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Socio-economic determinants of malaria transmission risk in KwaZulu-Natal, South Africa: A Bayesian inference approach

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Low socio-economic status (SES) has been suggested to sustain malaria transmission which in turn can propel the cycle of poverty. Thus, a deep understanding of the SES that influences malaria risk is vital because it will guide towards creating policy and strategies that will concurrently help combat malaria transmission, improve socio-economic conditions and strengthen the malaria elimination campaign in KwaZulu-Natal (KZN), South Africa (SA). The main purpose of this study is to assess the relationship between SES and malaria incidence in KZN, SA, using the Bayesian inference approach. Database of demographic/socioeconomic information and clinically confirmed malaria case data aggregated at the local municipality level for 2011 were obtained from statistics SA and the malaria control program of KZN, SA respectively. We used the 2011 dataset (SES and malaria incidence) for this study because it completely covered the study area. The association between SES and malaria incidence was evaluated by employing the Bayesian multiple regression model to obtain the posterior samples via a Markov chain Monte Carlo (MCMC) methodology. The obtained posterior samples reveal that, significant association existed between malaria disease and low SES such as illiteracy, unemployment, no toilet facilities and no electricity at 95% CI. Lack of toilet facilities (OR =20.2; 95% CI = -36.82, 76.0) exhibited the strongest association with malaria disease, followed by lack of electricity (OR=5.252; 95% CI = -52.40, 62.32). This study suggests low SES potentially sustains malaria transmission and burden. As an implication, poverty alleviation and malaria intervention resources should be incorporated side by side into the socioeconomic framework to attain zero malaria transmission. Therefore, the relevant policy makers and departments should stimulate additional sustainable developmental approach that combines both improved malaria intervention resources and socioeconomic conditions, which in turn, will help strengthen the malaria elimination goals in KZN, SA.

Biography

Osadolor Ebhuoma is a Doctoral student at the University of KwaZulu-Natal, South Africa, and teaches geographic information systems (GIS) and remote sensing. His research is aimed at developing spatial and temporal malaria transmission models in KZN, South Africa using malaria surveillance data, remote sensing derived climatic/environmental variables and socioeconomic factors. The expected outcome of his research will be the identification of determinants of malaria transmission in KwaZulu-Natal and the development of malaria forecast models and by applying time series and Bayesian models. His research interests include spatial epidemiology, GIS and remote sensing.

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