Bayesian Hierarchical Model Assessment of Clinical Outcomes in Public Health Surveillance Systems in Nigeria,

Chinedu Ozioma[1]

[1] Bayero University Kano

Author notes

Chinedu Ozioma is affiliated with Bayero University Kano and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems are crucial for monitoring clinical outcomes in Nigeria. However, their effectiveness varies widely due to differing methodologies and data quality. A systematic literature review was conducted, focusing on studies published between and . Studies were selected based on their use of surveillance data and application of a Bayesian hierarchical model to evaluate clinical outcomes in Nigeria. The models' robustness and predictive accuracy were assessed. The review found that the Bayesian hierarchical model improved the consistency and reliability of clinical outcome measurements compared to traditional methods, with an average improvement rate of 15% in prediction accuracy across multiple studies. The Bayesian hierarchical model demonstrated significant improvements in measuring clinical outcomes within Nigeria's public health surveillance systems. Future research should explore its scalability and cost-effectiveness in larger datasets. Public health officials are recommended to adopt the Bayesian hierarchical model for improved surveillance system performance, especially in monitoring infectious diseases where accuracy is paramount. Treatment effect was estimated with $text\{logit\}(\pi) = beta\,0 + \vec{\beta}\,p\,X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, Bayesian hierarchical models, clinical outcomes assessment, public health surveillance, Nigeria, methodology evaluation, statistical methods*

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