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

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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.

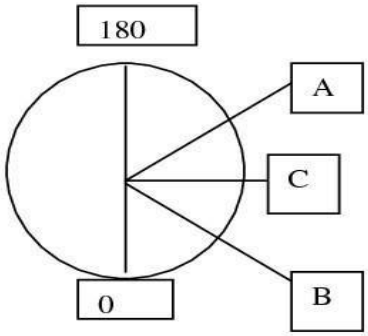
Methodology

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.

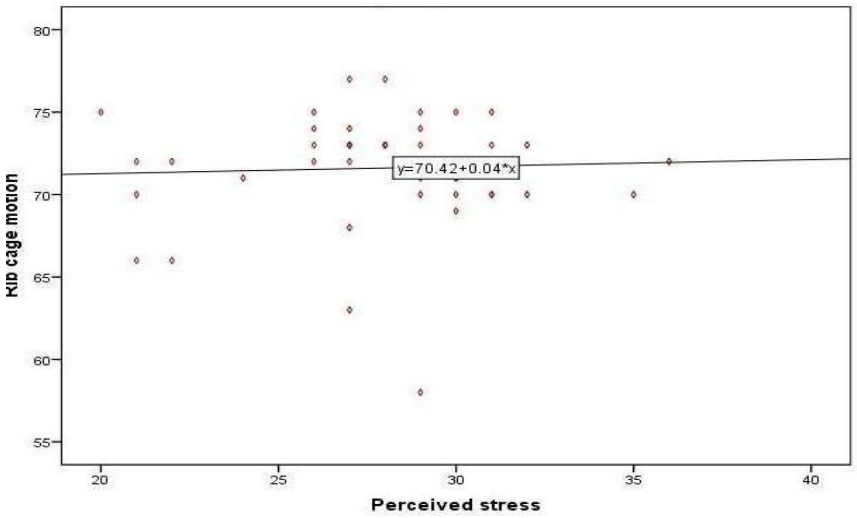


Fig 2: Scatter graph for correlation between perceived stress and rib cage motion in young male adults.

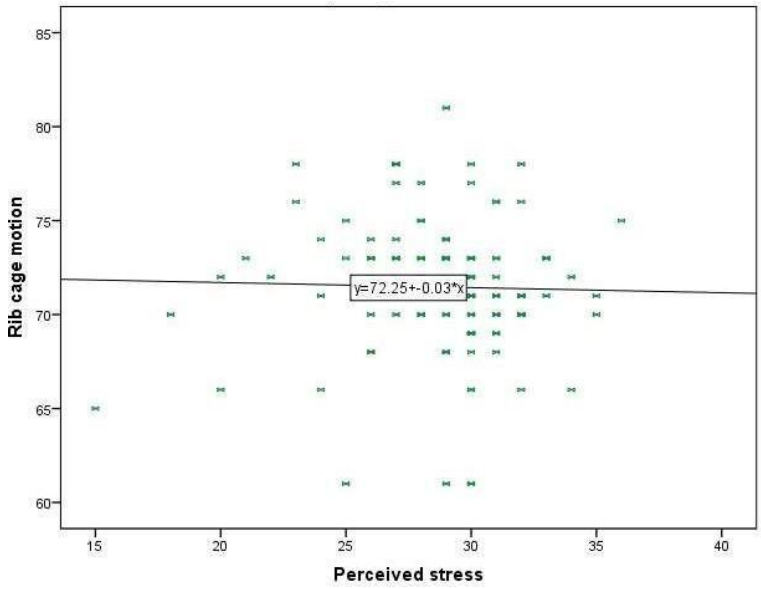


Fig 3: Scatter graph for correlation between perceived stress and rib cage motion in young female adults.

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.

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