

Modelling and Improving Public Health Outcomes of Respiratory Ailments in Rural and Resource Scarce areas of South-West Nigeria using Machine Learning

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The rural and semi-urban communities in sub-Sahara Africa share a disproportionately high burden of respiratory diseases due to residents' exposure to polluted indoor environment. The current study investigated the indoor condition that constituted risks to morbidity of respiratory ailments in Yewa south communities of South-West Nigeria. A multi-stage sampling procedure was employed to select 20 communities from the ten administrative units in the study area. In each of the communities, selected households were used for indoor quality assessment and questionnaire survey using appropriate tools. Collected data were modelled and analysed using machine learning tools with descriptive and inferential statistics. Particulate matter, odour, inadequate ventilation, presence of domestic animals was observed in some houses. The poor indoor housing condition was attributed to combustion of fuelwood, air-drying of agricultural produce and organic materials indoor. From descriptive and inferential statistics, indoor housing condition and practices that significantly ($p < 0.05$) constituted risk to respiratory health of residents included burning of dirty energy (OR 66.544), smoking of cigarette/tobacco (OR 9.487), room occupancy above five persons (OR 3.159), living in unplastered room (OR 12.350) and non-use of personal protective wears (OR 11.820). It is concluded that indoor environmental condition impacted air quality negatively. Consequently, the respiratory health of the occupants in the study area. Stakeholders' education programme is recommended to influence positive change in the attitude and practices of the residents for improved health. Furthermore, an extended study covering larger geographic communities in Nigeria using AI and machine learning tools for data modelling and forecasting is recommended.

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