# ANALYSIS OF CHILDHOOD PHARYNGITIS MORBIDITY, INDOOR AIR QUALITY AND DOMESTIC PRACTICES IN MODERN AND TRADITIONAL AREAS OF IWO TOWN, NIGERIA

BY

OKUNOLA, ABIDEMI YEMI (PG 21/0042)

B. Sc (NOUN, OSOGBO)

A Dissertation submitted to the Department of Environmental Management and Toxicology, College of Environmental Resources Management, Federal University of Agriculture, Abeokuta in partial fulfilment of the requirements for the award of degree of Master of Environmental Management and Protection

JUNE 2025

## ABSTRACT

Childhood respiratory diseases are caused by pathogens but commonly induced by exposure to air pollutants. This study examined the contribution of indoor air quality and domestic practices to the morbidity of childhood pharyngitis in Iwo town, Southwest Nigeria. A total of eight residential (four modern and four traditional) areas were sampled using stratified random method. One hundred and twenty households were randomly sampled across the eight residential areas for indoor air quality monitoring. Aeroqual gas analyzer (S-300) was used to measure the level of indoor air pollutants [particulate matter ($PM_{2.5}$ and $PM_{10}$), carbon monoxide (CO), methane ($CH_4$), nitrogen dioxide ($NO_2$), hydrogen sulphide ($H_2S$), sulphur dioxide ($SO_2$) and volatile organic compounds (VOCs)] in indoor environment. Clinical cases of pharyngitis reported by patients aged 0 – 15 years (2019 – 2023) in Iwo were collected from the General Hospital. Additionally, 120 copies of structured questionnaire were administered randomly to children and care-giver in the sampled households to obtain information on housing condition, energy use, manifestation and management of pharyngitis. Data obtained were analysed using descriptive and inferential statistical tools (SPSS 23.0). Results obtained indicated that the mean concentrations of indoor air quality across the residential areas ranged between 18.45±9.20 to 44.04±24.23 $\mu g/m^3$ ($PM_{2.5}$), 34.38±27.03 to 82.42±32.79 $\mu g/m^3$ ($PM_{10}$), 50.81±17.26 to 124.30±137.11 $mg/m^3$ (CO), 44.54±37.76 to 159.96±197.78 $mg/m^3$ ($CH_4$,), 0.15±0.07 to 0.29±0.06 $mg/m^3$ ($NO_2$), 0.09±0.13 to 0.28±0.29 $mg/m^3$ ($H_2S$), 0.04±0.07 to 0.12±0.12 $mg/m^3$ ($SO_2$), and 195.30±75.55 to 453.19±683.53 $\mu g/m^3$ (VOCs). There were significant ($p < 0.05$) spatial variations in the levels of the selected pollutants except $NO_2$. Exceedances were observed in the concentrations of indoor $PM_{2.5}$, CO, $NO_2$, $SO_2$ and VOCs in all sampled areas compared to the WHO limits. The concentrations of $CH_4$ and $PM_{10}$ exceeded the acceptable limits in 75 – 87% of the areas. Similarly, temporal variations ($p < 0.05$) were observed in the levels of $PM_{10}$ (four residential areas), $PM_{2.5}$

(three areas), CO and $NO_2$ (two areas), $H_2S$ and VOCs (one area each). $PM_{2.5}$ and $PM_{10}$ had significant ($p < 0.05$) positive correlation with CO ($r = 0.278 – 0.400$), $CH_4$ ($r = 0.184$), $SO_2$ ($r = 0.183 – 0.244$) and VOC ($r = 0.220 – 0.293$). Dust re-suspension, fossil fuel emission, biomass fuel combustion and decomposition of organic matter were identified as major sources of pollutants. The distribution of pharyngitis cases showed higher prevalence among children aged 0 – 5 years (74.1%), and males (51.5%). The hotspots of cases included Ojaale (12.0%), Feesu (10.0%), and Panada (9.6%) in the study location. The peak of pharyngitis was observed in January (200 cases) followed by December (192 cases) from 2019 – 2023. Use of biomass fuel was the major independent predictor of pharyngitis with significant odd ratio ($OR = 4.32$, $p < 0.05$), followed by living in mud houses ($OR = 3.09$) and rooms with more than three occupants ($OR = 2.66$). This study revealed that, poor air quality arising from biomass fuel use in traditional houses aggravated pharyngitis morbidity among children in the study area.