



Longitudinal Analysis of Air Quality Monitoring, Public Alerts and Asthma Hospitalisation Rates in Industrial Casablanca

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Abstract

Industrial areas of Casablanca, Morocco, suffer from chronically poor air quality, a recognised trigger for asthma exacerbations. Although air quality monitoring and public alert systems are operational, their longitudinal effect on severe outcomes like asthma hospitalisations remains unevaluated. This study evaluated the impact of a public air quality monitoring and alert programme on asthma hospitalisation rates for children and adults in Casablanca's industrial zones. Its primary objective was to determine whether the alert system's activation was associated with a measurable change in hospitalisation trends. A longitudinal ecological study was performed. Routinely collected administrative data on daily asthma hospital admissions were linked with air quality index (AQI) data and public alert logs. An interrupted time-series analysis compared hospitalisation rates before and after the full implementation of the public alert system, adjusting for seasonal trends and meteorological variables. Following the sustained implementation of public alerts, a statistically significant downward trend in asthma hospitalisation rates was observed. The most pronounced effect was seen in paediatric admissions, which showed an approximate 18% reduction in the quarterly hospitalisation rate compared to the pre-alert trend. The findings indicate that an operational air quality monitoring system, combined with proactive public alerts, is associated with a reduction in severe asthma exacerbations requiring hospitalisation in an industrial urban environment. Public health authorities should maintain and extend real-time air quality monitoring and alert systems. Targeted health communication strategies, especially for vulnerable paediatric populations and their caregivers, must be strengthened to improve behavioural adaptation during high-pollution episodes. air pollution, asthma, public health surveillance, health alerts, hospitalisation, longitudinal studies, Morocco This study provides empirical longitudinal evidence from an African industrial city on the potential public health benefit of integrating air quality monitoring with proactive public alerts.

Keywords: *Air pollution, Asthma epidemiology, Environmental health, Longitudinal study, North Africa, Public health surveillance, Respiratory disease*

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