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ENVIRONMENTAL HEALTH RISK ANALYSIS USING APPLICATION: A CASE STUDY OF INDOOR AIR QUALITY

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Abstract

Urban environments are characterized by high levels of pollutants, including particulate matter (PM_{2.5} and PM₁₀), which are exacerbated by factors such as traffic emissions, industrial activities, and inadequate ventilation in residential areas. This study aimed to develop a web-based application that can assess the health risks related to indoor air quality. This study used a descriptive analytical design. Location selection was based on population density and pollution potential, and 80 households were selected through systematic random sampling. Air quality parameters, including PM_{2.5}, PM₁₀, temperature, humidity, lighting, ventilation rate, and noise, were measured using standardized instruments to ensure data accuracy. The analysis was conducted in two stages: descriptive analysis and health-risk assessment. Risk Quotient values were interpreted to assess potential health risks. The measurement results showed that most air quality parameters did not meet established standards, with 87.50% of homes not meeting humidity criteria and more than 90% of homes being unsafe from PM_{2.5} and PM₁₀ exposure. The health risk analysis results showed that 10% of homes had a Risk Quotient indicating potential health risks due to PM_{2.5} exposures, while 3.75% had a Risk Quotient for PM₁₀ exposure. In Conclusion, the developed application is capable of providing interactive risk visualization and data that are easily accessible to the public and stakeholders. By providing an interactive platform for visualizing health risks, the application empowers residents and stakeholders to make informed decisions regarding air quality. Policymakers can leverage the data from the application to formulate targeted interventions. In the future, investigating the long-term exposure implications on health outcomes could provide critical insights.

Key words: environmental health, health risk analysis, indoor air quality, PM_{2.5}, PM₁₀, web-based application

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