

Spatial Pattern of Environmental Noise Levels and Auditory Ailments in Abeokuta Metropolis, Southwestern Nigeria

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Abstract : Environmental noise has become a major threat to the quality of human life, and it is generally more severe in cities. This study assessed the level of environmental noise, mapped the spatial pattern at different times of the day and examined the association with morbidity of auditory ailments in Abeokuta metropolis. The entire metropolis was divided into 80 cells (areas) of 1000 m by 1000 m; out of which 33 were randomly selected for noise levels assessment. Portable noise meter (AR824) was used to measure noise level, and Global Positioning System (Garmin GPS-72H) was employed to take the coordinates of the sample sites for mapping. Risk map of the noise levels was produced using Kriging interpolation techniques based on the spatial spread of measured noise values across the study area. Data on cases of hearing impairments were collected from four major hospitals in the city. Data collected from field measurements and medical records were subjected to descriptive (frequency and percentage) and inferential (mean, ANOVA and correlation) statistics using SPSS (version 20.0). ArcMap 10.1 was employed for spatial analysis and mapping. Results showed mean noise levels range at morning ($42.4 \pm 4.14 - 88.2 \pm 15.1$ dBA), afternoon ($45.0 \pm 6.72 - 86.4 \pm 12.5$ dBA) and evening ($51.0 \pm 6.55 - 84.4 \pm 5.19$ dBA) across the study area. The interpolated maps identified Kuto, Okelowo, Isale-Igbein, and Sapon as high noise risk areas. These are the central business district and nucleus of Abeokuta metropolis where commercial activities, high traffic volume, and clustered buildings exist. The monitored noise levels varied significantly among the sampled areas in the morning, afternoon and evening ($p < 0.05$). A significant correlation was found between diagnosed cases of auditory ailments and noise levels measured in the morning ($r=0.39$ at $p < 0.05$). Common auditory ailments found across the metropolis included impaired hearing (25.8%), tinnitus (16.4%) and otitis (15.0%). The most affected age groups were between 11-30 years while the male gender had more cases of hearing impairments (51.2%) than the females. The study revealed that environmental noise levels exceeded the recommended standards in the morning, afternoon and evening in 60.6%, 61% and 72.7% of the sampled areas respectively. Summarily, environmental noise in the study area is high and contributes to the morbidity of auditory ailments. Areas identified as hot spots of noise pollution should be avoided in the location of noise sensitive activities while environmental noise monitoring should be included as part of the mandate of the regulatory agencies in Nigeria.

Keywords : noise pollution, associative analysis, auditory impairment, urban, human exposure

Conference Title : ICMGPH 2019 : International Conference on Medical Geography and Public Health

Conference Location : Amsterdam, Netherlands

Conference Dates : May 14-15, 2019