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A COMPARATIVE STUDY ON BOX BREATHING TECHNIQUE TO IMPROVE THE QUALITY OF SLEEP IN FIRST YEAR MEDICAL STUDENTS.

Physiology

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ABSTRACT

Aims & Objectives:- We have taken up this study to find out the effect of box breathing on sleep disturbances in first year medical students of our institution. **Materials & Methods:-** 60 students were selected based on inclusion & exclusion criteria as participants after obtaining their voluntary consent. 30 formed intervention group and remaining 30 were control group.Data was collected in detail after obtaining ethical clearance from the institution. Sleep Quality Scale was used. Box breathing technique was taught to study group participants and were instructed to perform box breathing once in the morning and at evening. This technique was not taught to the control group. **Statistical analysis:-**Univariate data analysis was used for participant's age and gender. Bivariate analysis was used to identified the value of the difference between sleep disturbances before and after techniques box breathing the Shapiro wilk test was utilized in this study. **Results:-** we observed a statistically significant differences between the study and control groups for the sleep disturbances in first year medical students with a p-value of 0.00 (p> 0.05). **Conclusion:-** study showed a statistically significant improvement in sleep quality in the study group compared to control group.

KEYWORDS

INTRODUCTION:-

The life of first year medical students is very stressful. They have to adapt to new environment, food variation and learn vast syllabus in one year duration. Most of the students struggle to adjust with their sleep pattern and food. Sleep disturbances can lead to daytime fatigue, mood changes, cognitive impairment and increased risk of falling sleep during day time and poor sleep quality, which can cause mental illness. Long term sleep issues result in medical diseases. As a result, it's critical to pay attention to sleep quality and how it relates to wellbeing[1]. Some of the students even remain absent from their classes just to complete their sleep. Medicines are available to manage sleep disorders but they all have side effects. So the non -medical interventions are preferred like reduce intake of tea, coffee or any form of tobacco consumptions. They are advised to follow healthy life style, perform breathing exercises and involve in sports or other physical activities.

There is a form of deep breathing technique used by military and navy people to reduce pain intensity, lower stress, improve mood and to fall asleep quickly. It also helps in generalized anxiety disorder, panic disorder and post-traumatic stress disorder. Some studies shows that breathing exercises reduce the risk of Alzheimer's disease.[2] whenever any student is under anxiety or stress, we ask them to relax and take a deep breath. Box breathing is one of the relaxation techniques, which involves deep breathing and concentrating on relaxing different parts of the body. Stress and anxiety are two known factors that interferes with sleep. Relaxation techniques are effective in overcoming sleep disturbances.

Box breathing is a form of yoga which focus on the breath called as sama vritti pranayama. It is a simple technique that involves inhaling deeply, holding the breath, exhaling and holding the breath again. We hypothesized that box breathing technique would be more effective in reducing anxiety, sleep disturbances and improving well-being. We have taken up this study to find out the effect of box breathing on sleep disturbances in first year medical students of our institution.

MATERIALS AND METHODS:

we conducted this study on first year medical students of AIIMS, Udaipur for a duration of 1 month that is Dec 2021. Total sampling technique was used to find the number of samples in this study.

A total of 60 students were selected based on inclusion criteria as participants after obtaining their voluntary consent. Out of which, 30 formed the intervention group and the remaining 30 were considered as control group or non-interventional group.

Inclusion Criteria: -

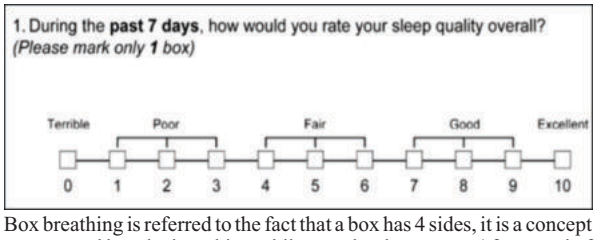
Apparently healthy first year students staying in campus and eating from the same hostel mess with sleep disturbances and willing to participate were considered as study subjects.

Exclusion Criteria:-

subjects on any medication, alcoholics, smokers, tea or coffee addict and not willing to participate were excluded from our study.

The Sleep Quality Scale was used in our study.[2]The data was collected in detail after obtaining ethical clearance from the institution.

The SQS is a self-administered questionnaire that incorporates a discretising visual analog scale (VAS). The questionnaire instructions direct the respondent to rate the overall quality of sleep over a 7-day recall period on a discretising VAS. This scale use a 0-10 scale with a horizontal line that has 11 different number choices whereby the respondent marks an integer score from 0 to 10. The five categories of this scale are scored as: Terrible=0, Poor= 1–3, Fair=4-6, Good=7-9, and Excellent=10. All the participants were instructed to keep in view all the core components of sleep quality when they rate their sleep quality such as the total number of hours of sleep they had and how easy it is to all asleep. Except to go to the bathroom how often they woke up during the night and in the morning how often they woke up earlier than they had to. lastly how refreshing was their sleep.



Box breathing is referred to the fact that a box has 4 sides, it is a concept represented here by breathing while you slowly count to 4 for a total of 4 times that is 4 counts of inspiration, 4 counts of breath holding, 4 counts of expiration and 4 more counts of holding after expiration. The other names of box breathing technique are 4x4 breathing, 4-4-4-4 breathing, equal breathing, four square breathing and square breathing. The box breathing technique was taught to study group participants and they were instructed to perform the box breathing twice daily, once in morning and the other at evening. This technique was not taught to the control group. The control group was instructed to not perform any kind of prayanama or breathing exercises.

Statistical Analysis:-

Univariate data analysis was used for participant's age and gender. Bivariate analysis was used to identified the value of the difference between sleep disturbances before and after techniques box breathing the Shapiro wilk test was utilized in this study.

RESULTS

Table 1:- Frequency Distribution Of Study Participants

Demographic		Study group(n=30)		Control group(n=30)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Age (years)	18-20	21	70%	24	80%
	21-22	09	30%	06	20%
Gender	Male	12	40%	17	56.7%
	Female	18	60%	13	43.3%

The results of our study is in the form of frequency and percentage, a summary of the distribution of sleep disturbances both before and after box breathing techniques is given.

Table 2:- Prevalence Of Sleep Disturbances Among Study Group

Sleep disturbances (n=30)		Frequency	Percentage
Before box breathing technique	Poor	16	53.3%
	Fair	14	46.6%
After box breathing technique	Good	23	76.6%
	Excellent	07	23.3%

According to Table 2, the majority of participants in the study group had poor sleep disturbances as many as 16 respondents (53.3%) prior to receiving the box breathing technique, but after receiving the intervention, there was an increase, with the majority having a good sleep as many as 23 respondents (76.6%).

Table 3:- Prevalence Of Sleep Disturbances Among Control Group

Sleep disturbances (n=30)		Frequency	Percentage
Before box breathing technique	Poor	24	80%
	Fair	06	20%
No box breathing technique	Poor	27	90%
	Fair	03	10%

In Table 3, it can be seen that most of participants in the control group who were not given box breathing intervention before had poor sleep disturbances as many as 24 respondents (80%), and afterwards they still had poor sleep disturbances as many as 27 respondents (90%), which means in this control group they experience an increase in sleep disturbance.

Table 4:- Data Normality Test Results For Study Group And Control Group Before And After Box Breathing Technique.

Variable		Statistics	p- value
Study group (n=30)	Before the Box Breathing Intervention	0.820	0.00
	After the Box Breathing Intervention	0.770	0.00
Control group (n=30)	Before the Box Breathing Intervention	0.752	0.00
	After the Box Breathing Intervention	0.549	0.00

Table 4 shows the results of the Shapiro-Wilk test used to determine whether the data were normally distributed. The p value in the study group before and after the intervention was p = 0.000, or p> 0.05, indicating that the data in the study group are not normally distributed.

Table 5: Normality Test Results Comparison Of The Difference In Value (Δ mean) Of Sleep Disorders In The Study And Control Groups

Study participants [variables]	Statistics	p- value
Study group (n=30)	0.923	0.057
Control group (n=30)	0.441	0.000

Table 5 shows the outcomes of the data normality test by performing the Shapiro-Wilk test. Our results in the study group showed the p-value = 0.05, so p > 0.05, which means that the data in the study group was normally distributed, in comparison to the control group, which had a p-value of 0.05, which means that the data in the control group was not normally distributed.

Table 6:- Comparison Of Differences In Sleep Disturbances In Study Participants Of Both Groups

Study participants (n=60)	difference in value (Δ mean)	p- value
Study group (n=30)	5.28	0.00
Control group (n=30)	0.32	0.00

According to Table 6, the mean difference between the before box breathing technique and after box breathing technique scores was 5.28 for the study group and 0.32 for the control group. There are statistically significant differences between the study and control groups for the sleep disturbances in first year medical students in the year 2021 , with a p-value of 0.00 (p> 0.05).

DISCUSSION:-

Many studies are done in the past on respiratory parameters, sleep disorders and yoga. We took up this study on first year students to help them reduce the anxiety and sleep disturbance in their new environment.

Respiration is one of the control mechanism that functions without consciousness but can be easily controlled voluntarily. Breathing pattern has an effect on heart rate and may be controlled to adjust the state of mind. Thus, managed breathing is a tool to enhance the domain of psychophysiological regulation[3]. Modernization has an impact on our health, especially on our food and sleep. People are now adopting healthy habits like meditation, breathing exercises across the world to get a healthy long life. So many researches are done to find out the physiological and psychological effects of breathing practices[4].

It is said that breathing exercises and yoga practices calm the autonomic nervous system and reduces stress hormones like cortisol in the body, it helps in maintaining concentration, and regulate bodily functions.

Studies done in the past suggests that yogic breathing exercises affect the hypothalamic-pituitary–adrenal axis known as HPA axis or HTPA axis. This HPA axis describes interactions among three difference endocrine glands called the hypothalamus, the adrenal gland, and the pituitary gland. Together, these glands constitute the HPA axis to regulate digestion, the immune system, sexuality, emotions, sleep and mood[(5,6,)].

Box breathing technique is used by military people for stress and sleep regulation. It also improve performance[(7,8,9)].

The box breathing technique helps to relax during stress by regulating breathing that lowers cortisol level and even lower the blood pressure. It even calms the mind. It mainly activating the parasympathetic nervous system.

In our study, we found that maximum number of participants were in the age group of 18 -20 years and female subjects were more in study group and the control group had a high percentage of male participants with sleep problems. This finding is in line with previous studies that have reported a high prevalence of sleep disturbances among the male elderly population. [(10,11)]

In a study by Lu Y et al[12], they investigated the effects of sleep quality in women with sleep disturbances and observed similar results to the study done by Amzal Mortin et al[10]. They reported that breathing exercises significantly improved the sleep quality of women with sleep disturbances. The study also reported that the participants in the intervention group had reduced levels of stress and anxiety, which are known to interfere with sleep.

Simon, Laila in their study observed no statistical improvement in cognitive function and other parameters of the students between study group and control group. In their study they have instructed only single practice session of prayanama. So they could not get any results or variations in physiological or psychological functions. Thus they suggested pranayama can be a powerful tool if practiced on regular basis.

The box breathing technique is an effective, non-invasive, and easily implementable solution for managing sleep disturbance in people suffering from stress and anxiety[14]. Further research is needed to investigate the long-term effects of box breathing technique on sleep quality and to identify the optimal frequency and duration of the intervention.

CONCLUSION :-

Our study done on first year medical student showed a statistically significant improvement in sleep quality in the study group compared

to the control group. The study group reported fewer instances of sleep disturbances and better sleep efficiency. The control group did not underwent any interventions and it was observed that their sleep disturbances worsened. These findings suggest that box breathing may be a useful non-pharmacological intervention for improving sleep quality in individuals with sleep disturbances. Box breathing is a simple and easy technique that can be taught to any individuals in any setup or institutions, making it a practical and accessible intervention option. Overall, this study highlights the importance of non-pharmacological interventions in improving sleep quality and quality of life in an individual.

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