



Research articles

Efficacy of brain gym exercises for improving quality of sleep in physiotherapy students

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ABSTRACT

Human health has suffered a lot as a result of changing times and technological advances. Poor sleep quality affects people of all ages, non-pharmacological solution is increasingly becoming a requirement. Exercises in the brain gym are a good contender in the competition. However, there is still more work to be done before a definitive conclusion can be made about its effectiveness as an intervention. This study aims to evaluate the sleep disturbance and effect of brain gym exercises in improving sleep in the undergraduate physiotherapy students. Here's idea we suggest to evaluate the sleep disturbance and effect of brain gym exercises as an intervention with duration of practice as 5 days in a week with a section of 25 minutes which is completed in one hour. Insomnia Rating scale is used to get the desired population for giving the intervention and Pittsburgh Sleep Quality Index (PSQI), which has 86.5% specificity and 89.6% sensitivity. The duration of study will be six months. The study design is pre and post interventional study. In this Hypothesis we aim to assess the efficacy of brain gym exercises for improving quality of sleep and treating mild to moderate insomnia. Brain gym exercises are already proved to improve the attention, memory, cognition and provide relaxation. The expected outcome includes detection of sleep disturbances and improvement in sleep quality which will be evaluated using PSQI. Data analysis will be done using students paired t test and conclusion of the study will be published after the results are analyzed.

Keywords: Sleep, Brain gym, Insomnia, PSQI, Insomnia Severity scale.

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INTRODUCTION

Changing times and technological advances have taken its toll on human health. The overuse of technology has significant effect on mental health. Sleep is closely interlinked with mental and emotional health. Nearly 60% of all undergraduate students are found to suffer from a poor sleep quality, and 7.7% meets the criteria for insomnia. [1]. Insomnia is a sleep disorder in which the person has trouble in falling or/and staying asleep. Insomnia can be a major contributing factor in initiating and worsening of mental health. [2]. According to the recent studies lack of sleep can affect the person mentally as well as physically. People with insomnia have reported a lower quality of life compared with the one sleeping well. [3].

Sleep deprivation is found to affect the immune function, brain maturation, development of the body, metabolic process and cognition. Sleep maintains normal homeostasis of the body [4]. Thus proper amount of sleep is important for active functioning of the brain and the body. [5]. So a non-pharmacological solution is increasingly becoming a requirement. [6]. Exercises in the brain gym are a good contender in the competition. However, there is still more to be done before a definitive conclusion can be made about its

effectiveness as an intervention.

Dennison and Dennison invented educational kinesiology which is another name for brain gym exercises. It was developed in the 1970 and it consists of series of movements that stimulate the brain, encourage the neurological reprogramming and aid whole brain learning. [7].

METHODOLOGY

The Institutional Ethics Committee (IEC) Clearance will be obtained prior. The participants (n=65) will be well informed about the aim of the research and will get informed consent. The participants will be allocated based on the inclusion criteria. Then they will be given pre and post interventional assessment using PSQI scale, readings will be recorded and exercise intervention will be given for the month. After the result has been obtained, data collection and statistical analysis will be done then the conclusion will be given and research paper will be created according to the study and published. It is a quasi-experimental study of intervention type on Physiotherapy Students with mild to moderate Insomnia for 6 months. The inclusion criteria will be age group 18 to 24,

physiotherapy undergraduate students, and moderate severity insomnia (15-24 score on Insomnia Severity Index). The exclusion criteria will be students with migraine, students who are diagnosed with psychological disorder and undertaking Psychotic Drugs, and having a history of Neurosurgery and cognitive damage.

Sample size consideration

This study protocol will be investigating the impact of brain gym exercises on mild to moderate insomnia patient in improving quality of sleep. The number of patients participating in the study is determined by SPSS 27.0 V and Graph pad prism 7.0 V software using data of Samhita Panda et al in his study of Sleep related disorders among healthy population. Four additional participants will be recruited to maintain sample size in the event of dropout or problem with data collection. We presume that 65 subjects will complete the study.

Intervention design

Here's idea we suggest to evaluate the sleep disturbance and effect of brain gym exercises as an intervention with duration of practice as 5 days in a week with a session of 25 minutes which is completed in one hour. Insomnia Rating scale is used to get the desired population for giving the intervention and Pittsburgh Sleep Quality Index (PSQI), which has 86.5% specificity and 89.6% sensitivity. This study will be conducted in Ravi Nair Physiotherapy College, Sawang, Meghe, Wardha. The duration of study will be six months. The study design is pre and post interventional study.

Brain gym exercise protocol

1. Spot Marching It will be done in the beginning as warm up, in which subject stands straight and lifts both the legs continuously above the ground for the time duration of one minute. ^[8].
2. Hook Ups helps in mind and body relaxation. The exercise is done in standing with crossing the hands and keeping it near the chest and taking a deep breath with eyes closed and feet interlocked just like hands. The participant is advised to keep on breathing deeply. It is to be done for duration of 2 minute (5 sets of 8 Repetitions). ^[9].
3. Positive Points helps to improve memory and reduce stress levels. The subject is instructed to breathe deeply and gently press the eyeballs with eyes closed for duration of 1 min (10 Repetitions). It also stimulates the lateral and side to side coordination. ^[10].
4. The Active Arms involves reaching up above the head with one arm that lengthens the muscles from ribcage. Support it around the elbow with another arm, now we need to activate the arm isometrically for few seconds. This is to be carried out for the duration of 5 min. This helps in activating brain for diaphragm relaxation , improves hand eye co-ordination and tool controlling skills. ^[11] .

5. Earth buttons helps in improving mental alertness and whole-body orientation. Earth buttons are situated on the body's front midline, which serves as the central point of reference for all activities involving both sides of the body. Rest two fingers of one hand on the lower lips and place the palm of other hand over the navel to do this. Breathe deeply while looking at the floor, look at ceiling and floor gradually just by moving the eyes. It's to be performed for 2 minutes (10 Repetitions).
6. The Energy Yawn is a perfect exercise to improve oxygenation. It can be performed in standing or sitting. Place the index and middle finger over the jaw muscles on both the sides, rub the jaw muscles gently like massaging but with adequate pressure, then open your jaw in a long yawning motion then gently close the jaw. This is to be performed for 1 minute (10 Repetitions).
7. A Lazy 8's helps in boosting eye muscle control, balance and concentration. The participant is instructed to extend the hand and make a figure of eight horizontally in front. Duration is for 1 minute (10 Repetitions).
8. Gravity Glider works by improving the blood and oxygen flow. It boosts confidence and improves stability. The participants is instructed to sit comfortably with crossing the ankles and keeping the knees relaxed, Bend forward to reach out in front and letting the arms glide down while exhaling and up with inhaling. Change the position of legs and then repeat. Duration of this exercise will be 5 minutes (10 Repetitions).
9. Foot flex, this exercise and stretch improves posture and socialization. It also helps in relaxation. Participant will be in sitting position with the ankle of one (right) over the knee of the other leg (left). Placing one hand behind the right knee over the calf, and other hand holding Achilles Tendon. Point and flex the foot for 5 times for 2 minutes while holding both the hands in the said positions.

The Energizer, it helps in improving posture, maintains back muscle tone and spine suppleness, flexibility and relaxation. Sit on the chair with a table in front of you, rest your brow on the table while placing your hands on either side of your head then slowly raise the head until chin points upwards while inhaling deeply. While exhaling tuck down and begin to move the head down. Rest the head on the table for a while and breathe deeply. Repeat it 5 times for the duration of 5 minutes.

Outcome measures

1. Insomnia Severity Index. It is highly reliable and valid scale with 86.1% sensitivity and 87.7% specificity for detecting insomnia.
2. Pittsburgh Sleep Quality Index (PSQI). It's a descriptive Scale with total 7 components that include Subjective Sleep Quality, Sleep Latency, Sleep Duration, Sleep efficiency, Sleep

disturbance, Use of sleep medications, Day time changes. PSQI is valid and reliable measure for evaluating the quality of sleep. PSQI has specificity of 86.5% and sensitivity of 89.6%.^[12].

Table 1. Brain gym exercises with its effects

Brain Gym Exercises	Effects
Spot Marching	Warm-up exercises.
Hook-ups	Helps in mind and body relaxation.
Positive Points	Helps to improve memory and reduce stress levels.
The Active Arms	Helps in activating brain for diaphragm relaxation, improves hand eye co-ordination and tool controlling skills.
Earth buttons	Helps in improving mental alertness and whole-body orientation.
The Energy Yawn	Perfect exercise to improve oxygenation.
A Lazy 8's	Helps in boosting eye muscle control, balance and concentration.
Gravity Glider	Improving the blood and oxygen flow. It boosts confidence and improves stability.
Foot flex	Improves posture and socialization, and also relaxation.
The Energizer	It helps in improving posture, keeps the back muscle toned and the spine supple, flexible and relaxed.

Follow up

All participants will be followed up at 4 weeks after rehabilitation and follow-up record forms will be completed. The time of the last rehabilitation training session will be recorded. When patients drop out of the trial, the reasons for withdrawal will be recorded in detail. Comprehensive and supportive patient communication will be undertaken; patients lost to follow-up because of any reason will be gotten in touch as soon as possible and be followed up within 4 weeks. Data regarding patients withdrawn from the trial will be mentioned

Data management

Data collection and reporting will be performed under the guidance of the chief investigators. Documentation for the analysis will be carefully scrutinized for accuracy. The Excel spreadsheet will be issued to an allocation blinded statistician at the end of the study to perform the required analysis. The trial's data will be stored in a safe, locked storage area with restricted access for later analysis by a biostatistician and the lead researcher. Checklists are used to avoid data from being lost due to inadequate personnel procedures.

Statistical analysis

The SPSS latest version will be used to perform statistical analyses Analysis of variance (ANOVA) will be used to assess the efficacy of brain gym exercise. Individual studies will be checked for homogeneity of the two study groups using the Student's t examination. To determine the impact of two steps, all statistical tests should be performed with a 95 percent confidence interval (p-value 0.05).

DISCUSSION

The study protocol aims to evaluate the sleep disturbances and severity of insomnia in undergraduate students by using Insomnia Severity Index.^[13,14] We hypothesis that there will be improved quality of sleep and reduced insomnia and this outcome will be assessed using PSQI. The research will help to prevaricate the

effectiveness of brain gym exercises on moderate insomniac students and help with strategies involved to induce relaxation and improve quality of sleep. In 2019 Elmeida Effendy , Novi Prasanty, Nurul Utami studied on effects of brain gym on quality of sleep, anxiety in elderly and found that brain gym significantly improves quality of sleep and reduces anxiety in elderly after eight weeks of intervention.^[15] Exercises are proved to act as effective as hypnotic drugs in reducing Insomnia. As reviewed by Dr Jenny Iyo ,that after 4 weeks of exercises, individuals have shown to fall asleep 13 minutes faster and stays asleep for 18 minutes longer after regular exercises.^[16]

Preliminary work in this field primarily which was focused on effectiveness of brain gym as an intervention was carried out by Lucinda Spaulding, Mark Mostert and Andrea Beam. They reported that brain gym exercises has great potential in better learning and scientific understanding how brain functions.^[17]

Several approaches for improving sleep quality are used in clinical practice including relaxation techniques, exercise, acupuncture, and medication but still the brain gym exercises are yet to be included. PSQI is selected as it's a descriptive Scale with total 7 components that include Subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medications, day time changes. it helps to entirely evaluate the patient's quality of sleep.

CONCLUSION

The study protocol will be concluding on the sleep disturbances and severity of insomnia in undergraduate students by using Insomnia Severity Index. Also, it may show significant improvement in the quality of sleep and reduced insomnia and this outcome will be assessed using PSQI.

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