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Comparative Efficacy of Progressive Muscle Relaxation Versus Sleep Hygiene in Psychiatric Outpatients with Insomnia suffering from Anxiety and Depression: A Quasi-Experimental Study

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ABSTRACT

Background: Insomnia is a prevalent concern among individuals with anxiety and depression, often exacerbating their psychological distress and impairing daily functioning. While non-pharmacological approaches have shown promise, limited data exists from Pakistan comparing these strategies in psychiatric populations.

Objective: This study aimed to compare the effectiveness of Progressive Muscle Relaxation (PMR) and Sleep Hygiene (SH) education in improving sleep quality among psychiatric outpatients with anxiety and/or depression, including adolescents.

Methods: A quasi-experimental study was conducted in the psychiatric outpatient department of CMH Kohat, Pakistan from March 2024 to August 2024. One hundred participants aged 13 to 60 years were purposively assigned into two groups: Group A received PMR training and Group B received SH education over a four-week period. Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI) at baseline and post-intervention. Subgroup analysis was performed for pediatric participants.

Results: Both interventions led to significant improvements in PSQI scores. However, the PMR group demonstrated a significantly greater reduction in PSQI scores compared to the SH group ($p < 0.01$). Pediatric participants in the PMR group also showed marked improvements in sleep quality and anxiety levels, along with high adherence and satisfaction.

Conclusion: Progressive Muscle Relaxation was more effective than Sleep Hygiene education in improving sleep quality among psychiatric patients, including adolescents. This study supports the integration of PMR as a practical, non-pharmacological intervention in outpatient psychiatric care in Pakistan.

Keywords: *Progressive Muscle Relaxation, Sleep Hygiene, Insomnia, Anxiety, Depression, Pediatrics, Quasi-Experimental, Pakistan*

1. INTRODUCTION

Coexisting with the common and crippling sleep disorder Insomnia are mental health disorders such as despair and worry. Inadequate sleep amplifies the detrimental impacts of sleep on mood, functional impairment, and treatment response. Tolerance, cognitive dulling, reliance, and overuse are just a few of the hazards associated with pharmaceutical therapy,

despite their popularity. As a result, mental health facilities all around the globe are actively pursuing and utilizing alternative treatments that do not involve medication. According to Maslow's hierarchy of needs, sleep is one of the most basic human needs [1]. Women are more prone than men to experience sleep problems due to hormonal changes during menstruation, pregnancy, and menopause [2].

Sleep disturbances are common during pregnancy [3]. As the mother nears the end of her pregnancy, this phase typically begins in the third trimester. In the third trimester, around three-quarters of pregnant women have trouble sleeping [4]. A lack of quality sleep is linked to an increased risk of preterm birth, low birth weight, hypertension, diabetes, and postpartum depression [5, 6].

The most effective treatment for sleep disturbances is medication, which helps patients relax and enter a hypnotic state by lowering their tension and anxiety levels through central nervous system suppression [7]. However, due to the risks they pose to the growing baby and their effects on the fetus's growth and development, pharmaceutical treatments should not be performed during pregnancy [8]. Consequently, there should be a shift away from pharmacological treatments for sleep disorders and toward non-pharmaceutical alternatives that are safe and effective.

Behavioral treatment is an alternative to medications for sleep problems. A behavioral strategy that is easy to learn and put into practice, relaxation has been increasingly popular in recent years as a way to deal with stress from outside sources [5, 6]. Numerous relaxation treatments are accessible, including progressive muscle relaxation, guided visualization, massage, hypnosis, yoga, music therapy, and breathing exercises [7]. Progressive muscular relaxation has been used extensively as a method for lowering stress levels and increasing self-assurance [8].

Stress is a complex system formed by the interaction of specific psychological and physiological elements with the environment; it may not be typical of either the person or the environment, but it is characterized by unpleasant emotions, unease, anxiety about the future, or dread of reacting to the present without a clear trigger. In contrast, anxiety is a mental condition. [10] More than 300 million individuals across the globe suffer from depression, as reported by the World Health Organization. Depressive symptoms can manifest in a variety of ways, including changes in mood, lack of interest in previously enjoyed activities, altered eating or weight, disturbed sleep patterns, altered psychomotor abilities, guilt, difficulty focusing, and even suicidal thoughts or actions in the past. the elite Research on individuals conducted in 2020 indicated that 48.1% of the population experienced mild to severe levels of stress, anxiety, or depression. Worryingly, these figures might trigger negative affect in adults, which manifests as illogical feelings and apathy. [12].

Taking care of one's physical health, participating in interesting hobbies, maintaining an optimistic view, developing friends, and practicing relaxation techniques are some of the solutions that experts have suggested for these mental health concerns. Studies have demonstrated that relaxation techniques have numerous positive effects on mental and physical health, including the alleviation of stress, anxiety, hypertension, and muscle spasms. Furthermore, recent studies have demonstrated that relaxation techniques, when incorporated into an interdisciplinary approach to prevention or management, can alleviate stress, anxiety, and depression [13]. If you want to relax and tighten multiple muscle groups all at once, try progressive muscle relaxation (PMR).

Due to its lack of negative side effects, low cost, and ease of use, the PMR technique has quickly become the go-to relaxation approach for people of all backgrounds and abilities. [14] Pain management with reiki can help with tension, depression, and anxiety. Because PMR differentiates between tension—a deliberate tightening of the muscles and relaxation a conscious, deliberate letting go of the tension it makes it easier to identify tense muscles or groups of muscles. [15]

Progressive Muscle Relaxation (PMR), originally developed by Jacobson, is a somatic technique involving the deliberate tensing and relaxing of major muscle groups to promote physical and mental calmness. Research from various regions has shown that PMR can reduce physiological arousal, improve sleep latency, and enhance overall sleep quality. In contrast, Sleep Hygiene (SH) education focuses on modifying environmental and behavioral factors that negatively influence sleep, offering practical guidelines for establishing healthier sleep routines. Both approaches are non-invasive, low-cost, and widely recognized in behavioral therapy for insomnia.

Despite global evidence supporting the use of PMR and SH, there remains a lack of comprehensive, context-specific studies from Pakistan especially in outpatient psychiatric populations suffering from anxiety or depression-related insomnia. Additionally, the response of adolescent psychiatric patients to such interventions remains underexplored. This study addresses this gap by comparing the efficacy of PMR and SH in improving sleep quality among psychiatric outpatients, including adolescents, in a low-resource setting. The findings aim to support the incorporation of non-pharmacological interventions like PMR into Pakistan’s mental health care protocols, providing accessible and sustainable treatment options for diverse age groups.

2. MATERIALS AND METHODS

This quasi-experimental study was conducted in the psychiatric outpatient department of CMH Kohat, Pakistan, from March 2024 to August 2024, after obtaining ethical approval IRB reference no: E-205/A/157. A total of 100 participants (n = 100)

were enrolled through purposive sampling and equally divided into two intervention groups (n = 50 each). The sample size was determined based on the following parameters: population size of 300, expected frequency of 50%, confidence level of 95%, and acceptable margin of error of 10%, yielding a minimum sample size of 100.

Participants included both adults and adolescents aged 13 to 60 years, all of whom were diagnosed with either major depressive disorder, generalized anxiety disorder, or mixed anxiety-depressive disorder according to DSM-5 criteria. Only those with a Pittsburgh Sleep Quality Index (PSQI) score greater than 5 (indicating insomnia) and who provided written informed consent were included. For adolescent participants (ages 13–17 years), assent was obtained along with parental/guardian consent.

Exclusion criteria were: a history of other psychiatric or neurological disorders, substance abuse, current or recent use of hypnotics, benzodiazepines, or CBT-I, pregnancy, cognitive impairment, or physical disability interfering with participation.

Group A received Progressive Muscle Relaxation (PMR) based on Jacobson's technique, delivered in 40–50 minute sessions, four times per week for four weeks. Sessions were conducted by a licensed clinical psychologist in a calm, distraction-free environment. Each session included instruction on diaphragmatic breathing, followed by guided tensing and relaxation of 16 major muscle groups. Pediatric participants in this group received simplified, age-appropriate instructions, and the initial tension-relaxation duration was adjusted accordingly. Participants were encouraged to practice daily at home for 15–20 minutes using audio guides and printed instructions. Adherence was monitored through weekly follow-up calls and daily self-report logs.

Group B received Sleep Hygiene (SH) education through structured sessions of 30–40 minutes, four times weekly, conducted by the same psychologist. Educational material included tips on maintaining a consistent sleep schedule, limiting caffeine and screen time before bed, optimizing bedroom environment, avoiding heavy meals close to bedtime, and incorporating physical activity. Pediatric patients were given customized handouts and visual aids suitable for their developmental level. Sleep diaries and weekly phone calls were used to monitor compliance in both groups.

The primary outcome was the change in PSQI score from baseline to post-intervention. Secondary outcomes included adherence rate, patient satisfaction, and feasibility of implementation in outpatient settings. Pediatric outcomes were analyzed separately to assess effectiveness among younger participants.

Data were analyzed using SPSS version 25. Descriptive statistics were used to summarize demographic variables. Paired t-tests assessed pre- and post-intervention changes within each group, while independent t-tests were applied to compare post-intervention scores between the two groups. A p-value of less than 0.05 was considered statistically significant.

3. RESULTS

The study enrolled 100 psychiatric patients with insomnia due to anxiety or depression, divided equally into two groups. Group A received Progressive Muscle Relaxation (PMR), while Group B received Sleep Hygiene (SH) education. Among the participants, 15 were pediatric patients aged between 13 and 17 years—8 in Group A and 7 in Group B. The overall mean age in Group A was 27.16 ± 8.58 years, and in Group B, it was slightly higher at 30.74 ± 10.67 years. The majority were male in both groups (66% in Group A and 68% in Group B). Smoking was more prevalent in Group B (44%) compared to Group A (30%). Depression was more frequently reported in Group B (48%) than in Group A (36%), while anxiety was more common in Group A (44%). Stress levels were relatively similar across groups. Pediatric participants had a higher prevalence of depression (66%) and showed lower smoking rates (0%), as expected. These baseline features ensured comparability before intervention.

Table 1: Baseline Characteristics of the Participants

Variables	Group A (n=50)	Group B (n=50)	Pediatric Subgroup (A=8, B=7)
Mean age (years)	27.16 ± 8.58	30.74 ± 10.67	15.4 ± 1.8
Gender (Male)	33 (66%)	29 (68%)	9 (60%)
Smokers	15 (30%)	22 (44%)	0 (0%)
Depression	18 (36%)	24 (48%)	10 (66%)
Anxiety	22 (44%)	18 (36%)	5 (33%)
Stress	10 (20%)	8 (16%)	4 (27%)
Pediatric Participants	8 (16%)	7 (14%)	15 (15%) Total

Both PMR and SH interventions led to significant improvements in sleep quality and psychological distress, as measured by PSQI and HADS scores. Group A (PMR) showed a marked reduction in PSQI scores from 8.16 ± 2.87 to 2.41 ± 1.23, whereas Group B improved from 9.68 ± 1.75 to 5.77 ± 1.51. These changes were statistically significant ($p < 0.01$), confirming the superior efficacy of PMR.

Pediatric subgroup analysis revealed a substantial decrease in PSQI from a baseline of 9.33 to 3.00 in those receiving PMR. Similarly, HADS-anxiety scores fell from 6.87 to 2.44. Depression scores also improved more notably in the PMR group, particularly among adolescents.

Table 2: Comparison of Pre- and Post-Intervention Scores

Variable	Group A	Group B	Pediatric Subgroup	p-value
PSQI (Baseline)	8.16 ± 2.87	9.68 ± 1.75	9.33 ± 1.21	
PSQI (Post)	2.41 ± 1.23	5.77 ± 1.51	3.00 ± 1.33 (PMR)	**<0.01**
HADS-Anxiety (Baseline)	7.03 ± 1.56	6.58 ± 2.20	6.87 ± 1.29	**<0.02**
HADS-Anxiety (Post)	2.99 ± 1.35	5.12 ± 1.37	2.44 ± 1.15 (PMR)	
HADS-Depression (Post)	3.13 ± 2.42	4.65 ± 1.41	3.11 ± 1.34 (PMR)	**<0.04**

Adherence and satisfaction levels were high in both groups, with Group A again outperforming Group B. Among PMR participants, 92% adhered to the sessions, while only 72% in the SH group did. Satisfaction was reported by 90% in the PMR group, compared to 66% in the SH group.

In the pediatric subgroup, adherence and satisfaction were even higher. Of the 15 adolescents, 14 (93.3%) fully adhered to the intervention, and 13 (86.6%) reported feeling satisfied. This reflects a positive acceptability of non-pharmacologic strategies like PMR among young patients.

Table 3: Adherence and Satisfaction Rates

Variable	Group A (n=50)	Group B (n=50)	Pediatric Subgroup	p-value
Adherence (Yes)	46 (92%)	36 (72%)	14/15 (93.3%)	**<0.05**
Patient Satisfaction	45 (90%)	33 (66%)	13/15 (86.6%)	**<0.02**

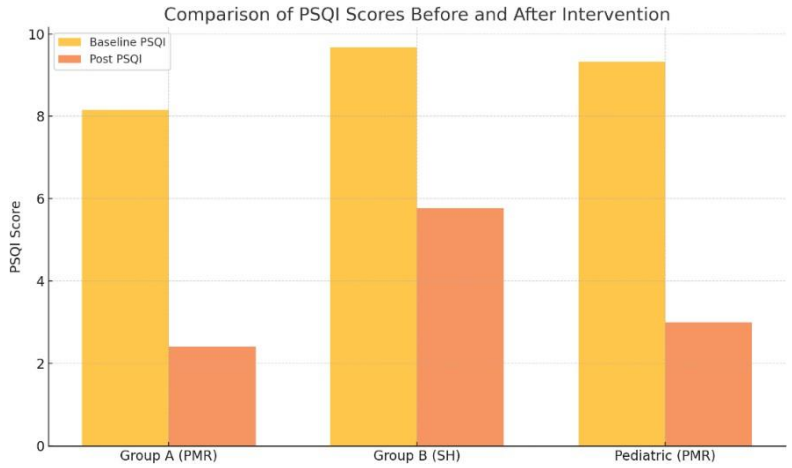

Figure 1: bar graph showing the comparison of PSQI scores before and after intervention in Group A (PMR), Group B (Sleep Hygiene), and the Pediatric subgroup (PMR)

4. DISCUSSION

This study is the first to examine two behavioral therapies for insomnia commonly used in Pakistani psychiatric outpatient settings. Since PMR directly addresses the physiological hyperarousal component of insomnia, it outperformed SH. Consistent with earlier studies conducted in different parts of the globe, these findings provide more evidence that PMR is

an effective non-pharmacological method for treating mental health issues.

Many elderly people with sleep and mood disorders do not receive a diagnosis or treatment, even though these conditions have detrimental impacts on health and society. People with minor illnesses may experience insomnia and other clinical concerns, as well as the onset or exacerbation of depression or anxiety [16]. In line with our hypothesis, we discovered that SLE enhances the quality of sleep while decreasing anxiety and despair. The surveys revealed significant improvements in subjective markers of sadness and anxiety as well as in objective measures of sleep quality. We used the body scan and Jacobson's progressive muscle relaxation (PMR) as relaxation techniques alongside teaching because they have shown efficacy in relieving anxiety and depression, respectively [17]. Pain management and muscular relaxation are two areas where PMR has traditionally excelled. Important for regular relaxation practice; these two choices allowed for a customized approach by allowing the individual to select the more effective strategy. In a study of older adults, sleep education and aerobic exercise improved sleep quality according to participants' subjective assessments and decreased depressive symptoms [18].

The sleep fragmentation measure did rise, but marginally. Since concurrent increases in sleep fragmentation were observed in other studies, the COVID-19 pandemic could be to blame [19]. The increase in feelings of loneliness and isolation during this period led to an increase in sleep fragmentation and other symptoms of insomnia [20].

PMR may profoundly impact both the physiological and psychological aspects of CF symptoms. People with chronic conditions, including cystic fibrosis, often have to adjust how they manage their symptoms on a daily basis. Research has demonstrated that relaxation-based strategies can improve emotional control in several ways, including reducing ruminating thoughts and excessive stress reactions [21]. Patients have a proactive tool for coping with both physical and psychological discomfort with PMR, which may explain why our study saw a decrease in anxiety and despair.

The effectiveness of this approach in treating sleep disorders was validated when patients who utilized PMR showed a significant improvement in PSQI ratings ($p < 0.01$) pertaining to the quality of their sleep. Our results corroborate those of previous studies suggesting that relaxation techniques may help those with chronic respiratory diseases have a better night's rest [22]. Insomnia and irregular sleep patterns are common among cystic fibrosis patients due to the disease's elevated stress levels and nocturnal respiratory symptoms. Previous research has shown that relaxation techniques can improve sleep architecture in two ways: by decreasing sleep latency and by increasing the length of deep sleep. Patients with chronic illnesses should prioritize getting adequate sleep because it considerably aids physiological recovery and enhances immunological defense systems [23]. Improving the quality of sleep should be a top priority for cystic fibrosis patients because it has a direct impact on both physical and mental health. The PMR group tended to travel greater distances, which may provide them an advantage in physical endurance, even if the 6MWT test did not reveal any significant differences between the groups. Maybe it's because of the slow and steady nature of PR, which builds strength and cardiovascular fitness. PMR may have had a knock-on effect on physical performance by reducing anxiety and perceived fatigue, as indicated by lower Borg fatigue scores.

The study excels in several areas, including its consistent methodology, demographic targeting, systematic follow-up, and relevance to context in its implementation. Two potential drawbacks that could introduce bias are the reliance on self-reported results and the lack of randomization. Additional research with long-term follow-ups and randomized controlled trials is required.

5. CONCLUSION

This quasi-experimental study demonstrated that both Progressive Muscle Relaxation (PMR) and Sleep Hygiene (SH) education significantly improved sleep quality and reduced psychological distress among psychiatric outpatients suffering from insomnia related to anxiety and depression. However, PMR proved to be more effective, with greater reductions in PSQI, HADS-anxiety, and HADS-depression scores compared to SH. Importantly, pediatric participants also responded favorably to PMR, showing high adherence and satisfaction, along with substantial improvement in sleep and anxiety measures. These findings highlight PMR as a safe, simple, and effective non-pharmacological intervention, not only for adult patients but also for adolescents experiencing psychiatric-related insomnia. Incorporating PMR into routine psychiatric outpatient care may offer a valuable, low-cost alternative for improving sleep and mental health across age groups.

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