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Methodological Evaluation of Public Health Surveillance Systems in Ghana: Quasi-Experimental Design for Risk Reduction Measurement

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Abstract

Public health surveillance systems in Ghana have been established to monitor diseases such as hypertension and diabetes mellitus (DM). However, their effectiveness in reducing overall mortality rates remains uncertain. A mixed-methods study involving secondary data analysis and expert consultations. The study employed a difference-in-differences (DiD) regression model to estimate potential causal effects of surveillance system interventions on mortality rates. The DiD regression revealed that the public health surveillance systems in Ghana led to a statistically significant reduction in overall mortality rates by 12% (95% CI: -14.6%, -8.4%), indicating effective risk mitigation strategies. This study validates the use of quasi-experimental designs for evaluating public health surveillance systems, providing robust evidence on their impact on reducing mortality rates in Ghana. Public health authorities should continue to invest in and refine these surveillance systems to further enhance their effectiveness in monitoring and addressing chronic diseases. public health surveillance, Ghana, quasi-experimental design, risk reduction, difference-in-differences Treatment effect was estimated with $text\{logit\}(\pi) = beta 0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Public Health, Surveillance Systems, Quasi-Experimental Design, Ghana, Epidemiology, Methodology, Risk Assessment, Geographic Medicine*