Letter to Editor

Pulmonary Function and Balance in Delhi Police Personnel; A Cross-Sectional Snapshot of Occupational Readiness: A Letter to the Editor

Dear Editor

We are writing to draw attention to the occupational health of police personnel. It is a well-known fact that their profession is physically demanding and emotionally stressful. They are subjected to significant psychological trauma and physical stressors, including prolonged shift work, extended periods of desk duties, frequent job transfers, inadequate sleep, and unbalanced diets. Collectively, these stressors contribute to long-term health consequences.

As an optimal balance and respiratory efficiency are crucial for both routine duties and high-stress emergencies,[1] a preliminary investigation was conducted on 90 police personnel with at least 5 years of experience, aged between 25 and 50 years from various police stations in Delhi-National Capital Region (Institutional Review Board No. AJIRB-EC/7/2022 and Clinical Trial Registry India No. CTRI/2023/01/049035). We assessed their static balance, dynamic balance, and respiratory function using the balance error scoring system (BESS), Y-Balance test (YBT), and peak expiratory flow rate (PEFR), respectively.

As existing literature suggested that respiratory health could influence various aspects of balance yet did not clarify the specific connection between PEFR and postural balance, we also investigated the correlation between balance and PEFR.[2-4]

The results indicated that there were 80 men and 10 women; 87.8% of the total participants were overweight, and 12.2% were obese (https://static.pib.gov.in/WriteReadData/specificdocs/documents/2025/mar/doc202531511001.pdf). Excess weight and obesity are known risk factors for lifestyle disorders such as diabetes, hypertension, cardiovascular disorders, arthritis, and future falls.

Though the mean BESS score of 13.80±7.49 reflected a moderate level of static balance ability, nearly half of the participants (n=39, 43.5%) demonstrated below-average to very poor static balance. This finding suggested that nearly half of the workforce might be at increased risk of falls, injuries, or reduced performance during physically demanding tasks. Such findings highlighted the need for strength and balance training programs to reduce occupational hazards.

The mean PEFR was 457.09±105.40 L/min. A majority of the participants (82.2%) were in the safe zone (green zone), reflecting adequate respiratory function. However, 16 participants (17.7%) were in the alert zone (yellow zone), suggesting compromised respiratory function. Although this finding could be attributed to occupational exposure to traffic-related air pollution, smoking habits, or underlying undiagnosed respiratory conditions, it is of great concern in a profession requiring high physical readiness and endurance.

These findings were unexpected and alarming, considering the relatively younger age and physical activity levels of the cohort, and warrant further investigation of the health parameters of this professional population.

There was a weak and non-significant correlation of PEFR with BESS ($r=0.10$, $P>0.05$), and YBT ($r=0.08$, $P>0.05$), suggesting that there were no significant relationships between respiratory function and balance metrics. This finding was in agreement with the current understanding that respiratory mechanics and balance control, through physiological interconnections, might operate independently in individuals without underlying impairment.

Our findings provided preliminary evidence of the absence of a strong relationship between respiratory mechanics and balance. The low correlation values observed in this study might reflect the ‘multifactorial nature’ of balance, which was influenced by various physiological systems, including

proprioceptive, vestibular, and musculoskeletal components, in addition to respiratory function.[5]

Furthermore, it is also speculated that the change in respiratory mechanics may not affect balance in a relatively younger participant, but may have the potential to impact balance in later life when the respiratory, musculoskeletal, and nervous systems are compromised.

These findings pointed towards the need for in-depth research on this topic, with evaluation and correlation of respiratory function and balance in a variety of populations who might be at risk for both respiratory and balance impairments due to the physical demands and stressors of their occupation, as well as age.

It is important to emphasize that the findings of the present study were limited to the selected population, which consisted of a sample that was readily recruited mainly from male participants in the Delhi police, limiting the external validity of the study. In addition, more sophisticated methods for the analysis of balance and pulmonary function are warranted for more accurate results. Nevertheless, the results of this study have steered our scientific inquiry in the right direction for the future, and more detailed research on this topic is warranted.

Acknowledgment

We express our sincere gratitude to the Delhi Police personnel for their constant support and cooperation throughout this study. Their willingness to participate, despite demanding work schedules, made this research possible. We deeply appreciate their dedication, discipline, and commitment to public service, which not only ensures the safety of our communities but also enabled us to carry out this study successfully.

Authors' Contribution

RK.S: Conceptualization, data analysis, data interpretation, and drafting the manuscript; P.R: Data collection, data analysis, and reviewing the manuscript; S.J: Data collection, data analysis, and reviewing the manuscript; S.M: Data interpretation, and reviewing the manuscript; N.R: Data interpretation, and reviewing the manuscript; Z.K: Study design, drafting , and reviewing the manuscript; All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of AI

Grammarly (version 1.151.1) was used solely for grammatical correction during manuscript preparation, and no AI tools were involved in the study design, data collection, analysis, or interpretation. After using this service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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