Database management system for the control of malaria in Arunachal Pradesh, India

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Abstract:

The Arunachal Pradesh state in India is epidemic for malaria, caused by *P.vivax* and *P.falciparum*. Despite the implementation of several control strategies, the outbreak of malaria in the state is mainly due to lack of proper information regarding the disease. Hence, we completed a database to help implement appropriate control strategy for the public health officials in Arunachal Pradesh.

Availability: www.envisiict.org

Keywords: malaria; database; control; mosquito; data

Background:

Frequent outbreak of mosquito borne diseases in India is generally attributed to the large number of mosquito species in vast eco-geographical areas and congenial environmental factors. Most states in India have reported the outbreak of mosquito borne diseases. The North Eastern Indian state of Arunachal Pradesh is mostly affected by malaria caused by *P. vivax* (60-65%) and *P. falciparum* (30-35%). [1] This is due to hilly terrain, congenital climatic conditions and dense tropical forests. [2] The failure of many effective control strategies in the state is due to lack of information on malaria causing agents. Hence, there is a need to gather detailed information about the disease for suitable implementation of mosquito control strategies. Here, we describe the development of a database for the understanding of various epidemiological, entomological and socioeconomic data in a relational manner.

Methodology:

Database Design

A database is designed in MS Access 2000 to store information. The front-end application has been designed using visual basic 6.0 enterprise edition. Reports and checklists are designed using web design in ASP/ DHTML with CSS and can be hosted in any local web server. Hence, the checklists and reports can also be using Internet browsers without specific application. The visual basic application has been designed to provide data entry into database using different forms and to view the data using checklists. These checklists are helpful in comparing and validating the data that is fed into the database. Various reports are designed for accessing data within and outside the application.

Data sets

The collection dataset is divided into the following sections.

Socio-economic details

This form contains district-wise details of patients affected by malaria which consists of information on Name, age, sex, occupation, literacy, income, location, type of house, vicinity of house to water body, drainage system, raised house structure, exposure to outside, state of compound wall, vegetation nearby, preventive measures against malaria, distance to nearest health center, outdoor visits after dusk, migration status and others.

Epidemiological details

This form contains blood survey data related to the disease in different districts collected over a period of several months.

Mosquito Dissection details

This form contains month, district, location & public health center (PHC) details of the different mosquito species collected and dissected. Information on different stages of pathogens is also incorporated in this form.

Entomology details

This form contains data on per man-hour density (PMHD) from different public health centers of the state.

Meteorological details

Details of weather conditions, like Temperature, rainfall, humidity, wind velocity etc., have been collected from the different public health centers and incorporated in this form.

Figure 1: Screen shots of Data Base Management System for the control of Malaria in Arunachal Pradesh.
A. Home Page of the Database, B. Data entry form of Socio-economic Details, C. Data entry form of Epidemiology Details, D. Data entry form of Mosquito Dissection Details, E. Data entry form of Entomology Details, F. Data entry form of Meteorology Details, G. Report page of Socio-economic Details, H. Report page of Epidemiology Details, I. Report page of Entomology Details

Reports Generating forms:
Socio-economic details
(1) Age-wise distribution; (2) -wise distribution; (3) Occupation-wise distribution; (4) Literacy-wise distribution; (5) Income-wise distribution; (6) Type of house wise distribution; (7) Location-wise distribution; (8) Vicinity of house to water body wise distribution; (9) Water storage wise distribution; (10) Drainage system wise distribution; (11) Raised house structure wise distribution; (12) Exposure to outside wise distribution; (13) State of compound wise distribution; (14) Migration status wise distribution; (15) Vegetation in compound wise distribution; (16) Awareness of malaria wise distribution; (17) Preventive measures against malaria wise distribution; (18) Distance to nearest health center wise distribution; (19) Outdoor visits after dusk wise distribution.

Epidemiological situation report
It provides the information about the epidemiological status of the disease of the study area by month and year wise.

Mosquito dissection report
This report provides all information (mosquito abdominal condition {unfed, full fed, gravid, semigravid}, sporozoite in salivary gland, parous rate, oocyte in gut position etc.,) of different mosquito species collected from the study areas.

Entomology details
(a) Whole night bait collection on indoor human bait; (b) Whole night bait collection on outdoor human bait; (c) Whole night bait collection on indoor animal bait; (d) Indoor cattle biting collection; (e) Indoor cattle resting collection; (f) Outdoor human dwelling resting collection; (g) Indoor human dwelling resting collection; (h) Annual entomological investigation report larva collection

Meteorological situation report
It generates the data about the meteorological information of the study area month wise and year

wise comprising of Temperature, Maximum & Minimum Rain fall and Wind speed.

Others Details:
Reports
Literature Collection
About 164 articles Information related to the disease from 164 research articles have been incorporated into the database with appropriate Hyperlinks to other external sources.

Help
Help screen describes different features and facilities available in the application.

Utility:
The Data Base Management System is used for the successful control of Malaria in Arunachal Pradesh, India.

This is the main form for accessing reports and checklists. Selection of appropriate options to click on the show button to view the report/checklist is available.

References:
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[02] K. Ashok, *et al.*, *Medical Geography*, 14:317 (1980)