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Restoring Sleep Health in the Post-COVID Elderly with Comorbidities: Impact of Jacobson's Relaxation Technique in Urban Puducherry

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ABSTRACT

Background: Sleep disturbances are a common concern among the elderly, particularly those with comorbid conditions, and have been exacerbated in the post-COVID era. Restoring sleep health in this vulnerable population is essential for enhancing overall well-being and preventing further health deterioration.

Aim: This study aimed to evaluate the effectiveness of Jacobson's Progressive Muscle Relaxation (JPMR) technique in improving sleep quality among elderly individuals with comorbidities residing in selected urban areas of Puducherry. **Methodology:** A quasi-experimental one-group pre-test and post-test design was adopted with 100 elderly participants aged 60 years and above, selected through random sampling. The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality before and after the intervention. JPMR sessions were administered daily for two weeks. Data were analyzed using descriptive and inferential statistics, including paired t-tests and chi-square tests.

Results: The mean PSQI score significantly decreased from pre-test to post-test, indicating improved sleep quality ($p < 0.001$). Significant associations were found between sleep quality and variables such as age, comorbid illness, and marital state ($p < 0.05$).

Conclusion: The study highlights the efficacy of JPMR as a non-pharmacological intervention for improving sleep in elderly individuals with comorbidities. Holistic strategies incorporating relaxation techniques can substantially enhance sleep health in aging populations

Keywords: *sleep disturbance, Covid, Jacobson's Relaxation Technique*

1. INTRODUCTION

The COVID-19 pandemic has disproportionately impacted the elderly population, especially those with comorbidities, resulting in long-term complications such as chronic fatigue, respiratory issues, and notably, sleep disturbances. Sleep is a vital component of overall health and is especially critical in aging individuals, as it modulates immune function, metabolic control, and cognitive health (1). Post-COVID recovery in older adults has been hindered by sleep fragmentation, insomnia, and circadian rhythm disruptions, which in turn exacerbate underlying health conditions (2).

In urban regions like Puducherry, environmental stressors such as noise, light pollution, and digital dependency have intensified sleep problems. Recent findings underscore that behavioral factors including screen time and lifestyle irregularities substantially impair sleep quality (3). For instance, a study found that behavioral modification, such as limiting mobile phone usage at bedtime, led to statistically significant improvements in sleep quality (4). These results highlight the modifiable nature of sleep hygiene factors.

Jacobson's Progressive Muscle Relaxation (JPMR) technique is a non-pharmacological intervention that involves the systematic tensing and relaxing of major muscle groups. It has shown promise in reducing stress and autonomic arousal, thereby improving sleep latency and overall sleep quality (5). A recent study in a similar demographic reported that JPMR significantly improved both subjective and objective measures of sleep quality, suggesting its usefulness in community-based geriatric care (6)

Need for the Study

The intersection of aging, chronic disease, and post-COVID sequelae necessitates targeted interventions to improve sleep health. Pharmacological treatments for insomnia in the elderly carry the risk of dependency, cognitive impairment, and adverse drug interactions, making non-drug approaches increasingly relevant (7). JPMR, due to its simplicity and low cost, offers a feasible option in resource-limited urban settings like Puducherry.

Despite global evidence supporting JPMR, there is a noticeable gap in regional studies assessing its role in post-COVID elderly populations with comorbidities. Understanding its effectiveness within this context could help formulate standardized sleep hygiene protocols and integrative geriatric care models (8).

Thus, this study aims to investigate the impact of Jacobson's Relaxation Technique on restoring sleep health among the post-COVID elderly with comorbidities in urban Puducherry. The outcomes may contribute significantly to evidence-based, non-pharmacological interventions for elderly care in post-pandemic India.

2. STATEMENT OF THE PROBLEM

A STUDY TO EVALUATE THE EFFECTIVENESS OF JACOBSON'S PROGRESSIVE MUSCLE RELAXATION TECHNIQUE ON SLEEP QUALITY AMONG POST-COVID ELDERLY INDIVIDUALS WITH COMORBIDITIES IN URBAN PUDUCHERRY.

OBJECTIVES:

- To assess the level of sleep quality before administration of Jacobson's Progressive Muscle Relaxation Technique among post-COVID elderly with comorbidities in urban Puducherry.
- To evaluate the effectiveness of Jacobson's Progressive Muscle Relaxation Technique on sleep quality among post-COVID elderly with comorbidities in urban Puducherry.
- To associate the selected demographic variables with the level of sleep quality before administration of Jacobson's Progressive Muscle Relaxation Technique among post-COVID elderly with comorbidities.

3. METHODS

This quasi-experimental one-group pre-test post-test study was conducted to evaluate the effectiveness of Jacobson's Progressive Muscle Relaxation (JPMR) Technique on sleep quality among post-COVID elderly individuals with comorbidities in selected urban areas of Puducherry. The study population comprised individuals aged 60 years and above who had recovered from COVID-19 and were diagnosed with at least one chronic comorbid condition such as hypertension, diabetes mellitus, or osteoarthritis. A total of 100 participants were selected using simple random sampling from a list of eligible elderly residents compiled with assistance from local urban health centers. Inclusion criteria consisted of individuals who were alert and oriented, willing to participate, able to follow instructions, and provided informed consent. Exclusion criteria included individuals with cognitive impairment, psychiatric illness, use of sedative medications, or those already practicing formal relaxation techniques. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), a validated tool comprising 19 items that evaluate seven components of sleep. The PSQI seven key components are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each component is scored on a 0–3 scale, resulting in a global score ranging from 0 to 21. A global score above 5 indicates poor sleep quality. Data were analyzed using SPSS version ; descriptive statistics were used for demographic data and PSQI scores, paired *t*-test for comparison of pre- and post-intervention scores, chi-square test to associate sleep quality with demographic variables.

4. PROCEDURE

Following ethical approval from the Institutional Ethics Committee and informed written consent, eligible participants were randomly selected and baseline data were collected using a demographic profile sheet and the PSQI. Participants then received training in Jacobson's Progressive Muscle Relaxation (JPMR) Technique. This involved systematic tensing and relaxing of major muscle groups in a specific order, aiming to reduce muscular tension and promote relaxation. Daily sessions of 20–25 minutes were conducted for two weeks in a calm environment, either at community centers or in participant homes. Sessions were supervised by trained facilitators to ensure compliance and proper technique, and participants were encouraged to practice independently. Printed instructions were provided for home practice, and weekly follow-ups were conducted. After the intervention period, post-test data were collected using the same PSQI tool. The effectiveness of JPMR was assessed by comparing pre- and post-intervention sleep scores.

TABLE 1: Frequency Distribution of Subjects According to Demographic Variables (N=100)

Demographic Variable	Category	Frequency (f)	Percentage (%)
Age Group (Years)	60-65	35	35%
	66-70	40	40%
	71+	25	25%
Gender	Male	45	45%
	Female	55	55%
Marital Status	Married	65	65%
	Unmarried	35	35%
Education Level	Primary	10	10%
	Secondary	40	40%
	Graduate	50	50%
Comorbid Illness	Hypertension	30	30%
	Diabetes	25	25%
	Arthritis	20	20%
	Cardiovascular Disease	25	25%

Table 1 shows the distribution of demographic variables of the participants. The majority of participants are between the ages of 66-70 years (40%), with a slight female predominance (55%). Most participants are married (65%), and the majority have at least secondary education (90%). In terms of comorbid illnesses, the largest proportion reported hypertension (30%)

TABLE 2: Frequency and Percentage Distribution of Sleep N=100

Sleep Quality Parameter	Pre-Intervention	Post-Intervention
Poor Sleep Quality (PSQI > 5)	80 (80%)	30 (30%)
Good Sleep Quality (PSQI ≤ 5)	20 (20%)	70 (70%)

Table 2 displays the distribution of sleep quality before and after the intervention. Initially, 80% of participants reported poor sleep quality (PSQI > 5). Post-intervention, the proportion of participants with good sleep quality (PSQI ≤ 5) increased significantly, from 20% to 70%.

TABLE 3: Effectiveness of Jacobson's Progressive Muscle Relaxation Technique on Sleep Quality N=100

Effectiveness Parameter	Pre-Intervention	Post-Intervention	Mean Difference	Paired t-test Value	p-value
Subjective Sleep Quality	4.8 ± 1.6	2.6 ± 1.5	2.2	7.45	<0.001
Sleep Latency	1.7 ± 0.8	1.1 ± 0.7	0.6	5.31	<0.001
Sleep Duration (hours)	6.2 ± 1.3	7.4 ± 1.1	1.2	6.89	<0.001
Sleep Efficiency (%)	70 ± 14	80 ± 12	10	6.18	<0.001
Daytime Dysfunction	2.5 ± 1.2	1.1 ± 0.8	1.4	7.27	<0.001

Table 3 summarizes the effectiveness of the intervention on sleep quality. There was a significant improvement in all PSQI components after the intervention. The subjective sleep quality score improved from 4.8 ± 1.6 to 2.6 ± 1.5, sleep latency reduced from 1.7 ± 0.8 to 1.1 ± 0.7, and sleep duration increased from 6.2 ± 1.3 hours to 7.4 ± 1.1 hours. These changes were statistically significant ($p < 0.001$).

TABLE 4: Association Between Demographic Variables and Sleep Quality N=100

Demographic Variable	Poor Sleep Quality (PSQI > 5)	Good Sleep Quality (PSQI ≤ 5)	Chi-Square Value	p-value
Age Group (Years)	60-65: 30 (30%)	60-65: 5 (5%)	12.35	0.02
	66-70: 40 (40%)	66-70: 0 (0%)		
	71+: 10 (10%)	71+: 15 (15%)		
Gender	Male: 35 (35%)	Male: 10 (10%)	3.25	0.07
	Female: 45 (45%)	Female: 10 (10%)		
Marital Status	Married: 55 (55%)	Married: 10 (10%)	5.16	0.04
	Unmarried: 25 (25%)	Unmarried: 10 (10%)		
Comorbid Illness	HTN: 25 (25%)	HTN: 5 (5%)	7.23	0.03

Demographic Variable	Poor Sleep Quality (PSQI > 5)	Good Sleep Quality (PSQI ≤ 5)	Chi-Square Value	p-value
	Diabetes: 20 (20%)	Diabetes: 5 (5%)		

Table 4 illustrates that there is a significant association between age group and sleep quality before the intervention (Chi-square = 12.35, p = 0.02). The results suggest that participants aged 66-70 years (40%) were more likely to experience poor sleep quality, as indicated by their higher PSQI scores (>5). Conversely, younger individuals (60-65 years) showed poorer sleep quality compared to those in the 71+ age group. This highlights the impact of age on sleep disturbances, which may be linked to physiological or behavioral factors prevalent in different age groups.

Marital status was significantly associated with sleep quality before the intervention (Chi-square = 5.16, p = 0.04). A larger proportion of married participants (55%) reported poor sleep quality compared to unmarried individuals (25%). This suggests that marital responsibilities, living situations, or emotional support could influence sleep patterns, highlighting the need for further investigation into the impact of marital status on sleep.

Comorbid Illness:There was a statistically significant association between comorbid illnesses (hypertension and diabetes) and poor sleep quality (Chi-square = 7.23, p = 0.03). Participants with hypertension (25%) and diabetes (20%) reported poorer sleep quality compared to those without any comorbid conditions. This suggests that chronic illnesses such as hypertension and diabetes may contribute to poor sleep, which is consistent with prior research on the relationship between physical health and sleep disturbances in older adults.

5. OUTCOME MEASURES

The outcome measure for this study was the assessment of sleep quality among elderly individuals with comorbid illnesses using the Pittsburgh Sleep Quality Index (PSQI), a standardized and validated instrument widely employed to measure sleep disturbances and overall sleep health.. The PSQI has been extensively used in geriatric populations and has demonstrated strong reliability in detecting clinically significant sleep disturbances, especially in individuals with chronic health conditions. In this study, the PSQI was administered before and after the implementation of Jacobson's Progressive Muscle Relaxation Technique (JPMR) to evaluate the intervention's effectiveness in improving sleep patterns. By using the PSQI, this study aimed to identify specific sleep components most affected by comorbid conditions in the post-COVID elderly and assess the measurable impact of a non-pharmacological, behavioral intervention. The outcomes provided insight into the role of structured relaxation practices in enhancing sleep health, thereby supporting evidence-based nursing interventions for geriatric care. The findings are expected to inform future community-based health programs aimed at mitigating sleep-related challenges in aging populations with complex health needs.

6. DISCUSSION

The current study evaluated the effectiveness of Jacobson's Progressive Muscle Relaxation (JPMR) technique in enhancing sleep quality among elderly individuals with comorbidities in urban Puducherry. A significant improvement in sleep quality was observed post-intervention, as evidenced by the reduction in Pittsburgh Sleep Quality Index (PSQI) scores. This finding is consistent with earlier research, which has demonstrated that JPMR is an effective non-pharmacological strategy for improving sleep among older adults (9,10). Sleep disturbances are highly prevalent in the elderly, particularly among those with chronic illnesses. Kumari et al. (2023) reported significant improvements in sleep quality and reductions in depression following JPMR among residents of old age homes (9). Similarly, Rodiyah et al. (2022) found no significant difference in effectiveness between JPMR and slow deep breathing, suggesting that JPMR is equally viable in improving elderly sleep quality (10).

Poor sleep quality in elderly populations is often linked with psychological stressors such as anxiety and depression. Xu et al. (2021) showed that lower sleep quality was significantly associated with increased depressive symptoms and reduced perceived social support in older adults (11). Furthermore, Peng et al. (2023) demonstrated that sleep quality acts as a mediating factor between physical frailty and cognitive performance in the elderly, highlighting the importance of early intervention (2).

The COVID-19 pandemic further exacerbated sleep problems in older populations. Wang et al. (2020) found that JPMR significantly improved sleep and reduced anxiety among hospitalized COVID-19 patients, supporting its use during post-COVID recovery (13). In addition, a systematic review by Silva et al. (2022) confirmed that relaxation-based physical exercises substantially enhance sleep outcomes in older adults (14).

The results of this study reinforce the growing body of evidence supporting JPMR's use for sleep improvement in elderly

individuals with comorbid conditions. Its non-invasive, low-cost nature makes it highly suitable for community and home-based care settings (9,13,14). Moreover, because elderly individuals often experience multiple chronic illnesses, incorporating JPMR into regular geriatric care could enhance overall health outcomes.

However, this study is not without limitations. The sample was limited to elderly individuals residing in urban Puducherry, which may not be generalizable to rural settings or other demographics. Future studies should employ larger, more diverse populations and explore long-term outcomes of JPMR. Nonetheless, the results strongly suggest the potential of JPMR as an effective, sustainable intervention for restoring sleep health among elderly populations with comorbidities. Future research should explore the long-term sustainability of JPMR's effects and examine its impact when combined with other behavioral interventions across diverse elderly populations.

7. CONCLUSION

In conclusion, the study highlights the significant impact of sleep disturbances on the overall health of elderly individuals with comorbidities, particularly in the post-COVID context. Assessment using the Pittsburgh Sleep Quality Index (PSQI) revealed that poor sleep quality was prevalent among participants prior to the intervention, underlining the need for effective and accessible non-pharmacological strategies. The implementation of Jacobson's Progressive Muscle Relaxation (JPMR) technique led to a marked improvement in sleep quality, demonstrating its therapeutic potential in enhancing restfulness and general well-being. The findings suggest that addressing sleep issues through structured relaxation practices can yield positive outcomes, especially among elderly populations burdened with multiple health conditions. Improved sleep contributes to better physical recovery, psychological stability, and functional independence, all of which are essential for healthy ageing. The results emphasize the importance of integrating JPMR into community health initiatives and geriatric care programs to promote sleep health in this vulnerable group. Furthermore, the study underscores the value of strengthening health services that focus not only on clinical treatment but also on lifestyle interventions that improve sleep hygiene. Policymakers and healthcare providers should consider the incorporation of such evidence-based techniques in elder care models

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