Malaria Control : Current Concepts

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MJAFI 2003; 59 : 5-6

Key Words : Malaria control; Strategies

Malaria continues to be a major public health problem in many countries and its role as a military medical problem goes back into antiquity [1]. Malaria has the potential to incapacitate such a large number of troops that military operations may be jeopardized [2]. In India, the Vedic medical literature recognized it as the “King of Diseases” [3].

Shifting from the ancient to the present - about 100 countries in the world are considered malarious with more than 2400 million of the world's population at risk [4]. The incidence of malaria worldwide is estimated to be 300-500 million cases each year, killing between 1.1 to 2.7 million people.

Urban and periurban malaria is on the increase in South Asia. Military conflicts and civil unrest, along with unfavourable ecological changes, have greatly contributed to malaria epidemics, as large number of unprotected, non-immune and physically weakened refugees move into malarious areas. Such population movements contribute to new malaria outbreaks and make epidemic prone situation more explosive [4].

Today, major advances have taken place in our understanding of the molecular biology of the malaria parasite and of the immunologic responses to it; in the development of diagnostic techniques, vector control methods, antimalarial drugs and vaccines; and in the trials of a variety of strategies for malaria control [5]. Contemporary malaria control efforts aim to reduce malaria related morbidity and mortality through a combination of multiple interventions that disrupt the parasite-vector-human cycle at several points. This stratified approach is based on the observation that the effectiveness of different malaria control options can depend heavily on local conditions [6]. Some understanding of these conditions is therefore essential in order to develop a malaria control project. First of all, basic surveillance data are necessary to determine the level of endemicity, assess the seasonality of transmission, and identify the level of risk in different population groups.

In some areas, drug efficacy testing will be needed to

understand the relative prevalence of antimalaria drug-resistant parasites and to develop effective treatment and chemoprophylaxis policies. An understanding of local attitudes and beliefs is also important, since these can affect the acceptability of some interventions, particularly those that depend on changing human behaviour. Finally entomological studies to identify the principal vectors are necessary for selecting appropriate vector control options [7,8].

Approaches focusing upon vector control have progressed beyond that of engineering and larval control to use of residual insecticides, aerosol distribution of insecticides, the use of mosquito netting and screens, repellants of various types and most recently the development of insecticide treated bed nets.

In the last ten years increasing experience with insecticide treated bed nets have shown reduction of transmission, clinical disease, and childhood mortality in at least three large controlled trials [9-12]. However, not all studies have demonstrated such positive benefits, and there is much controversy about the role of insecticide treated bed nets in control programs. An evaluation of a national program of insecticide treated bed nets under routine use failed to provide evidence for any reduction in child mortality [13]. Similarly, use of deltamethrin treated mosquito nets did not have significant impact in reducing malaria incidence in an air force setting where the vectors were exophilic [14].

In spite of such conflicting reports, insecticide treated bed nets are one more potentially valuable weapon to be included in working through an integrated approach to malaria control based upon epidemiological, ecological, and socioeconomic circumstances. For example, between 1992 and 1997, Vietnam reduced its malaria death toll by 97%, when number of people using insecticide treated nets provided free of charge soared from 300, 000 to 10 million. Vietnam's success was achieved through countrywide provision of insecticide treated nets, indoor spraying with insecticides, the use of high-quality antimalarial drugs, preventing malaria in pregnant women, and disease monitoring and reporting [15].

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In India, the Enhanced Malaria Control Project (EMCP) was launched in April 1997 with the assistance of World Bank. This is directly benefiting six crore tribal population of the eight peninsular states covering 100 districts and 19 urban areas. One of the components of EMCP is the insecticide treated bed net programme. During 1999-2000, 1,50,000 insecticide treated bed nets were distributed in the North-Eastern States. During 2000-2001 the supplies were increased in more areas besides the North-East and 3,20,000 nets were distributed [16].

The Roll Back Malaria (RBM) initiative was launched in October 1998. It has four founding partners; WHO, UNICEF, UNDP and the World Bank. This initiative is unique in that, unlike previous global campaigns against malaria, RBM is horizontal in its approach, focusing on building sustainable community capacity. RBM is also unique in its ability to raise the level of political commitment and advocacy at the country level.

Remote Sensing Technologies through satellites is likely to become a rapid epidemiological tool for surveillance of vector borne diseases and malaria in particular [16]. Scientists in USA had used this technique way back in 1971 to identify the habitats of a nuisance mosquito *Aedes sollicitans*. In India, The National Remote Sensing Agency is located in Hyderabad. A feasibility study using satellite data in collaboration with the Indian Space Research Organization in and around Delhi was carried out and correlation of changes in water bodies and vegetation with mosquito density was found significant in some sites. Malaria, along with tuberculosis and HIV/AIDS is considered one of the diseases of poverty and global efforts are on to scale up the remedial activities.

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