Author's response to reviews

Title: Geographical information system and predictive risk maps of urinary schistosomiasis in Ogun State, Nigeria

Authors:

- Uwem F Ekpo (ufekpo@hotmail.com)
- Chiedu F Mafiana (chiedu.mafiana@gmail.com)
- Clement O Adeofun (clemluy2000@yahoo.com)
- Adewale RT Solarin (Solarinart@unaab.edu.ng)
- Adewumi B Idwu (idowuab@unaab.edu.mg)

Version: 2 Date: 25 February 2008

Author's response to reviews: see over
24 February 2008

Editor-in-chief

BMC Infectious Diseases

Dear Editor,

We have received the three reviewers’ reports of which we are very much pleased as it will enrich the quality of our manuscript. The comments of reviewer 1 and 3 which was favourable have been noted and their suggestions have been reflected in the revised manuscripts. However, reviewer 2 raised a lot of concern and issues. Below is our point-to-point response to these concerns.

General
1. We have provided more details on the method of analysis used which were binary logistic regression analysis involving dichotomous dependent variables. In this case, the presence or absences of urinary schistosomiasis in a school in model one, and the presence or absence of high risk school in Model 2. One of the authors is statistician who provided assistances in regression analysis and development of the model equations. Therefore the analysis benefited from his statistical advice.

2. We have read the work of Raso et al and Clements et al, which used Bayesian geo statistic methods, to model transmission and intensity. However, our methods are largely that of Brooker et al 2000, Brooker et al 2002 where remotely sensed environmental images had been used in predicting the distribution of schistosomiasis in Tanzania and Cameroon. This has been found to be useful in predicting distribution for area where data are lacking. Our objective was to develop infection prevalence maps that can assist in planning disease control. We did not attempt to model intensity or transmission.

Abstract
1. The background has been re-written stating in clear terms the objectives of our study.

2. The method has been revised to give insight to the questionnaire. However, details of the questionnaire administration, data collection, validation, analysis and result have been previously published (Ekpo and Mafiana 2004).

3. The result of the logistic regression analysis i.e. regression coefficient and p values has been included.

4. Our conclusions have been revised to relate to the aim and objective of the study.

Introduction
1. This has been revised to include the aims of the study

Methods
1. Details of the questionnaire, validation have been previously published. There is no ongoing control programme in the state. The survey was done as part providing baseline data for developing a control programme in the state. The number of schools and school children in the state has been provided. We have felt that it would be wise to provide sample of the questionnaire (additional file) used and a brief on the method used in acquiring the infection data. Since these have been published elsewhere we have cited the reference. Table 1 was provided to show sources of our infection data. The additional file showing sample of the questionnaire used has been deleted accordingly.

2. NDVI and LST image acquisition and processing was done for the authors courtesy of Dr Simon Brooker. This effort has been dully acknowledged. Rainfall, altitude, soil types and land cover digital maps were sourced from GIS laboratory of International Institute for Tropical Agriculture (IITA) based in Ibadan, Nigeria.

3. We did the population projections using annual growth rate provide by National Population Commission of Nigeria.

4. The school locations are available from unpublished studies by the authors.

5. The spatial analysis performed used the interpolation module in Arc View spatial extensions.

6. Our model did not look at transmission but infection prevalence in the state. We need to incorporate snail intermediate host database to refine the model to look at transmission. Hopefully this is our further target.

7. More details has been provided on the logistic regression analysis, variable were selected using forward stepwise method.

Results

1. The choropleth map has been deleted. This has been replaced with a map showing the location of schools used for the analysis.

2. The details of the logistic model presented in the results section are necessary has it gives insight on the equations used in generating the risk maps (see Elnaiem et al, 2003: Am J Trop Med Hyg. 2003 Jan;68(1):10-7.)

3. A model validation has not been undertaken due to paucity of funds

4. The use of prediction map to calculate the burden of risk (not infection) is based on the approach of Moodley et al 2003 and is indicate in the methods.

5. Digital population density map are available for each LGA in the state. This can be easily converted to grid (image) data in Arc View GIS spatial analysis.

Discussion
1. It is well known that risk maps particularly for schistosomiasis has been widely used in developing and implementing control programme in Egypt, East Africa and recently South Africa. In the context of Nigeria disease control, such maps are lacking where estimates shows that 101 million Nigerian are at risk of infection (Chitsulo et al 2000). These maps perhaps represent a first attempt to provide reliable data for planning a disease control programme. The methods used in its production are standard which has been used elsewhere by expert in spatial epidemiology and GIS. These experts agrees risk maps are useful in the face of limited resources in delineating area of risk and assisting in developing control programme rather than undertaking parasitological examinations (Brooker and Michael, 2000).

2. The use of questionnaire for rapid assessment of risk of infection has become very popular in Africa in the context of limited resources. The infection data used in this study were vigorously validated using sensitivity and specificity methods published elsewhere (Ekpo and Mafiana, 2004). This to our knowledge is the best comprehensive data on urinary schistosomiasis in the State.

Thank you

Dr Uwem Ekpo

Corresponding Author