

# Visualizing Patterns of Indoor Air Pollutants to Respiratory Health Risk in Rural Yewa Region, Southwest Nigeria

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Indoor personal exposures to air pollution constitute a significant environmental risk factor of acute and chronic respiratory infections, which have a disproportionately high burden in the rural communities of sub-Saharan Africa. The current study characterized the concentrations of selected gaseous and particulate pollutants in indoor environment with a view to assess their respiratory health risk in Yewa south communities. A multi-stage sampling procedure was employed to select ten rural and ten semi-urban areas in the study area. In each of the communities, 10 households were selected for air quality monitoring and comfort index measurement using appropriate tools. Data were analysed using descriptive and inferential statistical tools. In addition, machine learning tools were used to aid visualization. Air Quality index (AQI) was computed to determine the health risk among exposed residents. The mean concentrations of PM<sub>2.5</sub> (51.23 µg/m<sup>3</sup>); H<sub>2</sub>S (0.34 mg/m<sup>3</sup>), VOC (380.25 mg/m<sup>3</sup>) SO<sub>2</sub> (0.43 mg/m<sup>3</sup>) and CO (52.1 mg/m<sup>3</sup>) were significantly high in different semi-urban communities. Spatial variations in the levels of PM<sub>2.5</sub> and PM<sub>10</sub> (32.10, 78.10 µg/m<sup>3</sup>); SO<sub>2</sub> and H<sub>2</sub>S (0.20, 0.26 mg/m<sup>3</sup>); CO and CH<sub>4</sub> (57.90, 94.40 mg/m<sup>3</sup>); and VOC (347.20 mg/m<sup>3</sup>) were monitored in different rural communities. The indoor AQI for particulate matter and CO ranged from unhealthy to hazardous in 40 and 100% of the semi-urban communities. In all rural communities, CO rating ranged from very unhealthy to hazardous for respiratory health. Pragmatic environmental health programme is recommended for the communities.

Keywords: Air pollution, environmental risks, respiratory infections, visualization, South West Nigeria.

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