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Study of Temporal Variation of Serum Heavy Metal and Biomarker Level among adults During Pre and Post-Diwali in Delhi

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Abstract

Introduction: The national capital of India, New Delhi is among the most polluted cities in the world regarding Particulate Matter (PM) 2.5 and 10. The city becomes more vulnerable during the early winters in the October-November period due to geological phenomena of temperature inversion of air, burning of firecrackers during Diwali, crop burning in the neighbouring states apart from the perennial issue of vehicular, factory emission and dust from construction. Firecracker burning poses an additional challenge of heavy metal pollution. Pollution causes local and systemic health problems.

Material and Methods: A community-based comparative cross-sectional study was conducted on adults from various pockets of Delhi in two phases in October, 2022. The participants were investigated for their serum heavy metal levels before and after the Diwali festival.

Results: A total of 54 and 52 participants were investigated for serum heavy metal level pre and post-Diwali. Their mean serum heavy metal level pre- and post-Diwali (ug/dl) are as follows: Arsenic (1.1 & 1.3, p-value: 0.06), Cadmium(0.6 & 0.7, p-value: 0.2), Mercury (0.4 & 0.5, p-value: 0.008), Lead (48.1 & 56.7, p-value: 0.053), Chromium (2.1 & 2.2, p-value: 0.3), Barium (3.0 & 4.3, p-value: 0.2), Cobalt (0.8 & 0.9, p-value: 0.2), Caesium (1.8 & 1.9, p-value: 0.3) and Selenium (154.6 & 318.1, p-value: 0.000). A total of 74 and 59 participants were investigated for serum IL-6 level pre- and post-Diwali (154.7 & 318.1, p-value: 0.0).

Conclusion: There is a significant rise of serum Arsenic, Mercury, Barium, Selenium and IL-6 level among study participants after Diwali. Heavy metal pollutants are inflammatory agents, systemic and environmental toxicants, and carcinogens causing serious health risks.