cancer patients experienced significant sleep problem [6].

Adequate and hygienic sleep is a fundamental component of daily living, with humans spending nearly one-third of their lives asleep. Disturbances in sleep can adversely affect physical functioning and contribute to fatigue, depression, irritability, impaired cognitive performance, reduced adherence to treatment, compromised self-care, exacerbation of underlying disease symptoms, and an overall decline in quality of life. Moreover, persistent sleep disruption has been associated with activation of pro-inflammatory pathways, heightened sympathetic activity, elevated cortisol levels [7, 8]. To evaluate sleep quality and sleep-related disturbance the Pittsburgh Sleep Quality Index (PSIQ) is designed. It is a self-administered questionnaire it consists of 19 items that generate Seven component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. These component scores are then summed to produce a single global score reflecting overall sleep quality [9]. The Pittsburgh Sleep quality Index (PSQI) was designed to offer a reliable, valid, and standardized tool for assessing sleep quality. Its primary objectives include distinguishing between good and poor sleepers, ensuring ease of use for participants, and facilitating clear interpretation for clinicians and researchers. Additionally, the PSQI provides a brief yet clinically meaningful evaluation of multiple sleep disturbances that may influence overall sleep quality [10]. Fatigue is one of the most common and distressing symptoms experienced by cancer patients, with more than 75% of those undergoing cytotoxic chemotherapy, radiation therapy, or biological response modifier treatments reporting feelings of exhaustion and weakness. The National Comprehensive Cancer Network (NCCN) defines cancer related fatigue as a distressing, persistent, and subjective sense of tiredness or exhaustion that is related to cancer or its treatment, is disproportionate to recent activity, and interferes with daily functioning. A review on sleep and fatigue in cancer patients indicates that fatigue arises from a combination of factors, including physiological issues such as pain or anemia, chronological disruptions like altered sleep wake cycles, psychological factors.

Among women with breast cancer undergoing adjuvant chemotherapy, fatigue or low energy levels are especially prevalent and distressing. Studies highlight that breast cancer patients report some of the highest rates of fatigue compared to other cancer types, with up to 99% experiencing fatigue during chemotherapy and 38% still affected after completing treatment [6]. Among female patients undergoing chemotherapy, fatigue and weakness have been identified as the primary symptoms that interfere with their ability to perform self-care activities [11]. In aneffort to conserve energy, many patients alter their daily routines by scheduling activities strategically, reducing non-essential tasks, and increasingly relying on others for household responsibilities such as meal preparation, grocery shopping, and cleaning.

Similarly, reported a marked decline in social participation among this population due to persistent fatigue. Additional evidence indicates that diminished energy levels and reduced physical stamina following cancer treatment may further impair the ability to return to work or sustain employment [12]. A review of existing instruments used to assess fatigue in cancer populations revealed that most tools embed fatigue items within broader measures of overall patient functioning. Comprehensive, easy-to-administer instruments with well-established psychometric properties were notably limited. In response to this gap, a self- report questionnaire was developed.

Recognizing fatigue as a multidimensional construct, the instrument was designed to encompass several key dimensions, including general fatigue, physical fatigue, reduced activity, reduced motivation, and mental fatigue. The multidimensional fatigue inventory (MFI-20) comprises five distinct scales, each representing a different dimension of fatigue. The General Fatigue scale captures broad perceptions of overall functioning, such as the feeling of being rested. Physical Fatigue reflects the bodily sensation of tiredness, intentionally excluding somatic symptoms like dizziness or muscle soreness to avoid overlap with disease related physical symptoms [13].

Non-pharmacological interventions, particularly mind body relaxation techniques, have gained popularity for their potential to reduce psychological and physiological stress, promote relaxation, and improve overall well being in cancer patients. Among these, Benson relaxation technique and Progressive muscle relaxation have been extensively studied for their therapeutic effects. The Benson relaxation technique developed by Dr. Herbert Benson, combines diaphragmatic breathing with the repetition of a word or phrase to evoke the relaxation response a physiological state of deep rest that reduces sympathetic nervous system activity. This technique has shown effectiveness in lowering anxiety, promoting calmness, and enhancing sleep quality by inducing parasympathetic dominance [14]. Progressive muscle relaxation, introduced by Jacobson in the 1930s, involves systematically tensing and relaxing major muscle groups to promote physical and mental relaxation. Progressive muscle relaxation has been widely used in various clinical populations, including cancer patients, to reduce muscle tension, alleviate fatigue, and improve sleep patterns. By increasing body awareness and reducing somatic tension [15].

Need for Study

- To check how much there is progression in sleep quality and fatigue reduction using Benson relaxation and progressive muscle relaxation.
- We need to find which technique is more effective on sleep quality and fatigue reduction among patients undergoing Modified Radical Mastectomy.
- Provide evidence on the superior relaxation technique for enhancing sleep and reducing fatigue in Modified Radical Mastectomy.
- To compare Benson Relaxation and Progressive Muscle Relaxation to identify the most beneficial method

Aim

To compare Benson relaxation and Progressive muscle relaxation technique to get better result on sleep quality and fatigue in patient following modified radical mastectomy.

Methodology & materials

Method

The present study was an experimental study conducted in the Cancer Department of SJS Hospital. The study population comprised patients aged above 18 years who had undergone Modified Radical Mastectomy. A total of 38 post–Modified Radical Mastectomy participants were

included in the study using a convenient sampling method. The data were collected over a study duration of six months.

Materials

The materials required for the study included a Data Collection Sheet, Consent Form, Pen, Pencil, Pillow, and Bed.

Selection criteria Inclusion Criteria

1. Post Modified Radical Mastectomy
2. Women age above 18 years
3. Patient undergoing Radiation Therapy or Chemotherapy
4. Patient able to understand and follow the instructions
5. Patient with medically stable and ambulatory
6. Willing to participate and available for the full intervention

Exclusion criteria

1. Recent Fracture
2. Psychological Conditions
3. Severe postoperative complications
4. Regular use of sedative- hypnotic medications

Outcome measures

1. Multidimensional Fatigue Inventory

The multidimensional fatigue inventory is a 20-item questionnaire created to assess five dimensions of fatigue: general fatigue, physical fatigue, reduced motivation, reduced activity, and mental fatigue. The developers intentionally kept the questionnaire brief to make it more manageable for individuals who may find longer assessments exhausting, while still gathering sufficient information to evaluate various aspects of fatigue [16]. Reliability and Validity: .53 to .93

2. Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) is a self report questionnaire used to evaluate sleep quality and is commonly utilized among breast cancer patients. PSQI consists of 19 self rated questions that produce seven component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. Each component is scored from 0 to 3, and the total of these scores yields a global sleep quality score ranging from 0 to 21.A global score above 5 indicates poor sleep quality [17, 18].

Reliability and Validity: ICC = 0.76

Procedure

Participants will be divided into two groups Group A and Group B.

Group A will be treated with Progressive muscle relaxation technique and Group B will be treated with Benson relaxation technique.

Group A

1. Progressive muscle relaxation

A relaxation technique is a method used to reduce the impact of stress on the mind and body. One such method is progressive muscles

Relaxation, which involves testing and then gradually relaxing different muscle groups. This technique helps release physical tension, which can in turn alleviate fatigue, stress, anxiety and related disorders.

Preparation

Set aside 15 minutes. Find somewhere quiet and comfortable and where won't be disturbed.

Remove your shoes and wear loose clothing.

Steps: Before begin, take five slow, deep breaths.

Step 1: Create Tension

As you inhale, intentionally and gently tighten the first muscle group as firmly as you can. You should feel the tension clearly in the targeted muscles. Some shaking or mild discomfort is normal, but it should not be painful. Make sure only the intended muscle group is tensed. Hold this tension for 5 to 10sec.

Step 2: Release and Relax

As you exhale, quickly and completely release the tension in the muscles. Focus on the sensations as the tension fades away imagine stress flowing out of your body. Pay close attention to how the muscles feel as they transition from tight to relaxed. Let the muscles go loose.

Step 3: Pause and Rest

Take 10 to 20 seconds to rest and allow your body to relax fully. Repeat steps 1through 3 for each muscle group.

Step 4: Refocus

Once all muscle groups have been relaxed, slowly count backward from five to one. Bring your awareness back to the present moment. Take a moment to enjoy the calm and relaxation you have created [19].

Practice once or twice a day. 4 sessions per week for 4 weeks.

Group B

2. Benson Relaxation Technique

Benson relaxation technique is a natural, built in mechanism that helps protect the body from the negative effects of stress. It doses this by promoting changes such as a slower heart rate, reduced metabolism, and decreased breathing rate, which help restore the body to a healthier, balanced state. To activate this response, four key elements are essential:

1. A quiet environment.
2. A mental focus or object to concentrate on
3. A passive attitude simply allowing the process to happen.
4. A comfortable physical position

Step 1: Sit quietly in a position that feels comfortable.

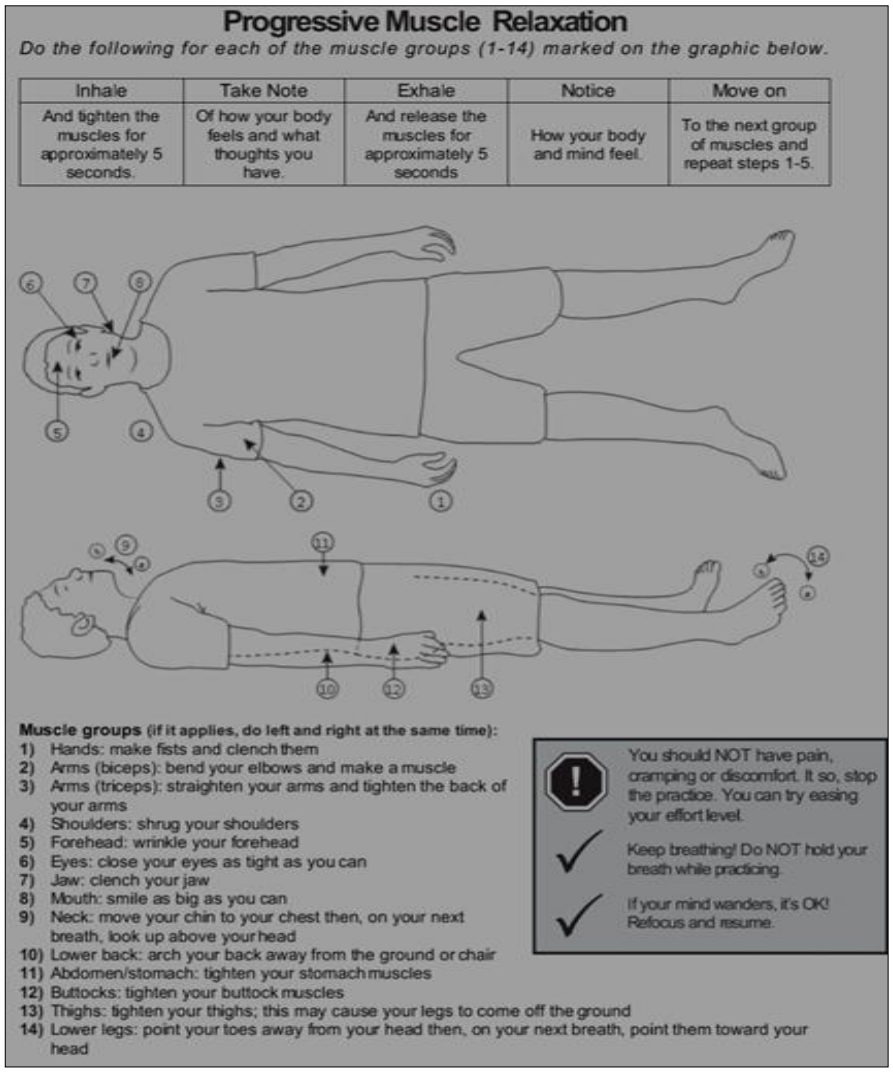
Step 2: Gently close your eyes.

Step 3: Allow all your muscles to relax deeply, starting from your feet and moving upward.

Step 4: Breath naturally through your nose, paying attention to your breath. As you exhale, silently say the word "ONE". For Example: inhale…. exhale, "ONE" …. inhale…. exhale, and so on.

Step 5: Continue this for 10 to 20 minutes. You may open your eyes briefly to check the time, but avoid using an alarm. After finishing, remain seated quietly for a few minutes first with your eyes closed, then open them slowly. Take your time before standing up.

Step 6: Don't worry about how well you're doing. Maintain a passive mindset and let the relaxation happen naturally. If your mind wanders, gently return your focus to repeating "ONE". With regular practice, the process will become easier. Practice once or twice a day [22, 23]. 4 sessions per week for 4 weeks



[21, 22]

Result

The present study evaluated the effectiveness of Progressive Muscle Relaxation (PMR) and Benson Relaxation Technique on sleep quality and fatigue among MRM patients using the Pittsburgh Sleep Quality Index (PSQI) and Multidimensional Fatigue Inventory-(MFI20). A total of 38 participants were equally divided into two groups, with 19 subjects in each group.

At baseline, both groups demonstrated comparable levels of poor sleep quality and moderate to severe fatigue, as indicated by higher PSQI and MFI-20 scores.

Following four weeks of intervention, both groups showed noticeable improvement in sleep quality and fatigue levels. In the PMR group, post-intervention PSQI scores showed a marked reduction compared to pre-intervention values, indicating significant improvement in overall sleep quality. Similarly, MFI-20 scores demonstrated a substantial decrease, reflecting reduced fatigue across physical, mental, andgeneral fatigue domains.

In the Benson relaxation group, post-treatment PSQI and MFI-20 scores also showed improvement; however, the magnitude of reduction was comparatively lower than that observed in the PMR group. Percentage analysis revealed a greater reduction in both PSQI and MFI-20 scores in the PMR group when compared to the Benson group. Overall, both relaxation techniques were effective, but PMR demonstrated superior outcomes in improving sleep quality and reducing fatigue levels.

A paired *t*-test demonstrated a statistically significant reduction in fatigue scores in the PMR group, with mean MFI-20 values decreasing from 75.0 ± 2.6 at pre-test to 47.7 ± 2.5 at post-test (mean difference = −27.263; $t = 162.016$, df = 18, $p < 0.01$), indicating the effectiveness of Progressive Muscle Relaxation in reducing fatigue among post-Modified Radical Mastectomy participants.

A one-tailed paired *t*-test revealed a statistically significant reduction in MFI-20 scores in the PMR group, with mean values decreasing from 75.0 ± 2.6 at pre-test to 47.7 ± 2.5 at post-test (mean difference = −27.263, SE = 0.168, $t = 162.016$, df = 18, $p < 0.01$), indicating that the Progressive Muscle Relaxation intervention was effective in reducing fatigue among the participants.

A one-tailed independent *t*-test showed a statistically significant greater percentage reduction in post-intervention MFI-20 scores in the PMR group (36.4 ± 1.4%) compared to the Benson relaxation group (27.2 ± 1.0%), with a mean

difference of 9.204% (t = 23.759, df = 36, p < 0.01), indicating that Progressive Muscle Relaxation was more effective in reducing fatigue than Benson relaxation.

A one-tailed paired t-test demonstrated a statistically significant improvement in sleep quality in the PMR group, with mean PSQI scores decreasing from 12.5 ± 1.1 at pre-test to 5.8 ± 0.8 at post-test (mean difference = −6.632, SE = 0.157, t = 42.260, df = 18, p < 0.01), indicating that Progressive Muscle Relaxation was effective in reducing PSQI scores among post-Modified Radical Mastectomy participants.

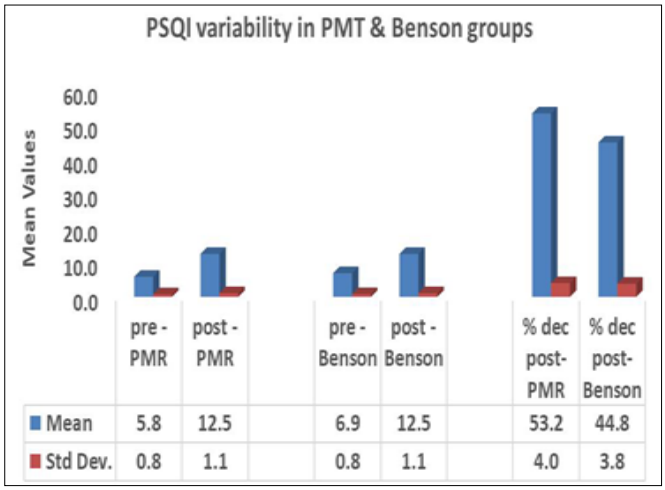
A paired t-test was conducted to compare pre- and post-intervention PSQI scores in the Benson relaxation group. The mean PSQI score significantly decreased from 12.5 ± 1.1 at baseline to 6.9 ± 0.8 after the intervention (n = 19). The mean difference between pre- and post-intervention scores was −5.58, indicating a substantial reduction in PSQI scores following theBenson relaxation technique. This reduction was statistically significant (t = 40.064, df = 18, p < 0.01, one-tailed). These findings demonstrate that the Benson relaxation intervention was effective in significantly improving sleep quality by reducing PSQI scores in the Benson group.

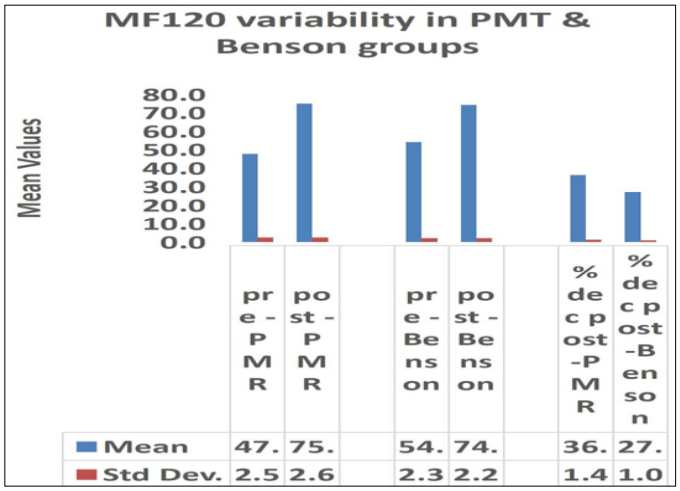
MFI-20

Variable	Mean	Std. Dev.
Pre-PMR	47.7	2.5
Post-PMR	75.0	2.6
Pre-Benson	54.2	2.3
Post-Benson	74.4	2.2
% dec post-PMR	36.4	1.4
% dec post-Benson	27.2	1.0

PSQI

Variable	Mean	Std. Dev
Pre-PMR	5.8	0.8
Post-PMR	12.5	1.1
Pre-Benson	6.9	0.8
Post-Benson	12.5	1.1
% dec post-PMR	53.2	4.0
% dec post-Benson	44.8	3.8





Discussion

The present study was undertaken to compare the effectiveness of Progressive Muscle Relaxation (PMR) and Benson Relaxation Technique in improving sleep quality and reducing fatigue among MRM patients. Fatigue and sleep disturbances are common symptoms in this population and significantly affect functional capacity, psychological well-being, and quality of life. The findings of this study indicate that both relaxation techniques produced significant improvements; however, PMR was more effective than Benson relaxation.

At baseline, participants in both groups exhibited poor sleep quality and moderate to severe fatigue, as reflected by elevated PSQI and MFI-20 scores. This finding is consistent with previous studies reporting high prevalence of fatigue and sleep disorders in MRM patients due to disease-related stress, pain, reduced physical activity, and psychological factors such as anxiety and depression. The absence of significant baseline differences between groups confirms the comparability of the study sample and strengthens the validity of the post-intervention findings.

Following four weeks of intervention, both groups demonstrated improvement in sleep quality. The reduction in PSQI scores suggests better sleep latency, improved sleep duration, and enhanced subjective sleep quality. These improvements may be attributed to the calming effect of relaxation techniques, which reduce autonomic arousal and promote parasympathetic nervous system dominance, facilitating sleep initiation and maintenance.

The PMR group showed a greater reduction in PSQI scores compared to the Benson relaxation group. PMR involves sequential contraction and relaxation of major muscle groups, which helps release accumulated muscle tension and somatic discomfort. This physical relaxation likelyreduced nocturnal muscle stiffness and pain, common contributors to sleep disturbance, thereby enhancing sleep quality more effectively than mental relaxation alone. Similarly, fatigue levels measured using MFI-20 showed significant improvement in both groups, with greater reduction in the PMR group. PMR influences multiple dimensions of fatigue, including physical, general, and mental fatigue. The repeated muscle relaxation cycles may improve peripheral circulation, reduce muscle fatigue, and enhance body awareness, leading to better energy conservation and reduced perceived fatigue. In contrast, Benson

relaxation primarily emphasizes mental calmness through controlled breathing and repetition of a calming word or phrase. While this technique effectively reduces psychological stress and anxiety—important contributors to fatigue—it may have a comparatively limited effect on physical fatigue components. This difference may explain the relatively smaller reduction in MFI-20 scores observed in the Benson relaxation group.

The superior outcomes observed with PMR may also be explained by its neuromuscular effects. PMR has been shown to decrease sympathetic activity and reduce cortisol levels, promoting physiological relaxation. This neurophysiological response may contribute to improved sleep architecture and reduced fatigue perception.

Additionally, PMR is easy to learn, requires minimal cognitive effort, and can be performed independently, making it particularly suitable for patients with physical and mental fatigue.

The findings of the present study are consistent with earlier research demonstrating the effectiveness of PMR in managing fatigue and sleep disturbances in chronic conditions. Studies have reported that PMR improves sleep efficiency, reduces sleep latency, and decreases fatigue severity by addressing both physical and psychological components. The current study adds to existing evidence by directly comparing PMR with Benson relaxation and highlighting the superior benefits of PMR in MRM patients.

Clinically, these findings support the incorporation of PMR as a routine adjunct to conventional rehabilitation programs. Given its low cost, safety, and ease of implementation, PMR can be prescribed by physiotherapists as a home-based intervention to improve sleep and reduce fatigue. Benson relaxation may still be recommended forpatients who prefer a simpler meditative approach or have difficulty performing muscle contractions. In summary, while both relaxation techniques are beneficial, PMR appears to provide a more comprehensive therapeutic effect by addressing both physical and mental aspects of fatigue and sleep disturbance. This highlights the importance of selecting intervention strategies that target multiple contributing factors in the management of fatigue and sleep-related problems in MRM patients.

Conclusion

The present study was conducted to compare the effectiveness of Progressive Muscle Relaxation (PMR) and Benson Relaxation Technique on sleep quality and fatigue among MRM patients. Fatigue and disturbed sleep are common and debilitating symptoms in this population, significantly affecting functional ability, emotional well-being, and overall quality of life. The results of the study demonstrate that both Progressive Muscle Relaxation and Benson Relaxation Technique are effective in improving sleep quality and reducing fatigue levels following four weeks of intervention. Improvement was observed in both groups as indicated by a reduction in Pittsburgh Sleep Quality Index (PSQI) scores and Multidimensional Fatigue Inventory-20 (MFI-20) scores.

However, the PMR group showed a greater reduction in both PSQI and MFI-20 scores when compared to the Benson relaxation group. This indicates that Progressive Muscle Relaxation is more effective in improving sleep quality and reducing fatigue in MRM patients. The superior effect of PMR may be attributed to its structured approach involving systematic contraction and relaxation of major muscle groups, which promotes physical relaxation, reduces neuromuscular tension, and enhances parasympathetic nervous system activity. This combined physical and psychological relaxation leads to better sleep initiation, maintenance, and reduction in fatigue. Benson Relaxation Technique was also found to be beneficial, particularly in reducing mental stress and promoting relaxation; however, its effect on physical components of fatigue appeared to be comparatively less than that of PMR. Based on the findings of the study, it can be concluded that Progressive Muscle Relaxation is a simple, safe, cost-effective, and clinically applicable intervention and can be recommended as an adjunct to conventional physiotherapy rehabilitation for managing sleep disturbances and fatigue in MRM patients.

Limitations of the Study

Despite the significant findings, the present study has certain limitations:

1. The sample size of the study was relatively small, which may limit the generalization of the results to a larger population.
2. The duration of the intervention was limited to four weeks; hence, the long-term effects of the relaxation techniques were not evaluated.
3. The outcome measures used in the study (PSQI and MFI-20) were subjective in nature and depended on self-reported responses, which may introduce response bias.
4. Factors such as disease severity, medication use, psychological status, and lifestyle factors were not controlled and may have influenced sleep quality and fatigue levels.
5. The study did not include objective measures such as actigraphy or polysomnography to assess sleep quality.

Future Scope of the Study

Based on the limitations and findings of the present study, the following recommendations are suggested for future research:

1. Future studies can be conducted with a larger sample size to enhance the external validity of the results.
2. Long-term follow-up studies are recommended to evaluate the sustained effects of Progressive Muscle Relaxation and Benson Relaxation Technique.
3. Objective assessment tools such as actigraphy, electromyography, or polysomnography can be included to support subjective outcome measures.
4. Comparative studies can be conducted between PMR and other relaxation or mind-body techniques such as yoga, mindfulness meditation, or breathing exercises.
5. Future research may explore the combined effect of relaxation techniques with conventional physiotherapy exercises.
6. Similar studies can be conducted in other populations with chronic fatigue and sleep disturbances to broaden clinical application.

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