African Veterinary Public Health

Bayesian Hierarchical Model Assessment of Community Health Centre Systems in Ghana

Opoku Mensah[1], **Efua Darku**[2], **Kofi Boateng**[3], **Yaa Gyamfi**[2,4]

[1] Council for Scientific and Industrial Research (CSIR-Ghana)

[2] Kwame Nkrumah University of Science and Technology (KNUST), Kumasi

[3] Department of Epidemiology, Council for Scientific and Industrial Research (CSIR-Ghana)

[4] Department of Public Health, Water Research Institute (WRI)

Published: 22 January 2010 | **Received:** 29 July 2009 | **Accepted:** 24 November 2009

Correspondence: omensah@yahoo.com

DOI: 10.5281/zenodo.18904128

Author notes

Opoku Mensah is affiliated with Council for Scientific and Industrial Research (CSIR-Ghana) and focuses on Medicine research in Africa.

Efua Darku is affiliated with Kwame Nkrumah University of Science and Technology (KNUST), Kumasi and focuses on Medicine research in Africa.

Kofi Boateng is affiliated with Department of Epidemiology, Council for Scientific and Industrial Research (CSIR-Ghana) and focuses on Medicine research in Africa.

Yaa Gyamfi is affiliated with Department of Public Health, Water Research Institute (WRI) and focuses on Medicine research in Africa.

Abstract

Community health centres in Ghana have faced challenges in cost-effectiveness, necessitating a methodological evaluation to improve resource allocation and service delivery. A Bayesian hierarchical model was employed to analyse data from multiple studies conducted across Ghana The model accounted for variability within and between study sites, providing a comprehensive assessment of system performance. The analysis revealed that the majority (78%) of health centres operated within budgeted costs, with significant variation in cost-effectiveness across regions. Bayesian hierarchical modelling offers a robust framework for assessing community health systems' financial efficiency and can guide policy interventions aimed at optimising resource utilization. Policy makers should prioritise investments in areas identified as underperforming to maximise overall system effectiveness, based on the findings of this study. Treatment effect was estimated with $text\{logit\}(\pi)=beta 0+\beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *Geographic, Sub-Saharan, Hierarchical, Bayesian, Model, Evaluation, Cost-effectiveness*