

Effect of Progressive Muscle Relaxation on Sleep Disorder “Insomnia” for People Who Got COVID-19

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Abstract

Background: People underwent severe changes as a result of pandemic’s uncertainty, which had an impact on their social interactions, employment, education, physical exercise and of course their pattern of sleep. Studies on insomnia and COVID-19 show significant associations with prevalence of 36 to 88%, which is significantly higher than the estimated 10 to 40% prevalence of insomnia in the general population.

Aim of Study: This study aimed to investigate the effect of progressive muscle relaxation on sleep disorders “insomnia” for people who got COVID-19.

Material and Methods: RCT, conducted on 51 patients, 11 had withdrawn but 40 completed the study who were assigned into two equal groups. Assessment tools was insomnia severity scale. Study group received progressive muscle relaxation for 2 weeks 5 times per week while control group was under only inspection.

Results: All descriptive statistical factor were analyzed to measure mean, SD, median, range and *p*-value. *p*-value of ISI (*p*-value = <0.0001).

Conclusion: Progressive muscle relaxation has clinically and statistically significant effect in managing insomnia in people who got COVID-19.

Key Words: *Insomnia – COVID-19 – Progressive muscle relaxation – Sleep disorders.*

Introduction

IN December 2019, many hospitals in Wuhan reported a cluster of patients with a different type of pneumonia of unknown etiology. Their clinical manifestations resembled the 2003-SARS pandemic in certain ways, with death rates ranged from 1.4% to 18.9%, and among those who were seriously sick,

they reached as high as 61.5% [2]. After six weeks, WHO has to declare this new viral disease become a global pandemic calling it COVID-19 with nearly two million cases of death and around sixty-six million confirmed patients all over the world [3]. Home quarantine and pandemic’s uncertainty impacts people’s social interactions, employment, physical exercises and sleep [4]. When an infected patient talks, sneezes, or coughs, respiratory droplets are created and spread among persons within 1-4 meters with incubation periods typically varies from 2 to 11 days [5,6].

The most frequent symptoms were fever 75.3%, cough 62.6%, dyspnea 52.7%, and sore throat 43.9%. Other symptoms were recorded like anorexia, diarrhea, myalgia, weariness, and pharyngeal congestion, were somewhat prevalent about 20-38%. Abdominal discomfort, loss of taste or smell, lightheadedness, and chest pain were the least frequent symptoms that mentioned with prevalence about 20% [7].

Almost 80% of patients with COVID-19 only had a very mild flu-like symptoms, so they recovered in their home isolation. Although this may vary based on age and comorbidities, the majority of their symptoms started to manifest 11 days after infection [8,9]. People who were got isolated in hospitals quarantine were those who had severe illness or has comorbidities like diabetes mellitus, hypertension, heart diseases, chronic kidney diseases, lung and liver diseases, obesity with a body mass index over 35, people who are age 65 years or older, and people who are immunocompromised and pregnant women [10].

Insomnia is defined as a complaint of difficulty falling or staying asleep which is associated with significant distress or impairment in daytime function and occurs despite an adequate opportunity for

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sleep [11]. It is a risk factor for major depression, anxiety disorders, substance use disorders, suicidality, hypertension and diabetes. It is recommended that treatment addressing insomnia whenever it is present [12,13]. Insomnia has a dramatic and wide-ranging socioeconomic burden, not only because of health-care expenses, but also because of decreased work productivity and susceptibility to injuries. Sleep is crucial for controlling both physical and psychological functions. Insufficient sleep and sleep disorders may interact with psychological and physical conditions to aggravate the effects on population health. Many researches have documented how COVID-19 affects sleep in particular groups [14,15].

The clinical diagnosis of insomnia is based on the complaint of trouble falling asleep, trouble staying asleep, early morning awakening, and resultant daytime dysfunction. This can manifest in a wide range of ways including fatigue, malaise, impairment in attention, concentration or memory, impaired social, family, occupational or academic performance, mood disturbance, irritability, sleepiness, hyperactivity, impulsivity, aggression, reduced motivation, susceptibility for errors, and concerns about dissatisfaction with sleep [10]. If insomnia is sufficiently severe to warrant independent clinical attention, it should be recognized as a separate, comorbid disorder [16]. For many, insomnia is a persistent condition, with 74% reporting symptoms for at least one year. Persistence is more common in women, the elderly, and those with more severe insomnia. Family history of insomnia is also common, occurring in 35% of individuals. The male-to-female ratio is 1:1.4 for insomnia symptoms and 1:2 for insomnia diagnosis. In both men and women, the prevalence of insomnia increases with age [17].

The sleep-wake cycle is necessary to replenish and heal the body to ensure that it can function properly. Proper sleep allows the body to engage in circadian rhythms in the body, which initiates the build-up of energy stores for metabolic processes, neuronal remodeling for synaptic function, memory consolidation, and the assimilation of complex motor systems [18]. Disturbances in an individual's sleep cycle can have a significant detrimental effect on their overall health. Non-rhythmic regulations of core body temperature, cortisol levels, and melatonin secretion are all indicators of irregularities [19].

However, in the modern era, lifestyle and work often are associated with habits interfering with the endogenous circadian rhythms and, consequently, with the physiological patterns of stress-hormones secretion. For example, the exposure to light at night perturbs the circadian rhythm, because light is the major determinant used by the body to discriminate day from night. If light-dark cycles are altered, biological rhythms can become desynchronized [14,15,18].

Material and Methods

51 patients were recruited in RCT study; 11 patients with drawn while 40 completed the study. This study was conducted in Beni Suef chest diseases hospital during 2023. All patients who got diagnosed with COVID-19 pneumonia and admitted to the hospital were referred by a consultant pulmonologist. Then, the process of checking patients who matched inclusion and exclusion criteria began. When patients matched the inclusion and exclusion criteria, they were informed about the study. Patients were assigned into two equal groups of 20 patients for each group; study and control. These patients were randomly assigned by simple random method. On approval to participate in the study, all patients signed a consent form after receiving all full information on the purpose of the study, procedure, possible benefits, privacy use of data, and their right to withdraw from the study whenever they want. The assessment process started once the patient signed the form and it consisted of filling a questionnaire; Insomnia severity index scale. In the presence of their sleeping partner, patients were asked to fill this 7 items questionnaire.

The intervention protocol; progressive muscle relaxation, was set for each patient to be 5 times per week for 2 weeks. Every patient was carefully taught and observed while they were in hospital and following them up when they were discharged to continue the intervention protocol in home as a home exercise program [20]. Meanwhile, control group was only under inspection receiving no treatment protocol.

The assessment process once again was repeated for all included patients in both groups; by asking them to refill insomnia severity index scale in the presence of their sleeping partner whenever it was available.

Intervention:

Progressive muscle relaxation was the treatment protocol administered to the study group patients. It taught the patients how to relax their muscles through a two-step process. First, patients systematically tensed particular muscle groups in their body, such as their neck and shoulders. Second, patients released the tension and notice how their muscles feel when they relaxed them. The exercise will help them to lower their overall tension and stress levels, and help them relax when they are feeling anxious. It can also help reduce physical problems such as stomachaches and headaches, as well as improve their sleep.

The instructions of exercise were as follow:

- Set aside about 15 minutes to complete this exercise.

- Find a place where you can complete this exercise without being disturbed.
- Wear loose, comfortable clothing, and don't forget to remove your shoes.
- You can lie down on your back; this will increase your chances of falling asleep. Also relaxing before bed can improve your sleep.
- Close your eyes and let your body go loose.
- Take about five slow, deep breaths before you begin.
- Tense your muscle 5 seconds, hold 5 seconds, release tension 5 seconds and at last relax 15 seconds.
- Repeat this step three times before tensioning the next group of muscles.
- You should never feel intense or shooting pain while completing this exercise.
- Make the muscle tension deliberate, yet gentle.
- If you have problems with pulled muscles, broken bones, or any medical issues that would hinder physical activity, consult your doctor first.

Insomnia Severity Index

The insomnia severity index has seven questions. The seven answers are added up to get a total score. When you have your total score, look at the "Guidelines for scoring/interpretation" below to see where your sleep difficulty fits.

For each question, please CIRCLE the number that best describes your answer.

Please rate the Current (I.e. Last 2 weeks) Severity of your insomnia problem(s).

Insomnia problem	None	Mild	Moderate	Severe	Ver severe
1- Difficulty falling asleep	0	1	2	3	4
2- Difficulty staying asleep	0	1	2	3	4
3- Problems waking up too early	0	1	2	3	4
4- How satisfied/dissatisfied are you with your current sleep pattern?					
Very satisfied	Satisfied	Moderately satisfied	Dissatisfied	Ver dissatisfied	
0	1	2	3	4	
5- How noticeable to others do you think your sleep problem is in terms of impairing the quality of your life?					
Not at all Noticeable	A Little	Somewhat	Much	Ver much noticeable	
0	1	2	3	4	
6- How worried/distressed are you about your current sleep problem?					
Not at all Worried	A Little	Somewhat	Much	Ver much worried	
0	1	2	3	4	
7- To what extent do you consider your sleep problem to interfere with your daily functioning (e.g. daytime fatigue, mood, ability to function at work/daily chores, concentration, memory, mood, etc.) Currently?					
Not at all interfering	A Little	Somewhat	Much	Ver much interfering	
0	1	2	3	4	

Guidelines for scoring/interpretation:

Add the scores for all seven items (questions 1+2+3+4+5+6+7) = _____ your total score

Total score categories:

- 0-7 = No clinically significant insomnia
- 8-14 = Subthreshold insomnia
- 15-21 = Clinical insomnia (moderate severity)
- 22-28 = Clinical insomnia (severe)

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For each muscle group do the next as follow:

- Foot: Curl your toes tightly.
- Lower leg and foot: Pointing your feet and toes down to the floor.
- Thigh or entire limb: Pointing the toes upward toward the ceiling.
- Buttocks: Squeeze your buttocks.
- Stomach: Suck your stomach in.
- Back: Arching your lower back.
- Shoulder: Bring your shoulders up toward your ear and squeeze.
- Hand: Clench your fist.
- Arm: Tighten your biceps by drawing your forearm up towards your shoulder and “make a muscle”, while clenching fist.
- Face and mouth: Clench your eyelids and purse your lips tightly.

Results

1- Demographic characteristics among the study population:

The range of patients’ ages was 40 years to 65 years, and this range matched the inclusion criteria of age in the study for both groups. The box-plot described that 50% of patients’ ages in control group ranged from 48 to 63 years with a median of 56 years, while the study group showed 50% of patients’ ages ranged from 47 years to 64 years with a median of 57 years.

2- The clinical data presentation of the patients in the study:

The probability values (*p*-value) within and in-between groups were measured to test the significance and it came as follow, the *p*-value within the study group when comparing pre-intervention insomnia severity index score with post-intervention insomnia severity index score was (*p*-value = <0.0001**) which indicates rejection of the null hypothesis and accepting the alternative hypothesis and it means that progressive muscle relaxation-technique has a significant effect in reducing insomnia severity index score and managing insomnia for people who got COVID-19.

On the other hand, the *p*-value within the control group when comparing pre-intervention and post-intervention insomnia severity index score was (*p*-value = 0.07) which indicates any improvement in insomnia severity index score could be happened by chance.

The previous graph is a simple way to demonstrate insomnia severity index scores in the whole study for all patients. The X axis indicates patients IDs in the study while the Y axis indicates insomnia severity index scores in patients.

The upper line charts indicate post-intervention insomnia severity index scores for both groups while the lower line charts indicate pre-intervention insomnia severity index scores for both groups with the red line charts for control group while the gray line charts for study group.

Table (1): Descriptive statistical characteristics among all cases study groups.

Both groups age	
Mean ± SD	54.85±7.63
Median	57
Range	(40-65)

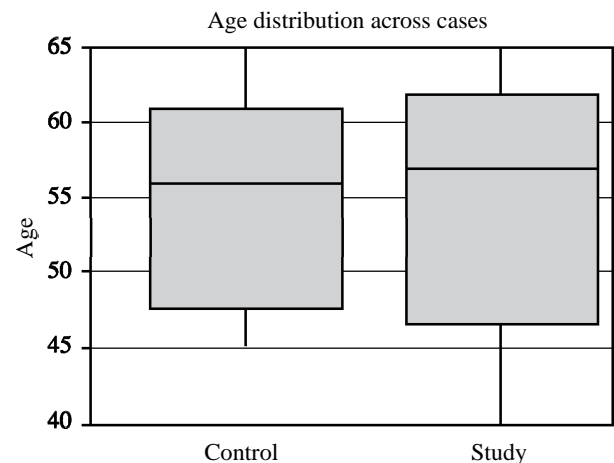


Fig. (1): Box-plot describe Age distribution across all cases of control and study group.

Table (2): Shows Insomnia severity index score amongst both groups.

	Pre-intervention	Post-intervention	<i>t</i> statistics	<i>p</i> -value
<i>Insomnia score:</i>				
Study			-5.5	<0.0001**
Control			-1.9	0.07
<i>p</i> -Value	0.026**	0.63		
<i>Mean ± SD:</i>				
Study	9.95±3.2	6.8±2.04		
Control	7.95±2.14	7.1±1.94		
<i>Median:</i>				
Study	9	7		
Control	8	6.5		
<i>Range:</i>				
Study	(3-16)	(3-11)		
Control	(4-12)	(5-12)		

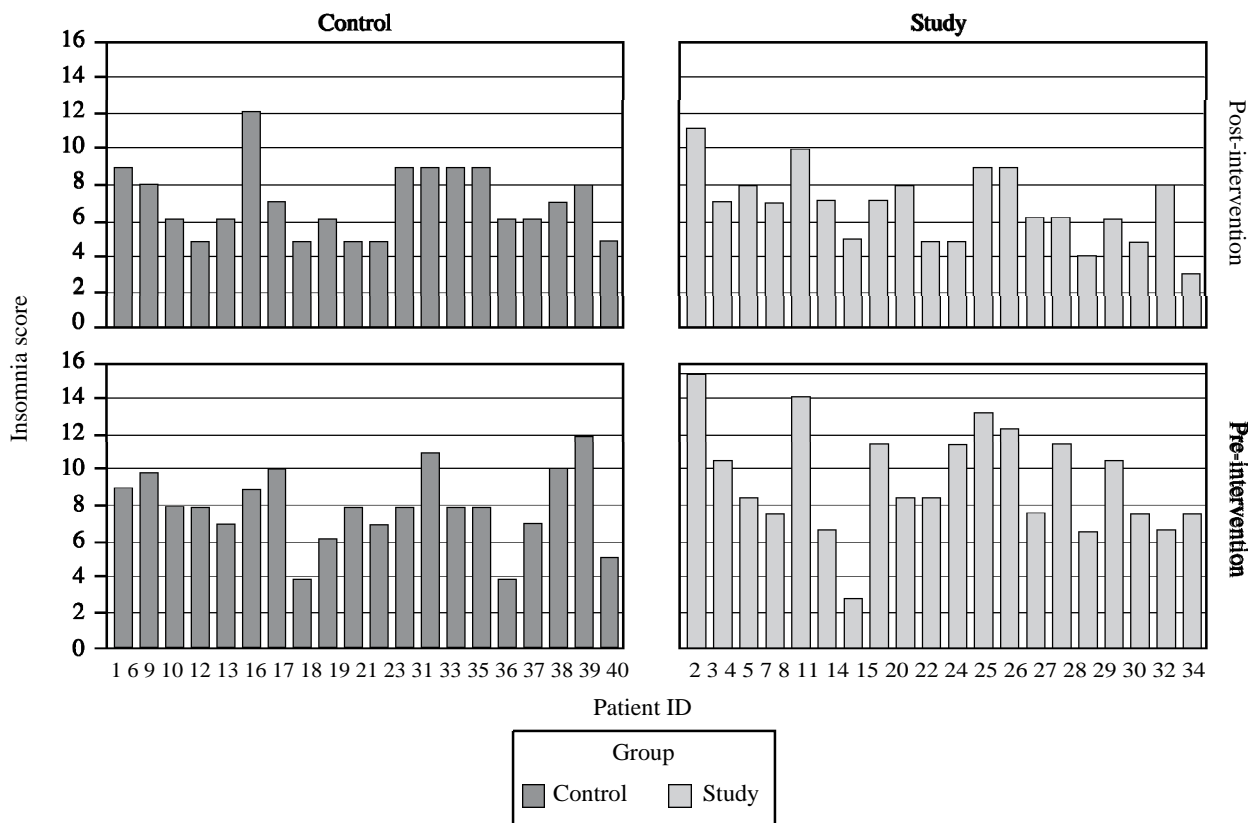


Fig. (2): Showing insomnia severity index scores in both groups.

Discussion

All descriptive statistical factor was analyzed to measure mean, SD, median, range and *p*-value of the total score of ISI scale for all patients in both groups.

p-value of for the total insomnia severity index score for all patients when comparing control group with study group scores, it came as (*p*-value = <0.0001) and it meant that PMR had statistically significant effect in management of insomnia for post COVID-19 patients.

Idris and Astarani stated that progressive muscle relaxation had effect on insomnia in elderly patients This study states that non-pharmacological therapy of progressive muscle relaxation therapy can be a nurse’s independent action in providing nursing care to patients, especially in elderly patients who experience insomnia [21].

Mirzanah stated that Progressive muscle relaxation could be given alone or in combination with cognitive behavioral therapy. It also has been proven to improve sleep quality among patients with chronic diseases regardless their ages. Procedures in progressive muscle relaxation vary, but all studies reported significant improvements on sleep quality. Progressive muscle relaxation significantly improves the sleep quality among patients with chronic diseases [22].

Conclusion:

Progressive muscle relaxation has clinically and statistically significant effect in managing insomnia in people who got COVID-19.

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تأثير ارتخاء العضلات التدريجي على اضطراب النوم «الأرق» لدى الأشخاص المصابين بفيروس كوفيد-١٩

في ديسمبر ٢٠١٩، أبلغت العديد من المستشفيات في مدينة وهان عن مجموعة من المرضى الذين يعانون من نوع مختلف من الالتهاب الرئوى مجهول السبب. وكانت أعراضهم تشبه جائحة السارس عام ٢٠٠٣ في بعض النواحي. وبعد ستة أسابيع، منظمة الصحة العالمية أعلنت ذلك المرض الفيروسي الجديد وباءً عالمياً يطلق عليه اسم كوفيد-١٩.

عندما يتحدث مريض مصاب، أو يعطس، أو يسعل، تتكوّن قطرات الجهاز التنفسي وتنتشر بين الأشخاص ضمن مسافة ١-٤ أمتار مع فترات حضانة تتراوح عادةً من ٢ إلى ١١ يوماً. وكانت الأعراض الأكثر شيوعاً هي الحمى والسعال، وضيق التنفس، والتهاب الطلق. والأعراض الأقل شيوعاً هي فقدان حاسة التذوق أو الشم، والدوار، وألم في الصدر.

لقد تعرض الناس لتغيرات حادة نتيجة حالة عدم اليقين التي فرضها الوباء، والتي كان لها تأثير على تفاعلاتهم الاجتماعية، وعملهم، وتعليمهم، وتمارينهم البدنية، وبالطبع نمط نومهم. تظهر الدراسات حول الأرق وكوفيد-١٩ ارتباطات كبيرة بمعدل انتشار يتراوح بين ٣٦ إلى ٨٨٪، وهو أعلى بكثير من معدل انتشار الأرق المقدر بـ ١٠ إلى ٤٠٪ بين عامة السكان.

تهدف هذه الدراسة إلى معرفة تأثير استرخاء العضلات التدريجي على اضطرابات النوم «الأرق» لدى الأشخاص المصابين بفيروس كوفيد-١٩. وقد أجريت التجربة على ٥١ مريضاً، انسحب ١١ منهم ولكن أكمل ٤٠ منهم الدراسة وتم تقسيمهم إلى مجموعتين متساويتين. وكانت أدوات التقييم هي مقياس شدة الأرق. تلقت مجموعة الدراسة استرخاء العضلات التدريجي لمدة أسبوعين ٥ مرات في الأسبوع بينما كانت المجموعة الضابطة تحت الملاحظة فقط. أجريت هذه الدراسة في مستشفى الأمراض الصدرية بنى سويف خلال عام ٢٠٢٣.

الاستنتاج: استرخاء العضلات التدريجي له تأثير مهم سريريًا وإحصائيًا في علاج الأرق لدى الأشخاص الذين أصيبوا بكوفيد-١٩.