



IMPACT OF STRUCTURED BREATHING EXERCISES FOR ANXIETY AND PROCRASTINATION AMONG PHYSIOTHERAPY STUDENTS

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ABSTRACT

Background: Anxiety, characterized by fear, worry, and physical symptoms such as increased heart rate and breathlessness, is common among students. Procrastination, defined as the habitual delay of tasks, contributes to stress, poor performance, and reduced well-being. Both are highly prevalent in student populations and demonstrate a strong positive correlation. Structured breathing techniques, including cyclic sighing and box breathing, may offer a simple and effective approach to enhance emotional regulation, well-being, and academic performance.

Objective: To investigate the impact of structured breathing exercises on anxiety and procrastination among physiotherapy students.

Methodology: A total of 100 physiotherapy students with Procrastination Assessment Student Scale (PASS) ≥ 88 were included. Baseline scores for PASS and the Hamilton Anxiety Rating Scale (HAM-A) were recorded. Participants practiced cyclic sighing and box breathing for 5 minutes daily over 28 days. Adherence was monitored using schedule forms, reminders, and follow-ups. Post-intervention PASS and HAM-A scores were reassessed.

Results: Mean PASS scores decreased from 130.36 to 128.00 ($p < 0.05$), while mean HAM-A scores significantly reduced from 29.24 to 13.18 ($p < 0.001$). A moderate positive correlation between anxiety and procrastination was observed both pre- and post-intervention.

Conclusion: Structured breathing exercises were highly effective in reducing anxiety among physiotherapy students. The effects on procrastination were mixed, with variable outcomes; some students improved, while others worsened. These findings suggest that while structured breathing is a powerful tool for anxiety management, addressing procrastination may require additional strategies such as time management, goal-setting, and behavioural interventions to support academic performance.

Keywords: Structured breathing, Cyclic sighing, Box breathing, Anxiety, Procrastination, Physiotherapy students.

INTRODUCTION:

India's higher education system ranks as the third largest in the world by the number of students, following China and the United States. Maintaining quality in higher education stands as one of the primary challenges

facing India at present. The primary goal of higher education is to instruct, aid, and motivate students to acquire knowledge. In order to meet these goals, factors that influence student learning must be investigated.¹ According to Newble and Entwistle, these components can be classified into two categories: (a) Those related to students' characteristics and (b) those associated with the learning environment.² Key factors that frequently arise in the literature regarding academic success include: Cognitive strategies, locus of control, procrastination, test anxiety, motivation, learning environment, student engagement, and academic entitlement.²

Procrastination refers to a deliberate, regular, willful, and unnecessary delay in starting or finishing targets, that hinders people from achieving their objectives. Delay in educational responsibilities, characterized as delaying study related assignments and tasks, is a common and a neglected problem.¹ It has been studied that four out of 10 students delay completing college work in their daily schedule.⁴ Consequently, delaying studying is likely to hinder academic achievement.³

Delaying a task usually leads to the necessity of hurrying to finish it right before the deadline, and those who procrastinate often feel anxious when confronted with the pressing obligations of completing tasks. Short-term academic procrastination is linked to tardy submission of assignments, test-related anxiety, and diminished performance, all of which affect the mental well-being of students. Therefore, procrastination causes anxiety, burnout, and low mood, which contributes to lowered wellness in life.⁵

According to the American Psychological Association, anxiety is an emotional state characterized by heightened tension, persistent worry, and physical responses such as increased blood pressure.⁶

Anxiety is viewed as another possible contributing factor to academic procrastination. According to Freudian psychoanalysis, procrastination fundamentally arises from anxiety.⁷

Consequently, procrastination and anxiety could negatively impact the student's well-being and their academic success. Numerous studies have demonstrated that there exists a significant positive correlation between the two factors, which are procrastination and anxiety.

The relationship between anxiety and procrastination has been examined among physiotherapy students¹, pre-licensure nursing students,⁸ college students,⁹ and high school children¹⁰, with a positive correlation observed between the two variables in all of the above mentioned studies.

In this study, we are going to examine the effectiveness of breathing exercises for anxiety on procrastination. Breathing exercises are a simple, low-cost intervention that require no equipment and can be practiced anywhere, making them highly accessible. They help regulate the autonomic nervous system, reduce stress, anxiety, and depression, and improve sleep quality and cardiovascular health. Because of their ease of use and minimal resource requirement, they are considered an effective, scalable tool for promoting mental and physical well-being in both clinical and community settings.²⁷

The rhythm and intensity of breathing directly influence the levels of oxygenation, heart rate, ventilation, and blood pressure. Studies have shown that breathwork leads to an enhanced mood and a decreased respiratory rate, whereas both outcomes contribute to a reduction in negative emotions, including state anxiety.

In this research, the kind of breathwork we will use is "Cyclic Sighing," which is defined by deep inhalations succeeded by prolonged, comparatively longer exhalations, and has been linked to emotional relief and normalization breathing rate. "Box breathing" conversely, is defined by equal ratios of inhalation, retention, and exhalation has been used by different military services for managing tension and enhancing execution.¹¹

In this research, we will examine the effectiveness of structured breathing exercises in reducing anxiety linked to procrastination. Procrastination frequently results in increased stress and anxiety, forming a cycle that is hard to escape. By concentrating on controlled breathing exercises, we seek to evaluate if these exercises can regulate anxiety and subsequently diminish procrastination habits.

OBJECTIVE OF THE STUDY

"To Study the efficacy of Structured Breathing Exercises for Anxiety on Procrastination among Physiotherapy Students".

“To find the relationship between anxiety and procrastination among physiotherapy students”

METHODOLOGY :

STUDY DESIGN : Experimental Study

SAMPLE SIZE : 100

SAMPLING METHOD : Convenient Sampling Method.

TREATMENT DURATION: 28 days

SESSION TIME: 5 minutes daily

MATERIALS USED:

- Pen
- Paper

CRITERIA FOR SAMPLE SELECTION :

The participants are selected for the study based on the following criteria :

INCLUSION CRITERIA:

- Both male and female students.
- Age 18-24.
- Participants with a PASS score equal or more than 88.
- Students with a WHODAS 2.0 (World Health Organization Disability Assessment Schedule 2.0) score of 0, indicating no disability.
- Participants must be able to follow the directions and perform the test.

EXCLUSION CRITERIA :

- Students with a WHODAS 2.0 (World Health Organization Disability Assessment Schedule 2.0) score of more than 0, indicating disability is present .
- Impaired hearing.

OUTCOME MEASURES :

- Procrastination Assessment Scale for Student (PASS)
- Hamilton Anxiety Rating Scale (HAM-A)

PROCEDURE : The study will involve 100 physiotherapy students. Additionally, the chosen participants must fulfil the inclusion criteria, which means they should have a Procrastination Assessment Scale (PASS) score of 88 or higher and WHODAS 2.0 score of 0 which indicates no disability. Next, each participant's Hamilton Anxiety Rating Scale (HAM-A) score will be recorded. Following this, both the breathing exercises (cyclic sighing and box breathing) will be instructed to the participants, and they will be requested to practice each exercise daily for 5 minutes over 28 days, performing the exercise only once a day during their leisure time. These participants will receive a schedule form where they must indicate daily whether they are engaging in the exercises or not. They need to mark a tick if they have done the exercises and a cross if they have skipped the breathing exercises on that specific day in the provided schedule form. Participants will also be instructed to set an alarm for around 6 pm for 28 days so that it reminds them to complete the exercises without missing out. This alarm will serve as a reminder to the participants to ensure they do not miss any day. Each participant will be monitored every 3 days to assess whether they are consistently performing the exercises. At the conclusion of the 28 days, they will be re-evaluated for their PASS and HAM-A scores.

Description of breathing protocols :-

1) Cyclic Sighing :

Participants were told to either sit in a chair or lie down after setting a five-minute timer then they were told to inhale gradually and once their lungs were full to breathe and breathe again to fill them completely independent of the to exhale all of their air slowly they were to thoroughly after inhaling again that was less in duration and smaller in volume than the first they were additionally instructed that the best way to exhale and inhale is through their noses this breathing technique should be practiced five minutes though they could

choose they were free to breathe only through their nose they were told its natural for the the second breath should be less than the first 11 they were then told to breathe regularly ¹¹

2) Box breathing :

Participants were asked to sit comfortably in a chair or lie down if preferred, and to keep a timer with a visible seconds display nearby.

They were then guided through the CO₂ tolerance test using the following steps:

Take four full breaths — one inhale followed by one exhale counts as a single breath. Ideally, these should be done through the nose.

Afterward, take the deepest breath possible. Once the lungs are filled, exhale gently and continuously through the mouth for as long as possible.

Record the total time, in seconds, it takes to fully release the air. This time is considered the CO₂ discard duration.

Do not hold your breath once the lungs are empty. Simply stop timing when exhalation ends and note the duration.

Use the discard duration as a reference to set the lengths of inhalation, exhalation, and breath holds when practicing the box breathing technique, following the provided guideline.

For individuals with a CO₂ discard time of 0–20 seconds, each inhale, exhale, and breath hold should last 3–4 seconds.

For a CO₂ discard time of 25–45 seconds, each phase of the breath cycle should last 5–6 seconds.

For a CO₂ discard time of 50–75+ seconds, each inhale, hold, and exhale should be extended to 8–10 seconds.

Participants were instructed to sit comfortably in a chair or, if they preferred, lie down and set a timer for five minutes. During this period, they were to follow a breathing cycle based on their CO₂ discard time. The cycle consisted of inhaling for the prescribed duration, holding the breath for the same length of time, exhaling for the same duration, and then holding again before repeating the process (e.g., inhale 4 seconds, hold 4 seconds, exhale 4 seconds, hold 4 seconds).

If maintaining these timings became difficult or required strain, participants were encouraged to shorten the duration of each phase. Breathing was to be performed through the nose whenever possible; however, if necessary, switching to mouth breathing was permitted.¹¹

They were then instructed to return to their normal breathing.

STATISTICAL ANALYSIS PROCRASTINATION

A paired-sample t-test was conducted to compare procrastination scores before and after a 28 days structured breathing exercise intervention (N = 100). A p value less than <0.05 was considered statistically significant.

Table 1 : Showing mean and standard deviation of pre and post procrastination scores.

| Variable | Mean | Standard Deviation | N |
|----------------------|--------|--------------------|-----|
| Pre-Procrastination | 130.36 | 20.02 | 100 |
| Post-Procrastination | 128.00 | 20.27 | 100 |

Intermediate values used in calculations :

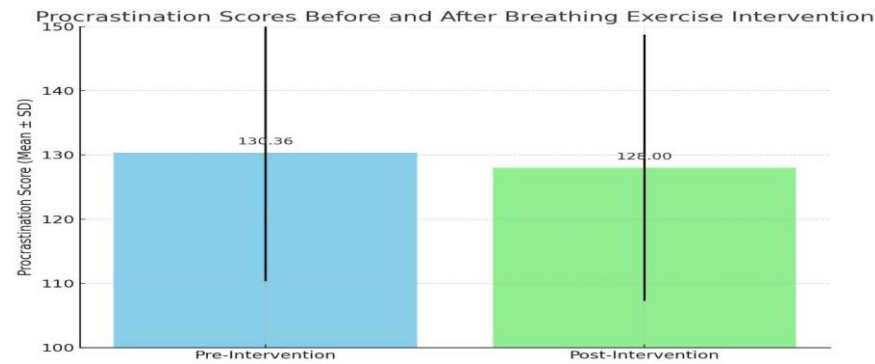
t= 2.4185

df = 99

The **mean procrastination score decreased** from 130.36 (SD = 20.02) to 128.00 (SD = 20.72) following the intervention.

The mean **reduction of 2.36 points** was **statistically significant**: $t(99) = 2.42$, $p = 0.0174$.
The 95% confidence interval for the difference in means ranged from 0.42 to 4.30.

Figure 1 : Showing Procrastination scores before and after breathing intervention.



Interpretation:

The **reduction is statistically significant** ($p < 0.05$). However, the change is Small in magnitude compared to the pre scores.

ANXIETY

A paired-sample t-test was conducted to compare procrastination scores before and after a 28 days structured breathing exercise intervention ($N = 100$). A p value less than < 0.05 was considered statistically significant.

Table 2: Showing mean and standard deviation of pre and post Anxiety scores.

| Variable | Mean | Standard Deviation | N |
|----------------|-------|--------------------|-----|
| Pre- Anxiety | 29.24 | 9.04 | 100 |
| Post – Anxiety | 13.18 | 4.77 | 100 |

Intermediate values used in calculations :

$t = 22.5902$

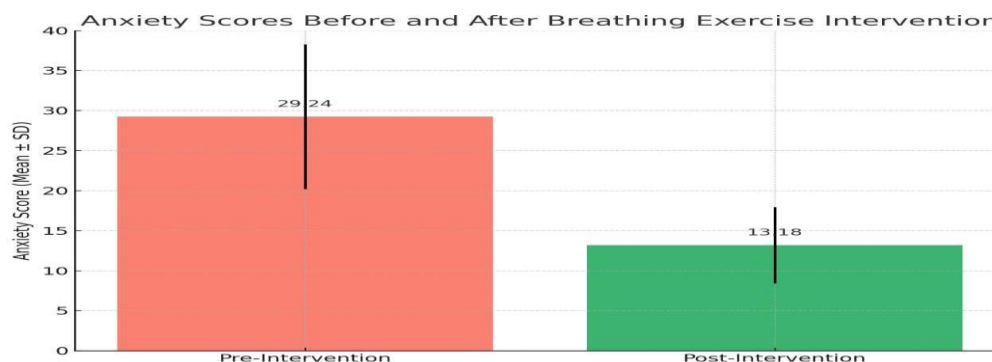
$df = 99$

The **mean anxiety score decreased** from 29.24 (SD = 9.04) to 13.18 (SD = 4.77).

This corresponds to a **mean reduction of 16.06 points**, which is **extremely statistically significant**, $t(99) = 22.59$, $p = 7.50 \times 10^{-41}$.

The 95% confidence Interval for the mean difference ranged from 14.65 to 17.47.

Figure 2 : Showing anxiety scores before and after breathing intervention.



Interpretation :

The **reduction is extremely statistically significant** ($p=0.05$).

Correlation Analysis between Procrastination and Anxiety pre and post scores :

Pearson's correlation coefficient R was computed to assess the linear relationship between anxiety and procrastination scores, both before and after the intervention.

Correlation Matrix :

| Variables | Pre-Anxiety | Post-Anxiety | Pre-Procrastination | Post-Procrastination |
|----------------------|-------------|--------------|---------------------|----------------------|
| Pre-Anxiety | 1.000 | 0.0625 | 0.507 | 0.547 |
| Post-Anxiety | 0.625 | 1.000 | 0.456 | 0.463 |
| Pre-Procrastination | 0.507 | 0.456 | 1.000 | 0.886 |
| Post-Procrastination | 0.547 | 0.463 | 0.886 | 1.000 |

Key Statistical Findings:

Pre-Intervention Relationship

Anxiety Pre vs. Procrastination Pre Scores:

- $R = 0.507$, $p < 0.0001$ (Highly significant)

→ Indicates a **moderate positive correlation**. Participants with higher anxiety also tended to have higher procrastination before intervention.

Post-Intervention Relationship

Anxiety Post vs. Procrastination Post Scores:

- $R = 0.463$, $p < 0.0001$ (Highly significant)

→ Indicates a **moderate positive correlation** remains post-intervention, though slightly lower.

RESULTS

Anxiety

The mean **anxiety score decreased** from 29.24 to 13.18 following the intervention.

The mean **reduction** of 16.06 points, which is extremely statistically significant.

Procrastination

The mean **procrastination score decreased** from 130.36 to 128.00 following the intervention.

The mean **reduction** of 2.36 points is statistically significant.

Pre-Intervention Relationship between Anxiety Pre vs. Procrastination Pre Score showed **moderate positive relationship**.

Post-Intervention Relationship between Anxiety Post vs. Procrastination Post Scores showed **moderate positive relationship**.

DISCUSSION

The present study looked at how a structured breathing exercise program affected anxiety and procrastination among college students. The results showed that anxiety levels went down for all participants in a clear and significant way. However, the effect on procrastination was mixed—some students improved, while others actually procrastinated more.

All students showed lower anxiety scores after the program. This means breathing exercises are a good way to help with emotional control. These exercises activate the parasympathetic nervous system, reduce stress reactions, and improve overall calmness in the body i.e improve the vagal tone.^{12,13} Previous studies also support that slow or deep breathing helps reduce anxiety in both patients and healthy people.^{14,15,16,17} For students, who often face heavy academic and social stress, breathing is an easy and low-cost method to feel better.

Unlike anxiety, procrastination results were not the same for everyone. Many students procrastinated less, but some procrastinated more after the program. Procrastination, however, is a more complex behaviour, influenced not only by emotional state but also by habits, time-management skills, personality traits, and environmental factors.^{18,19} This may explain why the reduction in procrastination scores, while statistically significant, was comparatively smaller.

Participants feedback revealed that heavy academic workload, poor time management, and the absence of a structured routine were common challenges that interfered with timely task completion. Distractions from phones and social media also emerged as significant barriers, reducing concentration and study efficiency. In addition, some students reported inconsistent adherence to the breathing exercise program, which may have reduced its effectiveness. These findings highlight that both academic pressures and individual habits can influence procrastination outcomes. Also, some students did not fully follow the breathing program, which might have reduced its effect.

The study found a moderate positive relationship between anxiety and procrastination before and after the program. This means students with higher anxiety tended to delay tasks more often. But the results also showed that lowering anxiety does not always mean procrastination will reduce. Some students may procrastinate due to habits, poor planning, or needing outside motivation, rather than because they feel anxious. This shows procrastination is more complex and cannot be solved only by reducing stress.

The findings suggest that breathing exercises are a strong tool for lowering anxiety and can give students mental clarity. However, reducing procrastination may need extra help, such as time management training, goal-setting, task scheduling, time blocking, breaking tasks into small steps, and reducing digital distractions. Using breathing together with these strategies may give better results.

Future studies should test combined programs that include both breathing exercises and behavioural strategies (like cognitive-behavioural techniques or planning skills). Long-term studies could show if the benefits last over time and whether students who practice regularly see bigger improvements. It would also be useful to study personal factors like motivation, coping styles, and academic stress to understand and get to know the reasons why some students showed better results.

Another this is that procrastination is usually a long term habit. Since this study only looked at short-term changes, a longer program with regular reminders might help students more. Using apps that combine breathing guides with study reminders could also be a new way to keep students both calm and focused. This might help the students in both the factors – anxieties procrastination.

CONCLUSION

The present study evaluated the impact of a structured breathing exercise program on procrastination and anxiety levels among participants. Statistical analyses revealed a significant reduction in both procrastination ($p = 0.0174$) and anxiety ($p < 0.0001$) following the intervention. The magnitude of change was greater for anxiety (mean reduction: 16.06 points) compared to procrastination (mean reduction: 2.36 points).

This study found that a structured breathing exercise program led to a significant reduction in anxiety among all participants, confirming its effectiveness as a quick, low-cost, and easily implementable stress-reduction tool for college students. The intervention also produced an overall reduction in procrastination, although the extent of change varied across individuals.

Breathing exercises significantly reduced anxiety and modestly improved procrastination, suggesting they are a powerful adjunct but not a standalone solution for academic procrastination.

LIMITATIONS

One major difficulty was faced during the collection of samples was getting students to take part and making sure they stayed consistent with the intervention was not always easy, and these few limitations mentioned might have affected the results.

Convenience sampling was used instead of randomization, which may have affected the accuracy of the results.

The study used only a breathing exercise program to reduce anxiety and procrastination. If other coping strategies such as time management skills, planning techniques, or motivation-building activities had also been included, the results might have been stronger, especially for reducing procrastination. Another limitation was the short treatment time. The breathing exercise was given for only five minutes a day. While this was simple and easy for students to follow, it might not have been enough to get the maximum benefits. In addition, it is possible that not all students followed the exercise regularly, which may have affected the outcomes.

The duration of the program lasted only twenty-eight days. This was enough to show a clear reduction in anxiety, but a longer program may have shown better and more consistent results for both anxiety and procrastination. Since there was no long-term follow-up, we cannot say for sure if the benefits continued after the study ended.

Another limitation is that the study did not include a control group. Without a comparison group, it is difficult to be certain that the observed changes were solely due to the breathing exercise intervention and not influenced by other factors.

Future studies could also focus on examining the immediate effects of breathing exercises to see how quickly changes occur after a single session or within a few days. Furthermore, procrastination can often be influenced by multiple factors such as perfectionism, sleep quality, academic overload, and motivation; exploring these in relation to breathing exercises and in relation to procrastination may provide a deeper understanding. Although the study included a relatively large sample size of 100 participants, they were all selected from a single student population and just physiotherapy students. This may limit how much the results can be applied to other groups, such as other professional students or working professionals.

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