Dengue in Pakistan; a new approach to battle the endemic

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Madam, dengue is a mosquito-borne tropical pandemic infecting up to 390 million people annually, of which 96 million people manifest the disease.[1] Dengue virus is now endemic in Pakistan, with official reports documenting a skyrocketing 22,652 cases of dengue in 2011 with 363 deaths.[2] One must question what appropriate preventative and curative measure should be taken against this menace. Table highlights the different approaches that should be used to battle the spectrum of the disease across all fronts.

Furthermore, to neutralize this deadly threat, developing an early warning system predicting dengue outbreaks in relation with climatic changes may represent a new approach. Many studies have established that a relationship exists between dengue transmission and climatic variability.[3] One such study shows that dengue is prevalent in summer months in the tropical belt which have a warm climate suitable for dengue spread.[3] The same review concludes that the transmission of dengue is highly sensitive to climatic conditions, especially temperature, rainfall and relative humidity. Increasing surface air temperatures due to global warming have led to the rise of mean temperature over the coastal belt of Pakistan, including Karachi and a decrease in precipitation in coastal belts over time. Pakistan is described as the 12th most vulnerable country to climatic changes which will impact the transmission of vector-borne diseases.[4] Unfortunately, few Geographical Information System (GIS) studies have been conducted in Pakistan. Qureshi EM et al. recently conducted a study to predict dengue outbreaks via dengue vector indices and climatic variables.[5] However, this study was limited to Lahore (a major city in Pakistan). Studies spanning the entire country and systematic reviews are needed to efficiently model tools for dengue risk mapping. One research in Guangzhou, China demonstrated how an efficient, low cost model can be built for dengue surveillance using a Time series Poisson model.[6] It also co-related climatic variation with dengue outbreaks. Hence, we in Pakistan can take a leaf out of the book of our Chinese neighbors. Pakistan and China share the same genetic footprint as well as similar Asian climate. Guangzhou is close to the same tropical belt of Asia as Karachi. Consequently, a study based on the Chinese model may be conducted and similar results may be expected.

Table: Four modes of dengue prevention.

Primordial prevention	Primary prevention	Secondary prevention	Tertiary prevention	Quaternary prevention
People residing in target areas should be educated about dengue awareness and prevention.[7]	Usage of newly developed vaccine, Sanofi Pasteur.[8] Elimination of breeding grounds and control of vector source i.e. mosquitoes by larvicidal sprays.[2]	A system in place to manage dengue virus infections, prompt recognition and immediate treatment to effected patients.[7]	Prevent dengue-related deaths due to dengue haemorrhagic fever by effective clinical management and training personnel for such cases.[7]	Avoiding unnecessary admissions, blood transfusions and platelet transfusions in uncomplicated dengue. Avoiding panic amongst the public.

It cannot be overemphasized that positive outcomes in dengue depend almost entirely on early diagnosis and action. Where traditional preventative practices have failed, a model based on climatic associations may prove to be successful. Developing this early warning system may prove to be a step in the right direction towards solving the dengue jigsaw in Pakistan.

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