Climate Variability and Malaria: A Case of Punjab, Pakistan

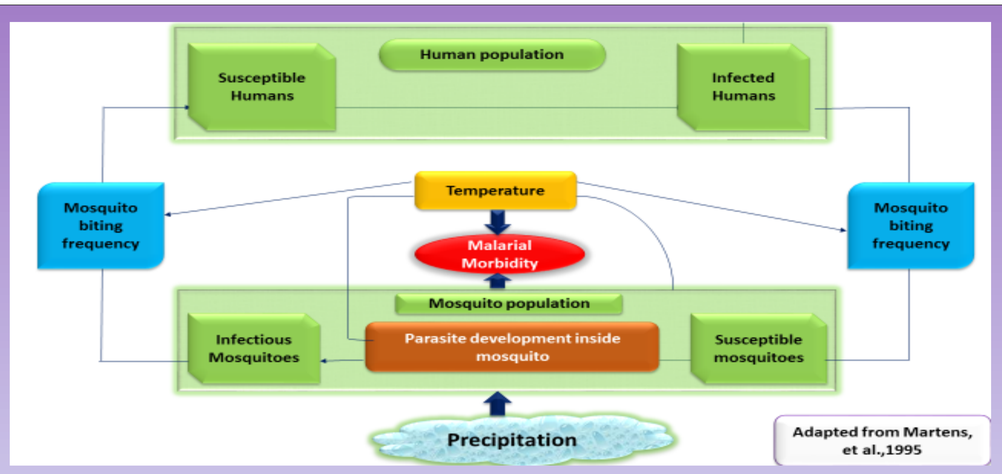
Sobia Rose[1], Muhammad Faisal Ali[1,2], Muhammad Ashfaq[1], Khuda Bakhsh[3]
[1] University of Agriculture, Faisalabad, Pakistan
[2] New York University, New York, United States of America
[3] Comsats Institute of Information Technology, Vehari, Pakistan

WHY THIS RESEARCH?

Malaria needs a priority attention in a developing country like Pakistan where it is a second most prevalent disease. The study is important because it provides a detailed district based analysis of malarial morbidity and its relation with climatic factors (temperature, rainfall and humidity) and socio economic factors. This research explored that disease burden differs from one district to the other depending on the climatic conditions and some confounding factors also play an important role. This study recommends that while formulating health policy the districts having favorable climate for the spread of malaria with weak socio economic conditions should be given more considerations.

WHAT IS THE PROBLEM?

Malaria is generally called a disease of poverty hence it lowers the socioeconomic status, especially of those who cannot afford the cost of preventive measures. Despite a "well–established" malaria control programs there are almost 500,000 malaria infections and about 50,000 malaria related deaths occur every year in Pakistan (Khattak et al., 2013) Moreover the epidemic potential of malaria is expected to increase 12-27 percent as a result of changing climatic conditions (Mustafa, 2011). A mere half-degree centigrade increase in temperature trend can translate into a 30–100% increase in mosquito abundance (Olson and Patz, 2011) while on the other hand the cost of health in Pakistan has already been increased a billion US dollars due to climatic variability and it is predicted to increase which will affect the country's health improvement and poverty reduction targets. Therefore, it was necessary to find out the linkages between climatic variations and malarial morbidity including the socioeconomic factors.



THEORETICAL IDEAS BEHIND THE STUDY

METHOD APPLIED

A Generalized linear unconditional fixed effects negative binomial model was applied

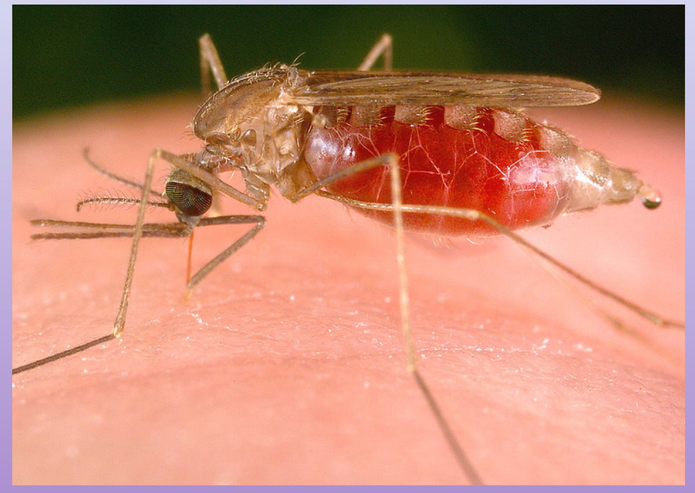
$$Malaria\ counts\mu d = \beta 0 + \beta 1\ Mean\ TEMP_{dmy} + \beta 2\ RF_{dmy} + \beta 3\ HUM_{dmy} + \beta 4\ Mean\ TEMPsq_{dmy} + \beta 5\ RFsq_{dmy} + \beta 6\ HUMRF_{dmy} + \beta 7\ BEdu_{dy} + \beta 8\ GEdu_{dy} + \beta 9\ CrpAREA_{dy} + \beta 10\ HlFacility_{dy} + \beta 14 \ldots\ldots\ldots\ldots 28\ DUM_{d}2 \ldots\ldots\ldots\ldots d15 + \varepsilon$$

RESULTS

- Findings revealed that temperature, rainfall and humidity have a significant relationship at two months lag to the malaria month of interest and their quadratic terms also showed significant but negative relationship with malaria prevalence.
- Education of women was negatively and significantly associated with the malaria burden
- Presence of a health facility showed a positive and highly significant relationship; contrary to a priori expectations.
- An increase in the number of health facilities might be expected to increases disease reporting. If this is not associated with an improvement in the quality of the health services hence it will cause no reduction in the malaria burden.

POLICY IMPLICATIONS

- ✓ Local targets should be specified by considering specific climatic and socio-economic conditions each district
- ✓ Better education of women with improved health services are needed to make these areas malaria free
- ✓ Malaria control interventions should target the vulnerable and poor communities first
- ✓ This study is the first of its kind in Pakistan and it can be used as a benchmark for further investigations on this subject



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