

## Impact of Burning Incense/Joss Paper on Outdoor Air Pollution: An Interrupted Time Series Analysis Using Hanoi Air Quality Data in 2020

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**Abstract :** Burning joss paper and incense during religious and cultural ceremonies is common in Vietnam. This study aims to measure the impact of burning joss paper and incense during Vu Lai festival (full moon of July) in Vietnam. Data of Hanoi air quality in year 2020 was used. Interrupted time series analysis was employed to examine the changes in pattern of various air quality indicators before and after the festival period. The results revealed that burning joss paper and incense led to an immediate increase of 15.94 units in the air quality index on the first day, which gradually rose to 47.4 units by the end of the full moon period. Regarding NO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>25</sub>, there was no significant immediate change at the start of the intervention period (August 29th, 2020). However, significant increases in levels and an upward trend were observed during the intervention time, followed by substantial decreases after the intervention period ended (September 3rd, 2020). This analysis did not find a significant impact on CO, SO<sub>2</sub>, and O<sub>3</sub> due to burning joss paper and incense. These findings provide valuable insights for policymakers and stakeholders involved in managing and enhancing air quality in regions where such practices are prevalent.

**Keywords :** air pollution, incense, ITSA, joss paper, religious activities

**Conference Title :** ICHPH 2024 : International Conference on Healthcare and Public Health

**Conference Location :** Toronto, Canada

**Conference Dates :** July 18-19, 2024