



EFFECTIVENESS OF DIAPHRAGMATIC BREATHING TECHNIQUE ON ENGINEERING STUDENTS WITH PERFORMANCE ANXIETY USING WESTSIDE TEST ANXIETY SCALE.

An Interventional Study

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Abstract: In order to excel academically, students must navigate the challenging landscape of performance evaluations, and this journey often brings forth heightened levels of anxiety. Recognizing the pervasive impact of examination stress on top-performing engineering students, this study delves into the effectiveness of diaphragmatic breathing techniques as a means to alleviate performance anxiety. In a 15-day intervention conducted in Pune, PCMC Area, fifty high-achieving engineering students engaged in daily diaphragmatic breathing exercises, emphasizing controlled inhalation and exhalation. The Westside Test Anxiety Scale served as the pre- and post-intervention assessment tool. Statistical analysis revealed a remarkable reduction in anxiety levels ($p < 0.001$), with the mean Westside Test Anxiety Scale score decreasing from 3.7 (SD = 0.6) to 2.9 (SD = 0.6). This focused exploration aims to shed light on diaphragmatic breathing's role as a cost-effective intervention for clinicians, providing a nuanced approach to enhance mental resilience and mitigate performance anxiety in academically driven individuals.

Method - Fifty top-ranking engineering students, aged 18 to 22, participated in a 15-day intervention study conducted in Pune, PCMC Area. Diaphragmatic breathing exercises, emphasizing controlled inhalation and exhalation, were administered for 10 minutes daily. The protocol involved personalized guidance to ensure proper technique adherence. The Westside Test Anxiety Scale was utilized for pre- and post-intervention assessments.

Result - Statistical analysis revealed a significant reduction in anxiety levels post-intervention ($p < 0.001$). The mean Westside Test Anxiety Scale score decreased from 3.7 (SD = 0.6) to 2.9 (SD = 0.6).

Conclusion - Diaphragmatic breathing exercises emerge as a practical and effective strategy for mitigating performance anxiety among top engineering students. This study contributes to the understanding of anxiety reduction techniques tailored to high-achieving populations.

Index Terms – Performance Anxiety, Diaphragmatic Breathing, Top engineering students, Academic Performance.

I. INTRODUCTION

Modern living has been characterized by stressful lifestyles that demand striving for success and competition. One shall pass the stage of evaluation in order to be regarded as competent amongst others. Examination anxiety becomes a major concern because the tested individuals will expect to be regarded as competent and meeting the standards of a certain criteria. This has been evidenced when students are being examined to test whether they are ready to pass a certain grade or level. Social concerns generally come and go, while the stress of tests may persist week after week, over a span of many years^[1].

The learning procedure in formal education is comprised of primary, secondary and tertiary level of education. Entering university as a tertiary level of education is a challenge for all students. The transition to university for many first year students is a difficult and challenging time as they move into a complex and fast-paced university environment^[2].

Students are tested on different spheres to evaluate their competency on different fields. The testing process leads students to be overwhelmed by stress and anxiety about the tests. It has impacted on student's true potential and has led students to find it difficult to cope during examinations. Strategies to assist students cope under this anxiety- provoking experience has been psycho-pharmacotherapy and individual therapy. Medication might be expensive for government and consumers in public sector so as it may be with individual psychotherapy. This encourages a cost-effective and economical forms of intervention to assist students manage anxiety. The aim of this study is to evaluate the effectiveness of breathing techniques amongst top students with performance anxiety.

II. METHODOLOGY

This Interventional study was conducted on 50 subjects with age 18-22 years old with mean age of 20.5 ± 1.2 years old at PCCOE Akurdi. Ethical committee clearance was obtained and permission was taken from the department. Written consent was taken from the subjects who fulfil the inclusion criteria and exclusion criteria. The subjects were informed about the study and intervention. The Westside Test Anxiety Scale served as the primary assessment tool for measuring anxiety levels before and after the intervention. Post intervention outcome measure values were noted and statistical analysis and interpretation was done.

II.A INCLUSION CRITERIA

- Students within top 5 rankings in their respective branches.
- Age criteria: 18 to 22 yrs old

II.B EXCLUSION CRITERIA

- PEOPLE ALREADY DOING YOGA AND MEDITATION

II.C OUTCOME MEASURES

- Westside test anxiety scale (Reliability-0.88)

II.D INTERVENTION PROTOCOL

- For the first step equal number of students from various engineering branches were selected on the basis of their academic performance in their respective branch. Top 5 students from each branch were selected. Anxiety was assessed using westside test anxiety scale, which is experienced by each student before giving their academic theory and practical exams every year.
- In intervention participants were taught diaphragmatic breathing exercise and instructed to practice the exercise 10 minutes every day for a period of 15 consecutive days^(13,15).
- Performance anxiety was assessed and compared with the performance anxiety recorded before intervention. Comparison of initial and final scores of anxieties were analyzed.

Breathing exercise protocol:

- Type of exercise –Diaphragmatic Breathing technique
- Duration – 10 minutes daily for 15 Days consecutively



Fig 1



Fig 2

III. STATISTICAL ANALYSIS

Data was collected and analysed by appropriate statistical test

Within group, Paired t test was used for pre and post readings of Westside Test Anxiety Scale. **Pre and Post Protocol WAS score data analysis:**

Figure indicate the comparison of pre and post protocol WAS scores of the candidates.



GRAPH 1

INTERPRETATION OF GRAPH 1:

Graph 1 shows, the paired-t test indicated that there is a significant large difference between Before ($M = 3.7, SD = 0.6$) and After ($M = 2.9, SD = 0.6$), $t(49) = 9, p < .001$.

IV. RESULTS

- Using paired t-test following data was obtained.

• P-value	• 6.519e-12
• t	• -8.9707
• Sample size (n)	• 50
• Average of differences (\bar{x}_d)	• -0.824
• SD of differences (S_d)	• 0.6495

Table 1

- Results of the paired-t test indicated that there is a significant large difference between Before ($M = 3.7, SD = 0.6$) and After ($M = 2.9, SD = 0.6$), $t(49) = 9, p < .001$
- Since the p-value $< \alpha$, H_0 is rejected. In other words, the sample difference between the averages of After and Before is big enough to be statistically significant.

V. DISCUSSION

The project aimed to address a significant issue affecting students, particularly those in highly competitive academic environments. In the context of modern education, where exams play a pivotal role in shaping one's future, the prevalence of performance anxiety is a concerning problem. This

research acknowledges the profound impact of anxiety on academic outcomes and focuses on a specific group of students – top-performing engineering students.

The study was designed to assess the effectiveness of breathing techniques in reducing performance anxiety in top students regarding exams. It involved a 15-day intervention period during which participants practiced diaphragmatic breathing exercises for 10 minutes daily. The Westside Test Anxiety Scale was employed to measure their performance anxiety both before and after the intervention. The analysis of pre- and post-intervention scores revealed a highly significant reduction in anxiety levels ($p < 0.001$).

The statistical data provided a compelling conclusion, indicating a significant reduction in anxiety among the participants. The pre-intervention Westside Anxiety Scale score ($M = 3.7$, $SD = 0.6$) reduced to the post-intervention score ($M = 2.9$, $SD = 0.6$), with a T value of 8.9707 and a p-value less than 0.001. This evidence highlights that anxiety related to exams and academic performance can be controlled and reduced with the guided application of the diaphragmatic breathing technique.

These findings align with previous research that explored the benefits of mindfulness and breathing techniques in reducing test anxiety. Studies conducted by Azdah Nemati in 2013, Hyunju Cho in 2016, and Cassie Dobson, along with Murselin Tasan's research in foreign language learning in 2021, support the idea that controlled breathing practices have a positive impact on anxiety reduction and skill enhancement.

The implications of these findings are multifaceted. They emphasize the practical advantages of integrating diaphragmatic breathing exercises into the daily routines of high-achieving students. These techniques offer an accessible and cost-effective approach to alleviate test anxiety, creating an environment where students can perform to their true potential.

Furthermore, the distinctiveness of this study lies in its exclusive focus on academically successful students. By narrowing down the participant pool to top performers, the study aimed to reduce the influence of variables associated with inconsistent academic efforts, thus isolating the psychological aspects of anxiety in high-achieving students. This selective approach enhances the understanding of anxiety in this specific population. Similar types of studies, for anxiety among students during exams have been performed earlier, but what this study did differently was filtering out population by only choosing academically successful students for the study purpose.

This factor which may seem insignificant earlier, is of great significance if given a thought to it. Academically successful students, when having anxiety is purely due to psychological reasoning as they in the past have already proved that they are capable of producing good results and are usually consistent and sincere with their academics. While on the other hand, including all students in the study may alter the results, by a simple fact that most of the students are not consistent with their academic efforts and when they feel anxiety it might be from real reason such as insufficient efforts taken individually. So by ruling out this set of data, considerable changes were expected in the results as they reflected in the statistics of the study.

Additionally, the success of diaphragmatic breathing in reducing anxiety can be attributed to several factors. Diaphragmatic breathing activates the parasympathetic nervous system, counteracting the "fight or flight" response triggered by the sympathetic nervous system, promoting relaxation, and reducing anxiety (McEwen, 2007).

Moreover, deep diaphragmatic breaths allow increased oxygen intake, improving oxygen exchange in the body, essential for optimal brain function and stress reduction (Jerath et al., 2006). The conscious release of tension in the shoulders, neck, and chest during diaphragmatic breathing helps alleviate physical symptoms of anxiety (Meuret et al., 2008).

The mindfulness aspect of focusing on the breath and being present in the moment diverts attention from anxious thoughts, promoting calmness. It also encourages a more regular, slower, and deeper breathing pattern, countering rapid and shallow breathing associated with anxiety (Homma & Masaoka, 2008).

Diaphragmatic breathing's impact on cortisol, the stress hormone, is noteworthy. It can lead to reduced cortisol production, contributing to an overall sense of calm (Jain et al., 2007).

VI. CONCLUSION

Diaphragmatic Breathing exercise proved to be beneficial in reducing performance anxiety in students.

VII. CLINICAL IMPLICATION

- Outcome of the project might guide for better results in managing anxiety by adding breathing exercises to daily routine.
- It can also be beneficial in clinical use for patients with generalized anxiety disorder.
- Breathing exercises can be taught to population with stress factor in their life as a means to reduce it.
- The diaphragmatic breathing technique can be widely taught to individuals experiencing stress in various aspects of their lives. These exercises offer a practical approach to reduce stress and promote overall well-being

VIII. LIMITATION OF STUDY

- The study relied on self-report measures, such as the Westside Test Anxiety Scale, which are subject to reporting bias. Future research could incorporate objective physiological measurements to provide more information alongside self-report data.
- Study doesn't take into consideration other factors causing anxiety to the individual.

IX. RECOMENDATION AND FUTURE SCOPE OF STUDY

- Comparative studies could be conducted to evaluate the effectiveness of diaphragmatic breathing in different academic disciplines and against other anxiety-reduction interventions.
- Exploring the potential role of technology, such as mobile applications or virtual reality, in delivering and enhancing diaphragmatic breathing interventions for students.
- Effectiveness of Breathing exercises in patients with generalized anxiety disorder can be further studied.
- Effectiveness of Breathing exercises in controlling stress can be studied in detail further.

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