

Pre and Post Analysis of Stress Reduction Following Pilates Exercise among Undergraduate Students of Physical Therapy

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ABSTRACT

Objective: Stress is a widespread issue with all students facing some level of stress. We conducted a study to assess if Pilates exercise can reduce stress among undergraduate students of Physical Therapy.

Study Design: Longitudinal study

Place and Duration of Study: This study was conducted at the Isra Institute of Rehabilitation Sciences and Karachi University from January 2019 to May 2020.

Materials and Methods: A Pilates expert was hired to do sessions of Pilates 3 times a week for six weeks. Pre and Post assessment of stress was carried out using the Perceived Stress Scale (PSS-14), a five-unit scale used to measure perceived stress. Data were then analyzed using SPSS Version 21.0 by applying paired t-test and setting the statistical significance at $P \leq 0.05$.

Results: A significant difference ($P \leq 0.05$) in perceived stress was shown before and after the students took part in Pilates exercise.

Conclusion: Pilates showed to be a reliable method in reducing stress among undergraduates of Physical Therapy. Pilates should be used more widely among different populations in reducing stress.

Key Words: Celebrex, nephroprotective, chemoprotective, PGE₂

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INTRODUCTION

Stress is a reality that all of us must have to face in our lives, in some way. The term stress was first applied in the science of Physics. Later on, its usage transitioned from being used in physics to behavioral sciences ⁽¹⁾. There is no agreed-upon definition of stress. However, McEwen states that "stress is a word used to describe experiences that are challenging emotionally and physiologically"⁽²⁾. Examples of stress include financial setbacks, health problems, personal and work-related issues, and stress on the person physically and psychologically ⁽³⁾. Everyone experiences stress, and the same can be said for students ⁽⁴⁾. Furthermore, most of the physical and emotional symptoms that students come across in their academic life include fatigue,

headaches, depression, anxiety, and the inability to cope, all of which can be related to or exacerbated by the stress ⁽⁵⁾. The good thing is that there are various ways to reduce stress among undergraduate students, including cognitive, mindfulness, and behavioral interventions ⁽⁶⁾. Among the stress management techniques is what is called Pilates. Pilates was introduced by Joseph Pilates in the latter part of World War I, calling his method the "The Art of Controlology." ⁽⁷⁾. The method of Pilates is a strong tool in the self-management of stress reaction. The six core principles of Pilates (relaxation, breath, concentration, guide imagery, heightened body awareness, and mindfulness), in a combination of strong curing skills, successfully help in coping and reducing harmful stress among people ^(8,9). Considering how much widespread stress is among students of universities in Pakistan, a study was conducted among the undergraduate students of Physical Therapy to evaluate and Pilates can reduce stress.

MATERIALS AND METHODS

An experimental longitudinal study was conducted at Isra Institute of Rehabilitation Science, Isra University, and Karachi Campus after the ethical board and research committee's approval. The study spanned for six months, during which 30 undergraduate students of Physical Therapy were selected from different Karachi colleges. The selection was made based on a simple random sampling technique. Only after consent was,

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they selected for the study. A Pilate's expert was hired independently to carry out 3 Pilates exercise and training sessions a week for six weeks. The following exercises of Pilates were conducted in the study:

Warm-Up Exercises:

1. Squat
2. Spinal Cord Rotation
3. Side Bends
4. Roll Down
5. Breathing

Beginning of Pilates Class

1. The Hundred
2. Roll Up
3. Single-Leg Circles
4. Rolling Like a Ball Prep
5. Single-Leg Stretch
6. Double Leg Stretch
7. Spine Stretch
8. Open Leg Rocker Prep
9. Corkscrew Prep I
10. Swan Dive Prep I

Cool Down Exercise:

1. Hamstring Stretch
2. Side-Lying Quadriceps and Hip Flexor Stretch
3. Piriformis Stretch

Data was collected using the Perceived Stress Scale-14 (PSS-14) questionnaire. The questionnaire consisting of 14 questions was given to the selected students before the Pilates classes' commencement and after the classes

were concluded. The PSS-14 will evaluate the degree of stress a person experiences during the past month. The PSS-14 scores each question from 0-4; 0-Never, 1-Almost Never, 2-Sometimes, 3-Fairly Often, 4-Very Often, with the scale being reverse for question 4,5,6,7,9,10, and 13. The PSS scores for low stress were 0-18, moderate stress 19-36, and 37-56 corresponded for High Stress (10). The data was then analyzed and evaluated using SPSS Version 21.0, with paired t-test being applied to the group. Statistical significance was set at ≤ 0.05 .

RESULTS

Table 1 shows the gender-based distribution among the participants

Table 2 shows the response Frequency and percentage of the participants

Table 3 shows the frequency and percentage of stress level among the participants

Table 4 shows the level of significance on comparison of pre and post stress levels.

Table No.1: Gender of the participants

| | | Frequency | Percent (%) |
|-------|--------|-----------|-------------|
| Valid | Male | 12 | 40.0 |
| | Female | 18 | 60.0 |
| Total | | 30 | 100.0 |

Table No.2: Shows the Frequency and percentage of the response of the participants

| Questions | Pre- Pilates Exercise Perceived Stress | | | | | Post Pilates Exercise Perceived Stress | | | | |
|--|--|--------------|------------|--------------|------------|--|--------------|------------|--------------|------------|
| | Frequency (Percentage) | | | | | Frequency (Percentage) | | | | |
| | Never | Almost Never | Some times | Fairly Often | Very Often | Never | Almost Never | Some times | Fairly Often | Very Often |
| Have you been upset in the last month because of the unexpected things? | 0 (0) | 3 (10) | 11 (36.6) | 4 (13.3) | 12 (40) | 6 (20) | 10 (33.3) | 9 (30) | 2 (6.7) | 3 (10) |
| Have you felt in the last month that you failed to control important things? | 0 (0) | 4 (13) | 12 (40) | 7 (23.3) | 7 (23.3) | 5 (16.7) | 10 (33.3) | 11 (36.7) | 4 (13.3) | 0 (0) |
| Last month have you felt stressed and nervous? | 0 (0) | 1 (3.3) | 14 (46.7) | 7 (23.3) | 8 (26.7) | 4 (13.3) | 12 (40) | 10 (33.3) | 4 (13.3) | 0 (0) |
| Last month have you deal successfully with irritating life hassles? | 2 (6.7) | 15 (50) | 9 (30) | 4 (13.3) | 0 (0) | 2 (6.7) | 7 (23.3) | 18 (60) | 3 (10) | 0 (0) |
| During the last month have you felt that you were able to cope up the important changes happening in life effectively? | 6 (20) | 15 (50) | 7 (23.3) | 2 (6.7) | 0 (0) | 6 (20) | 12 (40) | 8 (26.7) | 4 (13.3) | 0(0) |
| During the Last month have you felt confident enough to solve the personal problems? | 7 (23.3) | 12 (40) | 8 (26.7) | 3 (10) | 0 (0) | 0 (0) | 0 (0) | 8 (26.7) | 14 (46.7) | 8 (26.7) |
| Have you felt during the last month that the things were going according to the way you want? | 3 (10) | 16 (53.3) | 10 (33.3) | 1 (3.3) | 0 (0) | 3 (10) | 7 (23.3) | 12 (40) | 4 (13.3) | 4 (13.3) |
| Last month have you found that you could not copeup with all things that you had to do? | 4 (13.3) | 3 (10) | 15 (50) | 4 (13.3) | 4 (13.3) | 5 (16.7) | 16 (53.3) | 8 (26.7) | 1 (3.3) | 0 (0) |

| | | | | | | | | | | |
|---|----------|-----------|-----------|----------|----------|----------|-----------|-----------|-----------|----------|
| During the last month have you been able to manage frustrations of your life? | 4 (13.3) | 10 (33.3) | 15 (50) | 1 (3.3) | 0 (0) | 1 (3.3) | 1 (3.3) | 4 (13.3) | 19 (63.3) | 5 (16.7) |
| During the last month have you felt that you were on top of things? | 4 (13.3) | 13 (43.3) | 12 (40) | 1 (3.3) | 0 (0) | 0 (0) | 1 (3.3) | 9 (30) | 13 (43.3) | 7 (23.3) |
| During the last month have you been annoyed because of the uncontrolled things? | 0 (0) | 5 (16.7) | 15 (50) | 7 (23.3) | 3 (10) | 5 (16.7) | 16 (53.3) | 7 (23.3) | 2 (6.7) | 0 (0) |
| Have you found during the last month that yourself you were thinking about things that you want to achieve? | 0 (0) | 1 (3.3) | 15 (50) | 9 (30) | 5 (15.7) | 5 (16.7) | 11 (36.7) | 10 (33.3) | 4 (13.3) | 0 (0) |
| Have you been able to control during the last month that way you want to spend time? | 6 (20) | 13 (43.3) | 9 (30) | 2 (6.7) | 0 (0) | 0 (0) | 3 (10) | 13 (43.3) | 7 (23.3) | 7 (23.3) |
| During the last month have you felt that you are unable to overcome the difficulties piling up so high? | 0 (0) | 1 (3.3) | 17 (56.7) | 9 (30) | 3 (10) | 3 (10) | 16 (53.3) | 7 (23.3) | 2 (6.7) | 2 (6.7) |

Table 1: Pre stress level of Pilate exercises * Post stress of Pilate exercises Cross tabulation

| | | Post stress of Pilate exercises | | Total |
|--------------------------------------|--------------------------|---------------------------------|--------------------------|---------------------|
| | | Low level of stress | Moderate level of stress | Low level of stress |
| Pre stress level of Pilate exercises | Moderate level of stress | 13 | 13 | 26 |
| | High level of stress | 2 | 2 | 4 |
| Total | | 15 | 15 | 30 |

Table No.2: Paired Samples Statistics

| | | Mean | N | Std. Deviation | P-value |
|--------|----------------------------|---------|----|----------------|---------|
| Pair 1 | Pre Pilate exercises test | 33.37 | 30 | 2.918 | 0.00517 |
| | Post Pilate exercises test | 18.4333 | 30 | 6.73480 | |

DISCUSSION

Stress is an issue that all students must face nowadays. Our study results showed that the majority of the students faced stress and had a high level of irritation, causing them to pursue different coping measures to deal with stress. Another study conducted by V.R. Zare et al.; that went onto assess depression, anxiety, and stress in school children found that stress was high among students regardless of their schooling in the public or private sector¹¹. Our study showed that students were highly stressed out and were not able to tackle their life problems because of this reason. Another study similar to our study using the perceived stress scale showed that personal and academic sources of stress contributed to a high level of perceived stress

among students¹². Jacob et al. also hinted in his student conducted on physical therapy students that clinical practice is a much higher risk factor for students' stress than academic activities. This shows students of physical therapy also face different levels of stress, and their faculty staff must identify students who are dealing with stress.

A systematic review conducted showed that spending time in the outdoor environment, particularly those with greenery and open spaces, reduces stress, and ultimately improves health¹³.

Similarly, we used Pilates to see if it had any effect on stress reduction among students of Physical therapy. Pilates help reduce the students' perceived stress, with significant difference ($P \leq 0.05$) among the students after the Pilates sessions had been concluded. This shows that Pilates is a useful technique in reducing stress among undergraduate students of physical therapy. Another study also showed that a 16-week Pilates-based training regime helped significantly improve the health and sleep quality of women¹⁴. This further shows that once people undergo Pilates exercise, they will have lower stress, better sleep, and overall improved health.

CONCLUSION

Pilates was shown to be an effective method in reducing perceived stress among the students of physical therapy. Students showed significant improvement in stress levels, coping, and dealing with problems in their life after taking part in Pilate's sessions. Students should participate in activities such as Pilates and more exercises to reduce the stress they face during their personal and academic life.

Author's Contribution:

Concept & Design of Study: Noman Ahmed
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REFERENCES

1. Krohne HW. Stress and coping theories. *Int Encyclopedia Social Behavioral Sci* 2002;22:15163-70.
2. McEwen BS. Physiology and neurobiology of stress and adaptation: central role of the brain. *Physiological Reviews* 2007;87(3):873-904.
3. Kassymova K, Kosherbayeva N, Sangilbayev S, Schachl H. Stress management techniques for students. *Int Conference Theory Practice Personality Formation in Modern Society (ICTPPFMS 2018)* 2018 Sep. Atlantis Press.
4. Hussain I, Ahmed M, Ahmad S, Suleman Q, Khalid N. A Study to Investigate the Availability of Educational Facilities at the Secondary School Level in District Karak. *Language Ind* 2012;12(10).
5. Dusselier L, Dunn B, Wang Y, Shelley il MC, Whalen DF. Personal, health, academic, and environmental predictors of stress for residence hall students. *J Am Coll Health* 2005;54(1):15-24.
6. Regehr C, Glancy D, Pitts A. Interventions to reduce stress in university students: A review and meta-analysis. *J Affective Disorders* 2013; 148(1):1-1.
7. Anderson BD, Spector A. Introduction to Pilates-based rehabilitation. *Orthopaedic Physical Therapy. Clin North Am* 2000;9(3):395-410.
8. Pilates JH. *Return to Life Through Contrology*. Incline Village, NV: Presentation Dynamics Inc 1945.
9. Clark M, Romani-Ruby C. *Pilates Matwork for Fitness and Rehabilitation Professionals*. Pittsburgh: Word Association Publishers 2003.
10. Shaikh S, Shaikh S, Shaikh S, Shaikh AA, Saleem SG. Prevalence of hair loss and stress as the cause; a cross-sectional study. *International Journal of Advanced Research* (2016), Volume 4, Issue 7, 327-333.
11. Zare VR, Ramesh B, Kokiwar P. Assessment of "depression, anxiety and stress" among students of schools at RHTC area catered by private medical college in South India. *Int J Community Medicine Public Health* 2018;5(7):3116-20.
12. Jacob T, Gummesson C, Nordmark E, El-Ansary D, Remedios L, Webb G. Perceived stress and sources of stress among physiotherapy students from 3 countries. *J Physical Therapy Education* 2012;26(3):57-65.
13. Akbaş E, Ünver B. A six-week pilates exercise protocol for improving physical and mental health-related parameters. *Malaysian Journal of Movement, Health Exercise* 2018;7(2):65-79.
14. Fleming KM, Herring MP. The effects of Pilates on mental health outcomes: A meta-analysis of controlled trials. *Complementary Therapies Med* 2018;37:80-95.