EPH- International Journal of Medical and Health Sciences
Volume 12 Issue 01 April 2026
ISSN- 2456 - 6063
DOI: https://doi.org/10.69980/nx30dw84

PERCEIVED STRESS AND DYSFUNCTIONAL BREATHING PATTERN IN YOUNG ADULTS – A CORRELATIONAL STUDY.

Ashna Waseem Patel[1*], Pragati Konwar[2] , Dr. Pravin Aaron[3]

[1*]Assistant Professor, Department of Allied and Healthcare, S-VYASA Deemed to be University, Bangalore. Email: ashnapatel94@gmail.com
[2]MPT Student, Padmashree Institute of Physiotherapy, Rajiv Gandhi University of Health Sciences, Bangalore. Email:konwar460@gmail.com
[3]Professor, Padmashree Institute of Physiotherapy, Rajiv Gandhi University of Health Sciences, Bangalore. Email: pipprincipal@gmail.com

Received:- 18/02/26 Revised:-26/03/26 Accepted:-02/04/26 Published:- 09/04/26

Abstract
Background: Psychological stress is highly prevalent among young adults and may influence physiological processes including breathing mechanics. Dysfunctional breathing refers to inefficient breathing patterns occurring without structural respiratory pathology. Objective: To evaluate the relationship between perceived stress and dysfunctional breathing patterns in young adults. Methods: A correlational study was conducted on 220 young adults using the Perceived Stress Scale-10 (PSS-10) and Manual Assessment of Respiratory Motion (MARM). Results: No statistically significant correlation was observed between perceived stress and rib cage motion. Conclusion: Perceived stress did not significantly affect breathing mechanics in healthy young adults.
Keywords- Perceived stress, Dysfunctional breathing, Young adults, PSS-10, MARM

Introduction

Stress has emerged as a major public health concern in the modern era, particularly among young adults who face increasing academic expectations, social responsibilities, lifestyle changes, and uncertainty regarding future career prospects [1–3]. Stress is defined as a state of psychological and physiological imbalance that occurs when perceived demands exceed an individual's coping resources [4]. Although short-term stress responses may be adaptive, chronic exposure to stress has been associated with a wide range of adverse physical and psychological health outcomes.

Perceived stress is a subjective construct that reflects an individual's appraisal of stressors rather than the objective presence of stressful events [4]. The Perceived Stress Scale (PSS-10) is one of the most widely used tools for measuring perceived stress and has demonstrated strong psychometric properties across diverse populations [6,7]. Elevated levels of perceived stress have been linked to anxiety, depression, impaired immune function, cardiovascular dysfunction, and dysregulation of the hypothalamic–pituitary–adrenal axis [5–11].

Breathing is a fundamental physiological process regulated by complex interactions between voluntary control, autonomic nervous system activity, and emotional states. Psychological stress and anxiety have been shown to alter respiratory rhythm, depth, and coordination [9–11]. Dysfunctional breathing patterns refer to inefficient or maladaptive breathing behaviors that occur in the absence of identifiable respiratory pathology [12]. Such patterns may include thoracic-dominant breathing, reduced diaphragmatic excursion, irregular breathing rhythm, and excessive recruitment of accessory respiratory muscles [12–17].

Stress-related alterations in breathing may arise from increased sympathetic activation, muscle tension, and changes in respiratory drive [18,19]. Over time, these maladaptive breathing behaviors may become habitual, potentially contributing to symptoms such as breathlessness, fatigue, dizziness, chest discomfort, and reduced quality of life [20,21]. Despite optimal lung function, young adults experiencing persistent stress may therefore develop subtle disturbances in breathing efficiency.

Existing literature examining the relationship between psychological stress and breathing patterns presents mixed findings. While some studies report clear associations between stress and dysfunctional breathing, others demonstrate minimal physiological changes in healthy young populations [15,16,21]. Furthermore, many studies rely on self-reported measures of breathing dysfunction, limiting objective interpretation. There remains a need for research incorporating biomechanical assessment techniques to better understand the interaction between perceived stress and breathing mechanics [17]. Therefore, the present study aims to investigate the correlation between perceived stress and dysfunctional breathing patterns in young adults using a validated assessment tool.

Methodology

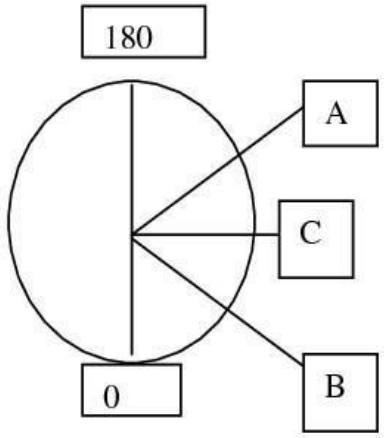
A correlational research design was employed to examine the association between perceived stress and dysfunctional breathing patterns in young adults. The study was conducted over a six-month period at Padmashree Group of Institutions, Bengaluru, after obtaining approval from the institutional ethics committee. All participants provided written informed consent prior to participation, and confidentiality was maintained throughout the study.

220 young adults aged between 18 and 24 years were recruited using convenience sampling. Both male and female participants who reported moderate to high levels of perceived stress were included in the study. Individuals with a history of respiratory diseases, neurological disorders, cardiovascular conditions, thoracic musculoskeletal abnormalities, or previously diagnosed breathing pattern disorders were excluded to minimize potential confounding variables.

Perceived stress was assessed using the Perceived Stress Scale-10 (PSS-10), a self-administered questionnaire consisting of ten items rated on a five-point Likert scale ranging from 0 (never) to 4 (very often) [4,18]. The total score ranges from 0 to 40, with higher scores indicating greater perceived stress. The PSS-10 has demonstrated good internal consistency and construct validity in previous studies involving young adult populations.

Dysfunctional breathing patterns were evaluated using the Manual Assessment of Respiratory Motion (MARM), a non-invasive palpatory assessment technique that evaluates respiratory movement at the upper rib cage, lower rib cage, and abdominal regions. [19,20,21] Participants were assessed in a relaxed sitting position while the examiner evaluated breathing volume, symmetry, and thoraco-abdominal coordination during quiet breathing. An assessment of the overall vertical motion relative to the overall lateral motion was made. Based on the graphic notation in Fig 1, the upper line (A) represents the degree of vertical and upper

thoracic motion and the lower line (B) represents the degree of lower ribs and abdominal motion. The horizontal line (C) represents the thoraco-lumbar junction. MARM has been reported to have acceptable inter-rater and intra-rater reliability and provides clinically relevant information regarding breathing mechanics.[19,20,25]



Variables Calculated From MARM Graphic Notation

Variable	Description	Calculation
Area of Breathing	Angle formed between upper line and lower line	Angle A B
Balance	Difference between angle made by horizontal axis (C) and upper line (A) and horizontal line (C) and lower line (B)	AC-CB
Percent rib cage motion	area above horizontal / total area between upper line and lower line x 100	AC/AB X 100

Fig 1: MARM Graphic Notation

Results

Data were analyzed using SPSS software. Descriptive statistics were used to summarize demographic characteristics and outcome measures. Pearson's correlation coefficient was applied to determine the relationship between perceived stress scores and breathing pattern variables. Statistical significance was set at $p < 0.05$.

The study sample consisted of 220 participants, including 49 males (22.3%) and 171 females (77.7%), with a mean age of 21.9 ± 1.5 years. The distribution of perceived stress scores indicated that the majority of participants experienced moderate to high levels of stress.

Assessment of breathing patterns using the Manual Assessment of Respiratory Motion revealed predominantly normal upper and lower rib cage movement in both male and female participants. No clinically significant gender differences were observed in rib cage motion or breathing volume.

Pearson's correlation analysis demonstrated no statistically significant relationship between perceived stress scores and breathing pattern variables, including upper rib motion, lower rib motion, and overall breathing volume ($r = 0.026$, $p > 0.05$). These findings indicate that increased perceived stress did not correspond to measurable alterations in breathing mechanics among the participants.

The absence of significant correlations suggests that breathing adaptations related to stress may not manifest in healthy young adults or may be too subtle to detect using palpatory assessment techniques alone.

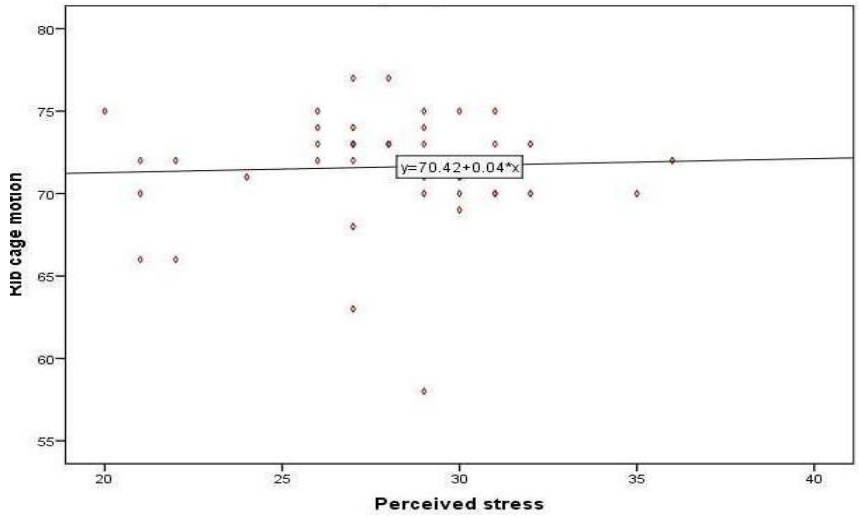


Fig 2: Scatter graph for correlation between perceived stress and rib cage motion in young male adults.

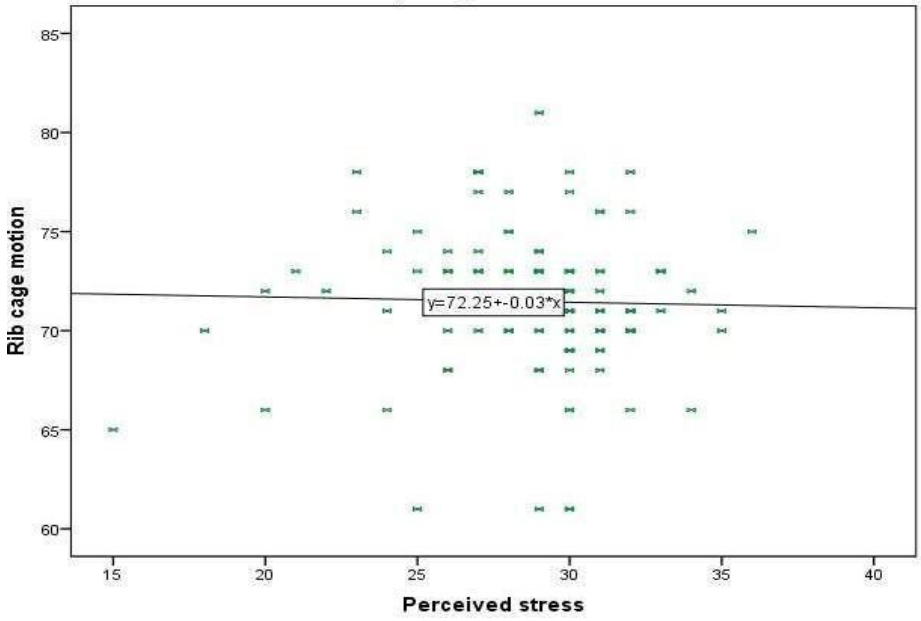


Fig 3: Scatter graph for correlation between perceived stress and rib cage motion in young female adults.

Discussion

The present study investigated the relationship between perceived stress and dysfunctional breathing patterns in young adults and found no statistically significant association between the two variables. These findings suggest that healthy young adults may maintain efficient respiratory mechanics despite experiencing elevated levels of psychological stress [26].

One possible explanation for the absence of significant findings is the greater physiological resilience and respiratory reserve observed in young individuals. Effective compensatory mechanisms and adaptive coping strategies may mitigate the impact of stress on breathing patterns [27]. Additionally, participants in the present study were free from underlying respiratory pathology, which may further explain the preservation of normal breathing mechanics.

Previous studies examining the relationship between stress and breathing patterns have reported inconsistent results. Some studies have identified stress-related thoracic breathing and reduced diaphragmatic activity, whereas others report minimal physiological impact in non-clinical populations [28,29]. Variations in study design, assessment tools, and stress measurement methods may account for these discrepancies.

The use of manual assessment techniques such as MARM, while clinically valuable, may be less sensitive to

subtle biochemical changes such as altered carbon dioxide levels and respiratory alkalosis [29]. The cross-sectional design of the study also limits causal inference. Future research should incorporate objective respiratory assessment tools such as capnography, spirometry, and electromyography, as well as longitudinal study designs, to provide a more comprehensive understanding of the dynamic relationship between stress and breathing mechanics [30,31].

Conclusion

The study concludes that perceived stress does not significantly correlate with dysfunctional breathing patterns in healthy young adults. Although stress is prevalent in this population, its direct influence on breathing mechanics appears limited, suggesting effective physiological compensation.

References

1. Selye H. The stress of life. New York: McGraw-Hill; 1956.
2. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer; 1984.
3. Chrousos GP. Stress and disorders of the stress system. Nature reviews endocrinology. 2009 Jul;5(7):374-81.
4. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. Journal of health and social behavior. 1983 Dec 1:385-96.
5. McEwen BS. Protective and damaging effects of stress mediators. New England journal of medicine. 1998 Jan 15;338(3):171-9.
6. Schneiderman N, Ironson G, Siegel SD. Stress and health: psychological, behavioral, and biological determinants. Annu. Rev. Clin. Psychol.. 2005 Apr 27;1(1):607-28.
7. Thayer JF, Sternberg E. Beyond heart rate variability: vagal regulation of allostatic systems. Annals of the New York Academy of Sciences. 2006 Nov;1088(1):361-72.
8. Chida Y, Steptoe A. Cortisol awakening response and psychosocial factors: a systematic review and meta-analysis. Biological psychology. 2009 Mar 1;80(3):265-78.
9. Masaoka Y, Homma I. The effect of anticipatory anxiety on breathing and metabolism in humans. Respiration physiology. 2001 Nov 1;128(2):171-7.
10. Boiten FA. The effects of emotional behaviour on components of the respiratory cycle. Biological psychology. 1998 Sep 1;49(1-2):29-51.
11. Homma I, Masaoka Y. Breathing rhythms and emotions. Experimental physiology. 2008 Sep 1;93(9):1011-21.
12. Courtney R. The functions of breathing and its dysfunctions and their relationship to breathing therapy. International Journal of Osteopathic Medicine. 2009 Sep 1;12(3):78-85.
13. Barker N, Everard ML. Getting to grips with 'dysfunctional breathing'. Paediatric respiratory reviews. 2015 Jan 1;16(1):53-61.
14. Vidotto LS, Carvalho CR, Harvey A, Jones M. Dysfunctional breathing: what do we know?. Jornal Brasileiro de Pneumologia. 2019;45(01):e20170347.
15. CliftonSmith T, Rowley J. Breathing pattern disorders and physiotherapy: inspiration for our profession. Physical therapy reviews. 2011 Feb 1;16(1):75-86.
16. Thomas M, McKinley RK, Freeman E, Foy C, Prodger P, Price D. Breathing retraining for dysfunctional breathing in asthma: a randomised controlled trial. Thorax. 2003 Feb 1;58(2):110-5.
17. Courtney R, Greenwood KM, Cohen M. Relationships between measures of dysfunctional breathing in a population with concerns about their breathing. Journal of bodywork and movement therapies. 2011 Jan 1;15(1):24-34.
18. Lee EH. Review of the psychometric evidence of the perceived stress scale. Asian nursing research. 2012 Dec 1;6(4):121-7.
19. Courtney R, Van Dixhoorn J, Cohen M. Evaluation of breathing pattern: comparison of a Manual Assessment of Respiratory Motion (MARM) and respiratory induction plethysmography. Applied psychophysiology and biofeedback. 2008 Jun;33(2):91-100.
20. Yoosefinejad AK, Yousefiyan R, Nazari R, Rezaei I. Inter-rater and intra-rater reliability of manual assessment of respiratory motion in patients with unilateral cervical radiculopathy: A cross-sectional study. International Journal of Osteopathic Medicine. 2024 Mar 1;51:100708.
21. ALISON JA, HOLLAND AE, JONES AH. RESPIRATORY DISEASES. Cardiorespiratory Physiotherapy: Adults and Paediatrics: formerly Physiotherapy for Respiratory and Cardiac Problems. 2016 Jun 7:163.
22. Bovier PA, Chamot E, Perneger TV. Perceived stress, internal resources, and social support as

determinants of mental health among young adults. Quality of life research. 2004 Feb;13(1):161-70.

23. LoMauro A, Aliverti A. Sex differences in respiratory function. Breathe. 2018 May 31;14(2):131-40.
24. Anderson DE, Chesney MA. Gender-specific association of perceived stress and inhibited breathing pattern. In-Special Issue on Women's Health 2002 Sep 1 (pp. 216-227). Psychology Press.
25. Molgat-Seon Y, Peters CM, Sheel AW. Sex-differences in the human respiratory system and their impact on resting pulmonary function and the integrative response to exercise. Current Opinion in Physiology. 2018 Dec 1;6:21-7.
26. Birditt KS, Turkelson A, Fingerman KL, Polenick CA, Oya A. Age differences in stress, life changes, and social ties during the COVID-19 pandemic: Implications for psychological well-being. The Gerontologist. 2021 Mar 1;61(2):205-16.
27. Parsons N, Nagakumar P, Tomlinson J, Frost S, Davies B, Rao S. Outcomes of physiotherapy management in children and young people (CYP) with breathing pattern disorders (BPD). European Respiratory Journal. 2021.
28. Grillo L, Russell AM, Shannon H, Lewis A. Physiotherapy assessment of breathing pattern disorder: a qualitative evaluation. BMJ Open Respiratory Research. 2023 Jan 1;10(1):e001395.
29. Courtney R, Van Dixhoorn J, Greenwood KM, Anthonissen EL. Medically unexplained dyspnea: partly moderated by dysfunctional (thoracic dominant) breathing pattern. Journal of Asthma. 2011 Apr 1;48(3):259-65.
30. Strohl KP, Thomas AJ. Breathlessness, anxiety, and respiratory physiology. Biopsychosocial Science and Medicine. 1998 Nov 1;60(6):680-1.
31. Gevirtz RN, Lehrer PM, Schwartz MS. Cardiorespiratory biofeedback. Biofeedback: A practitioner's guide. 2016 Feb 10:196-213.