Spatial Distribution of Childhood Malaria Incidence in Akure, Nigeria: Spatial Methods for Risk Modelling.

Der räumliche Blick auf Gesundheit im 21. Jahrhundert: Methoden, Herausforderungen und Perspektiven

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What about Malaria?

Was uber Malaria?

Only infected female Anopheles mosquitoes have the capacity to transmit the parasites (plasmodium)
Geography is Destiny in Medicine?

*Geographie ist Schicksal in der Medizin?*

How?

Why?

Where?

Any obvious and simple correlation?

**Reflections of environmental determinism**
Geographical Variation of Malaria Transmission

Geographische Variation der Malariaübertragung

Disease of the poor
Increased prevalence of 5 million (211M – 216M)
90% & 91% of cases and death occurs in Africa (194.4M; 407,000)
The children and nature movement is fuelled by this fundamental idea: the child in nature is an endangered species, and the health of children and the health of the Earth are inseparable. *Richard Louv*

>2/3 U5 malaria global death i.e U5 death every 2 mins.

Every one minute, a child die before first birth day in Nigeria from a preventable death.
Epidemiology Triad Model

Theorie von Krankheit

Traditional model of infectious disease causation

Environment
(Climate, housing characteristics, mobility)

Agent (vectors)
(Viruses, parasites, fungi, bacteria)

Disease (malaria)

Host
(Human, animal)
Study Area: Akure, Nigeria

- High rainfall, 2378mm
- Relatively low, 370m (1,150 ft) above sea level
- Tropical rain forest
- Average temperature is between 28 deg. and 25 deg
- Coverage of 991 km² (383 sq mi)
- Millennium city
- Density 490/ km²
What is the aim of this study?

How can we develop spatial models with integration of malaria risk factors that are instrumental to malaria control and prevention strategies?

Map Visualization

Risk maps

Spatial pattern of malaria

Scaling up spatial epidemiology in Nigeria?

How about direction of malaria spatial pattern?
• Complexity in transmission
Ecological Data

Natural environment

Socio-ecological

Epidemiological Data

Biological Characteristics

Socio-epidemiological

Temperature
Rainfall
Humidity
Slope
Building characteristics
Health facilities
Road networks
Waste site
Proximity factors

Age
Sex
Body weight
Malaria event
Socio-eco. status
Level of education
Religion
Household density
Ethnicity
Preventive behaviour
• Random selection of households in the districts of Akure

Objective 1 → Local Indicators of Spatial Associations (LISA) i.e Local Moran’s I and Local Geary’s C Statistics

Objective 2 → Multi Criteria Evaluation (MCE) using Analytical Hierarchic Process (AHP)

Objective 3 → Spatial regression models (Geographical Weighted Regression; Spatial Durbin Model)

Objective 4 → Systematic review of literature from identified database (PubMed) and field experience

Objective 5 → Illustrative communication with maps
Chapter 1:- Background information i.e Introduction, justification and objectives of the study

Chapter 2:- Literature review of GIS and RS applications to malaria studies

Chapter 3:- Spatial and temporal pattern of childhood malaria in Akure

Chapter 4:- Remotely sensed environmental risk modelling of childhood malaria in Akure

Chapter 5:- Relationship between urbanity and childhood malaria incidence in Akure

Chapter 6:- Conclusion
Thank you for listening

Vielen Dank

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