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The Effect of Combined Physical Exercise Program on Quality of Sleep in Physiotherapy Students

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ABSTRACT:

BACKGROUND: The physiological condition of unconsciousness known as sleep is controlled by homeostatic mechanisms. We spend almost one-third of our lives asleep. Sleep is crucial for maintaining healthy cognitive and physical processes, removing cellular toxins, preventing disease, and healing the body and mind [1].

AIM: The purpose of the study is to determine how far the screen time is affecting the quality of sleep in young individuals and how physical activity acted as a mediating factor in regulating the sleep wake cycle.

METHODOLOGY: This experimental study determines the possible effect of excessive screen time in disturbing the sleep wake cycle. By analyzing the extent of smartphone influence in the quality of sleep, the appropriate intervention is given.

RESULT: A high rate of prevalence is detected for those having sleep disturbances. Out of 136 participants, 43 were found to have a altered sleep pattern. 31.61% have sleep deficits due to various reasons. After giving the intervention, it was founded to have a great impact in the students and their quality of sleep.

CONCLUSION: There was an massive change in the quality of sleep and the students came to know the adverse effects of smartphone influence in the sleep wake cycle.

Keywords: Sleep Wake Cycle, Screen Time, Exercise, Music Assisted, Physiotherapy Students

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INTRODUCTION

Human sleep is characterized by a loss of consciousness and a state of complete inertia while lying flat on the back with closed eyelids. For sleep to start and last, ascending arousal mechanisms must be suppressed from being active. Circadian rhythm sleep-wake disorder (CRSWD) is a term used to describe sleep-wake abnormalities brought on by endogenous circadian system disruptions or desynchronization between internal and external sleep-wake cycles. Patients with CRSWD typically have chronic daytime sleepiness and/or insomnia, which limits their

ability to do daily tasks [2]. There are many elements that affect how much and when people sleep, as well as the structure of their sleep (the stages they go through). The environment, circadian rhythms, and quantity of awake time are significant ones. The data that are currently available for this age group (10 to 17 years) are primarily dominated by the observation that they tend to go to bed much later in the evening especially if they have access to television or smart phone. They spend a lot of time in bed on the weekends to make up for missing sleep. The melatonin rhythm is phase-delayed on the weekends as well as throughout the week [3].

The amount and timing of sleep in college students is frequently inconsistent, and many of them have severe sleep deficits. Short sleep duration in adults has been linked to psychiatric disorders, metabolic disorders, such as obesity, diabetes, and cardiovascular disease, as well as cognitive impairments in adults, including slower reaction times and reduced cognitive function.

There is a lower amplitude light rhythm in irregular sleepers. Regular snorers sleep later and sleep more during the day. The patterns of light exposure in irregular sleepers predict a delayed initiation of melatonin secretion [4].

The majority of teenagers and 30% of toddlers, preschoolers, and school-age children get insufficient sleep as a result of the extensive use of portable electronic devices and the normalizing of screen media devices in bedrooms [5] [6] [7]. Studies indicate that evidence-based techniques can enhance sleep through suggestions for sleep-friendly screen use and other takeaways for families and professionals [7]. The usage of screen media can cause children and adolescents to delay going to bed in order to continue watching television or other forms of entertainment [8] [9] [10]. Time lost while using a screen-based gadget is time that could have been spent sleeping. When screens are used at night, when sleep is most likely the activity being directly offset, this time-displacement process is more potent [11]. It is time to update the standards for healthy media usage and include age-specific recommendations for the quantity and timing of electronic media [12].

It has been reported that engaging in physical activity can help treat sleep issues. Physical activity may enhance both the quantity and quality of sleep, according to studies on healthy adults. Physical therapy is also thought to be a potent non-pharmacological treatment for sleep problems in neurological conditions, with few side effects and good effects on both motor and non-motor functioning. Physical therapy activities can help neurological patients with sleep difficulties, but they are frequently overlooked in traditional neurorehabilitation programs [13].

Physical activity is one of the healthy behaviors that PTs are advised to know how to promote because it leads to numerous known health advantages. Physical activity is one of the healthy behaviors that PTs are advised to know how to promote because it leads to numerous known health advantages. Exercise had a marginally positive effect on self-reported sleep quality, reduced usage of sleep medicine, and shortened sleep latency [14].

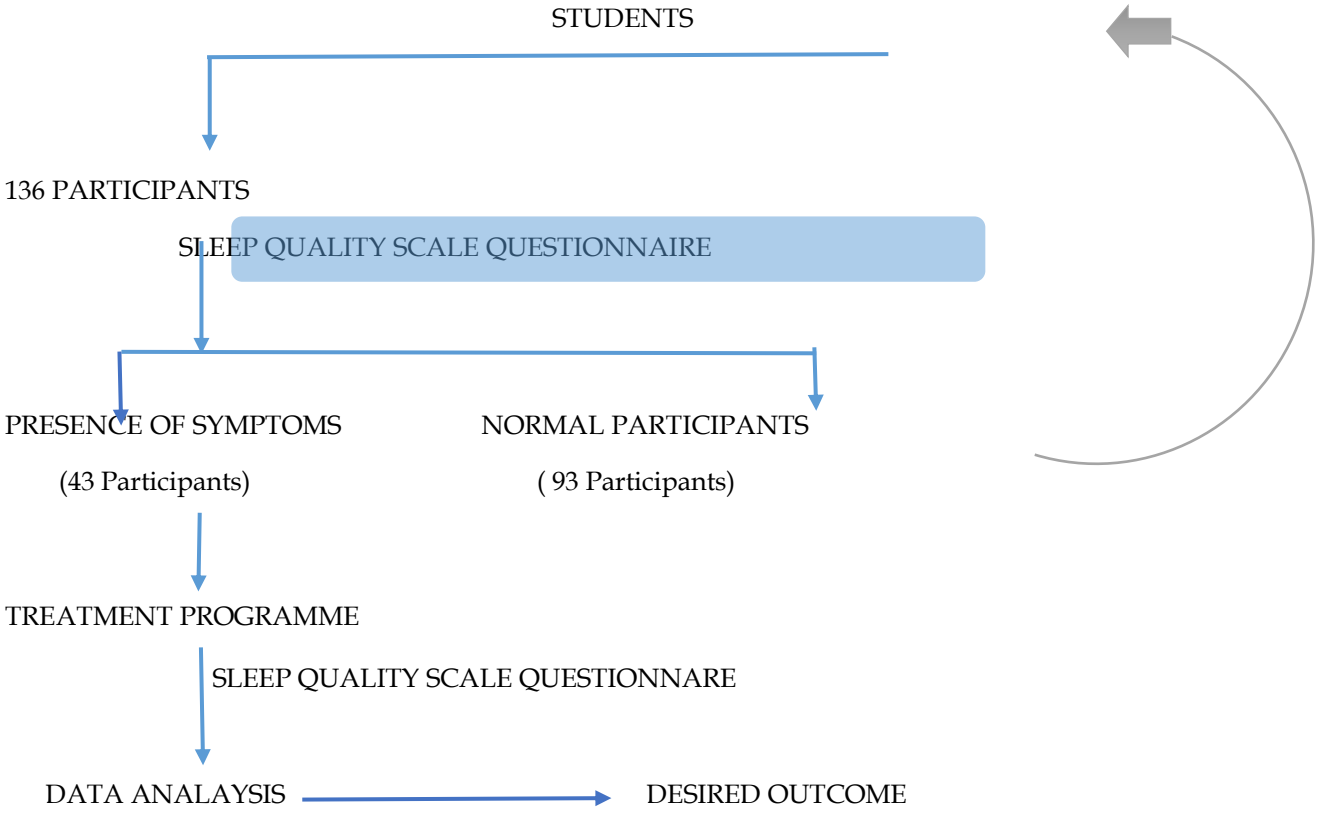
AIM:

- To find the prevalence sleep lacunas among college students
- To find out the effect of physiotherapy rehabilitation program on improving the quality of sleep.

METHODOLOGY

It is a cross- sectional experimental study with a number of 136 students from Department of physiotherapy, Sri Balaji Vidyapeeth. The inclusion criteria were students aged between 17 to 23 of either gender and with significant sleeping problems, frequent headache and those who volunteer to participate in the study through their consent. The exclusion criteria were participants who does not fall on the desired age group and students with cardiac problems, neurological disorders and unstable patients. Once after the screening process of the samples, all the samples were explained about the study and the informed consent were obtained. The participants were given with the Sleep Quality Scale Questionnaire and asked to respond to it. Through their response the

prevalence is inferred among the selected participants. For the selected 43 samples who fall under the desired category the combined physiotherapy programme was given assisted with music. After the treatment sessions, again the questionnaire is given to the samples in order to show the effectiveness of the physiotherapy technique.



TREATMENT PROGRAMME

Following the students' completion of THE SLEEP QUALITY SCALE QUESTIONNAIRE, we evaluated the severity, prevalence, and level of sleep deficits based on the questions and symptoms**.** For a period of six weeks, they received the intervention model in three days in a week sessions. The intervention programme consists of Aerobic exercises, relaxation training, and simple body awareness exercises. In this study, music is used during exercise to promote calmness and induce sleep.

COMBINED PHYSIOTHERAPY PROGRAMME:

Treatment Protocol

- Breathing exercises
- Interactive session
- Military sleep method
- Relaxation techniques assisted with music
- Home advice session

BREATHING EXERCISES:

Some of the earliest and most basic breathing exercises have been shown to have a variety of therapeutic effects on the body and mind. The sympathetic component of hyper-arousal, which may contribute to insomnia and is mostly caused by the hectic pace of modern life, may be diminished by slow, deep, regular breathing. Long-term relief from sympathetic over-arousal may be achieved with regular calm breathing exercises. Additionally, it has been demonstrated that slow, deep breathing causes the generation of melatonin, which not only encourages relaxing [15].

- Abdominal breathing
- 4-7-8 Breathing routine
- Body scan technique
- Counting while breathing
- Breathing imagery

MILITARY SLEEP METHOD

The military sleep method involves the following steps:

1. **Breathe deeply**
2. **Relax your face**
3. **Drop your shoulders and arms**
4. **Work your way downward**
5. **Clear your mind**.

Practicing this technique for six weeks in a row is supposed to help the individual master it, so one can fall asleep in under two minutes.

RELAXATION TECHNIQUES:

Progressive muscle relaxation involves gradually tensing and relaxing muscles throughout the body, with the relaxation phase concentrating on the muscular release. You can practice progressive muscle relaxation on your own or with a narrator's help.

- **Step 1**: First, take a seat or lay down comfortably. The area should contain as few distractions as possible.
- **Step 2**: Tighten the foot muscles and curl the toes under starting from the feet. Hold for five seconds, then gradually let go for ten. Pay close attention to the tension being released and the sensation of relaxation as you release.
- **Step 3**: is to contract the lower leg muscles. Hold for five seconds, then gradually let go for ten. Pay close attention to the tension being released and the sensation of relaxation as you release.
- **Step 4**: Contract the hip and buttock muscles. Hold for five seconds, then gradually let go for ten. Pay close attention to the tension being released and the sensation of relaxation as you release.
- **Step 5**: Contract your chest and stomach muscles. Hold for five seconds, then gradually let go for ten. Pay close attention to the tension being released and the sensation of relaxation as you release.
- **Step 6**: Contract the shoulders' muscles. Hold for five seconds, then gradually let go for ten. Pay close attention to the tension being released and the sensation of relaxation as you release.
- **Step 7**: Contract your facial muscles, such as by tightly closing your eyes. Hold for five seconds, then gradually let go for ten. Pay close attention to the tension being released and the sensation of relaxation as you release.
- **Step 8**: Make a fist by contracting the hand's muscles. Hold for five seconds, then gradually let go for ten. Pay close attention to the tension being released and the sensation of relaxation as you release.

STATISTICAL ANALYSIS

PREVALENCE

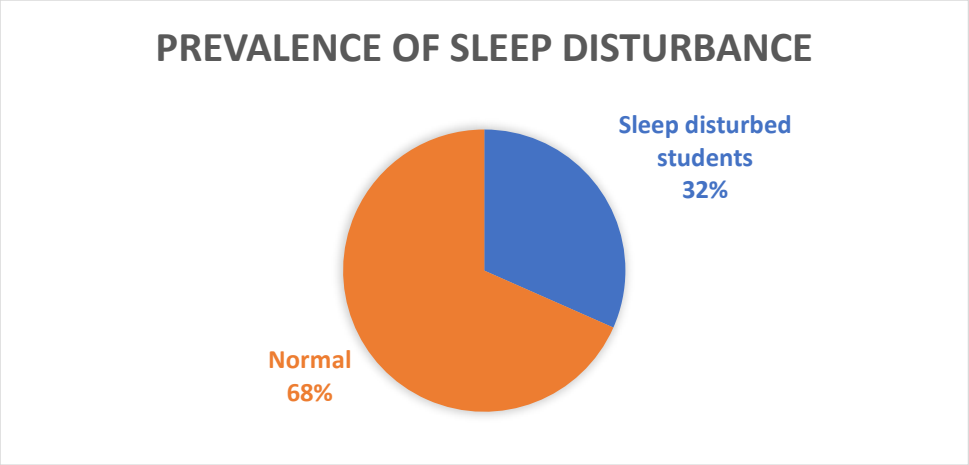


Fig: 1 – Pie chart describing the prevalence of students with sleep disturbances due to smart phone usage,

This shows the prevalence of students with sleep disturbance among the 136 participants. It was found that among 136 participants 43 were presented with altered sleep pattern and remaining 94 were normal. The percentage of students with altered sleep pattern was 31.61% and the normal individual constitutes 68.38%.

Pre – Management Analysis

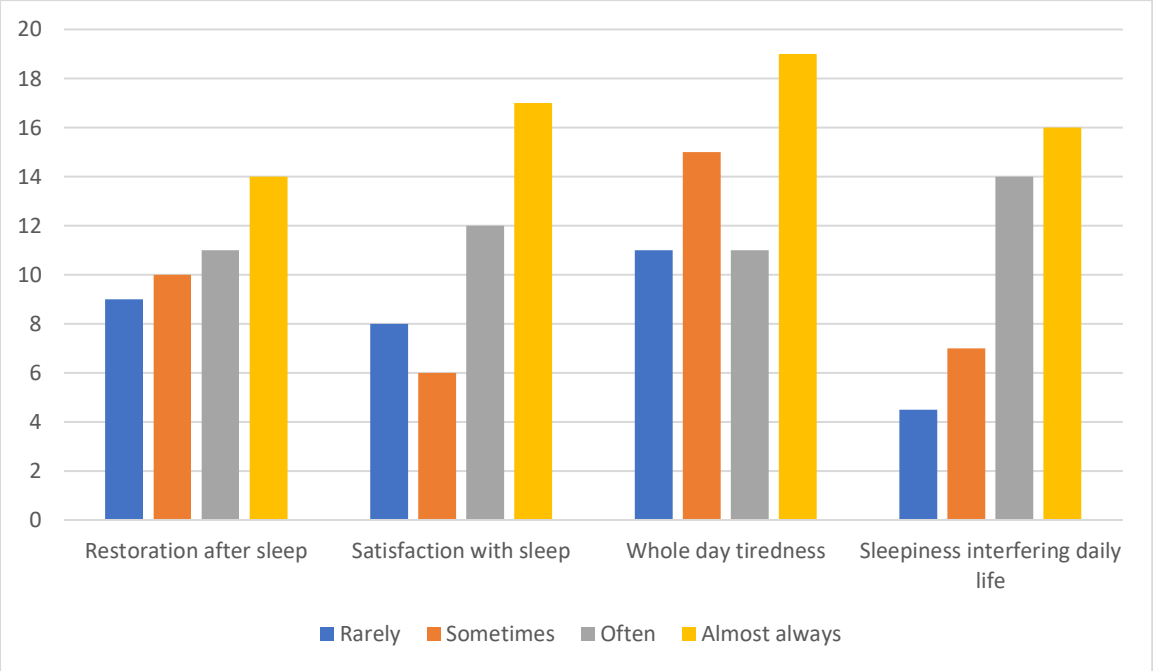


Fig 2: Graphical representation of the pre test analysis with sleep quality scale. All the 43 recruited participants were given with the questionnaire and asked to respond to it. All the values show that their sleep quality is affected to a considerable extent.

Post – Management analysis:

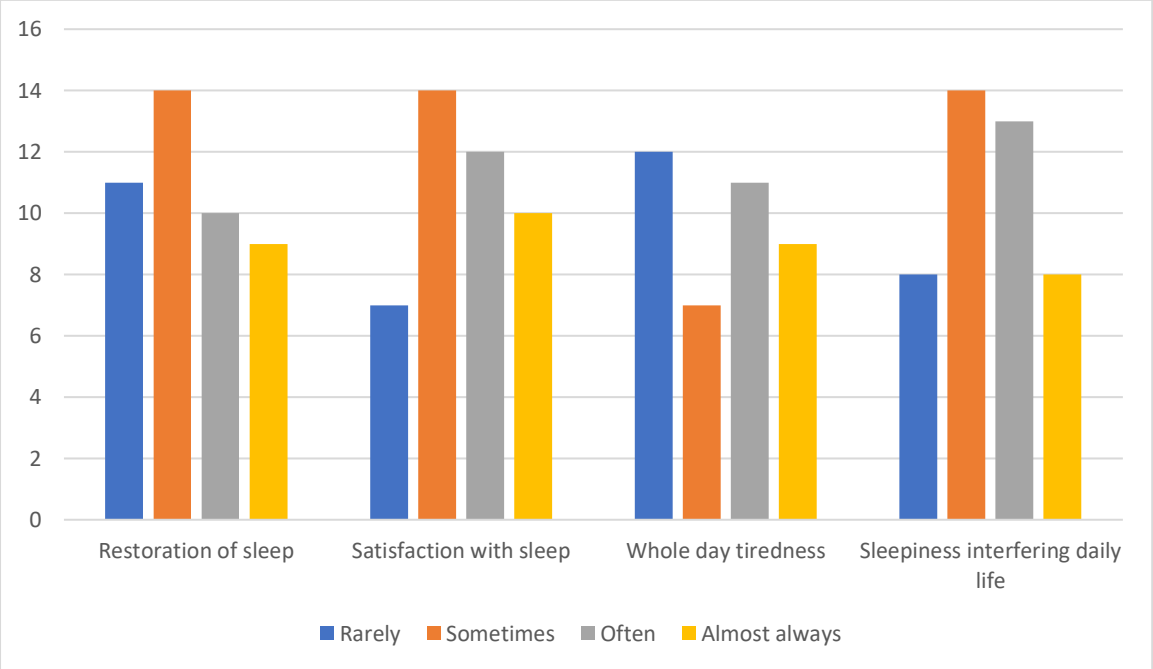


Fig 3 – Graphical representation of the post – management analysis.

After the management, once again the questionnaire is given and the data obtained were compared. And this shows a significant improvement in the quality of sleep.

RESULT ANALYSIS:

TABLE 1: ANALYSIS OF PRE AND POST – TEST

COMBINED PHYSIOTHERAPY INTERVENTION	MEAN	STANDARD DEVIATION	P VALUE
PRE – TEST	22.3724	1.75	0.037
POST - TEST	23.6404	2.39	

TABLE 1: The pre and post - test data were compared and the mean and standard deviation is compared with both data and interpreted as 22.3724 ± 1.75 and 23.6404 ± 2.39 respectively. The P – value is interpreted as 0.037 which is found to be significant.

STUDY VARIABLES

SLEEP QUALITY SCALE– To determine the efficiency of sleep and severity of sleep disturbances.

S. No	Name of the dependent / independent variables	Scale of measurement (Quantitative / qualitative)
1	SLEEP QUALITY SCALE	Quantitative

RESULT:

From this study a high prevalence of disturbed sleep is detected among college students due to various reasons.

- The prevalence of college students with sleep disturbance was detected as 32 % . Out of 136 individuals, 43 individuals have issues in sleep quality.
- After giving an appropriate combined physiotherapy treatment to induce sleep, there was a massive improvement in the quality and satisfaction level after the sleep among college students. The p – value = 0.037 which is defined as significant and is less than 0.05.

DISCUSSION:

Students who fall under the predominance category are given with a combined physiotherapy intervention. The military technique along with breathing exercises cause a soothing effect in the minds of the students. The relation techniques assisted from music induces relaxation and calmness in nature.

Sleep is essential to both physical and mental well-being as well as learning and practice. It is an integral aspect of human health and existence. Excessive sleep, frequent short-term sleep, staying up late, and early wake-up times have all been linked to negative effects on learning, academic performance, and neurobehavioral processes [16,17,18].

Previous studies have indicated that the quantity of sleep reported by individuals as delayed or inappropriate sleep, waking up too late, especially at weekends and daytime sleepiness is associated with compromised academic performance in children and adults.[2] Some studies have emphasized the relationship between delayed starting time of classes and academic success [19].

Severe tiredness and poor academic performance have been linked to decreased nightly sleep or changed sleep habits. In a research, those who got enough sleep compared to those who didn't used creative solutions to challenging arithmetic problems twice as frequently. When students with insufficient sleep were compared to those who

got enough sleep, the odds of them failing their classes were as high as one or more years.. Accidents at work and in cars are more likely to occur among people who sleep less and during the day [20,21].

Research has been done to determine whether or not sleep disorders affect academic performance. To compare the amount and quality of sleep, a certain sample of pupils who were either accomplished or not was chosen. But there was not a discernible difference between the two groups [22].

Another study found that the only independent predictor of academic success was daytime tiredness, not sleep duration or quality. In another study that was comparable to this one, academic success was linked to the duration of sleep that a person takes to fall asleep and wake up, rather than the total amount of sleep that a teenager with a dynamic mind would get [23,24].

In another study that was comparable to this one, academic success was linked to the duration of sleep that a person takes to fall asleep and wake up, rather than the total amount of sleep that a teenager with a dynamic mind would get. There are other research that show an inverse relationship between sleep disturbance and academic achievement, in contrast to others that highlight little or no association. The amount of sleep at night and the degree of daytime sleepiness were related to academic performance in a study involving 491 first-, second-, and third-year medical students.

In a related study, medical students' academic performance was negatively impacted by sleep deprivation at night, staying up late, and being sleepy throughout the day. Specifically, sleep problems can have a detrimental effect on academic performance, creating a vicious cycle. When considered collectively, the research indicate that the majority of students have been shown to have poor quality sleep in most studies. Therefore, it is important to proceed cautiously when drawing 7conclusions about the association between frequent sleep disturbance and academic achievement. This is because a variety of factors, such as family size, social media reliance, social network addiction, evolutionary process, evolutionary stage of life, supplement and vitamin intake, and social concerns, can impact academic success. In research, these unrelated variables [25,26,27].

CONCLUSION

From this study, it is found that the combined physiotherapy exercise program with relaxation techniques and military sleep method had a significant improvement in the sleep quality among physiotherapy students.

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