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Integrated Vector Management Strategy: An Overview of its Scopes and Challenges in India

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Abstract

Integrated management of vectors is an affordable, effective and efficient intervention for facing the challenge of increasing burden of vector borne diseases especially in developing countries where resources are scarce and limited.

Vector borne diseases like Dengue, malaria etc are taking heavy toll in terms of morbidity, mortality and also adversely affects economy and serve as major obstacle for socioeconomic development of a developing country like India.

Scope 1. To reduce Burden of VBDs in World and in India 2. Elimination of Malaria, Filariasis and Visceral leishmaniasis 3. To improve public health and Socio-economic development 4. Control of emerging and re emerging diseases 5.To reduce the financial burden due to Vector borne diseases.

Following Vector control strategies are the pillars of integrated vector management. 1. Source reduction 2. Appropriate methods to control larva. 3.Adult mosquitoe control measures. 4. Community education & Participation for risk assessment and interventions.

Other challenges in implementation of IVM are lack of capacity building and poorly defined the role of advocacy. Supportive legislative framework is lacking and also there is inadequate intersectoral co ordination.

Human Resource development is a major Challenge because skilled manpower and adequate infrastructure from central level to grass root level are the prerequisites for effective implementationof IVM.

Implementation of integrated vector management strategies need strengthening. The implementing agencies should analyze the opportunities depending upon the situational and for effective implementation co operation from all stake holders is essential.

Keywords: Challenges, integrated, management, vector, scope.

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Key Messages: Following Vector control strategies are the pillars of integrated vector management. 1. Source reduction 2. Appropriate methods to control larva 3. Adult mosquitoe control measures 4. Community education & Participation for risk assessment and interventions.

INTRODUCTION

Concept and Rationale of Integrated Vector management (IVM)

World Health Organization adopted IVM strategy globally in 2004 in order to control vector borne diseases. It is a rational decision making process that involves efficient, cost effective and eco friendly methods optimizing the use of standard chemical, physical, biological and environmental measures to control vectors,in order to achieve the global targets to control vector borne diseases. IVM is based on five key principles as 1) evidence-based decision-making, 2) integrated approaches 3), collaboration within the health sector and with other sectors, 4) advocacy, social mobilization, and legislation, and 5) capacity building.[1-2]

Integrated management of vectors is an affordable, effective and efficient intervention for facing the challenge of increasing burden of vector borne diseases especially in developing countries where resources are scarce and limited.

Vector borne diseases like Dengue, malaria etc are taking heavy toll in terms of morbidity, mortality and also adversely affects economy and serve as major obstacle for socioeconomic development of a developing country like India.

Scope

To reduce Burden of VBDs in World and in India

Global Statistics: As per the estimates nearly 80% of human population is at risk of contracting at least one vector borne disease in lifetime and annual deaths due to VBD exceed 700000.[3]

Problem statement in India

Malaria is an endemic disease in 104 countries and territories, with India accounting for almost 50 percent of the 2 million cases reported in the WHO's South-East Asia Region.The majority of malaria cases and deaths in India are recorded from Chhattisgarh, Jharkhand, Madhya Pradesh, North Eastern States, Orissa and Rajasthan. [4]

One of the most significant reemerging arboviral diseases is dengue fever, which is expected to cause 390 million cases year worldwide, of which over 500 000 require hospitalisation and about 100 million require medical treatment. India is known to be endemic, with all four serotypes (DENV-1, DENV-2, DENV-3, and DENV-4) circulating year-round in various regions. It is estimated that 34% of cases worldwide originate from India.[5]

A total of 565.41 million people are at risk of chikungunya infection; instances of suspected chikungunya vary from 35 (in Lakshadweep) to 7,62,026 (in Karnataka), with as many as 1.39 million cases reported. The overall incidence per thousand population is calculated to be 2.46 and varied from 0.04 in the National Capital Territory of Delhi to 14.45 in Karnataka. During the 2006 pandemic, at least 0.148 million cases out of 1.39 million were unquestionably caused by chikungunya when corrected to the sero-positivity rate.[6]

Elimination of Malaria, Filariasis and Visceral leishmaniasis

The vertical programs against Malaria, Filariasis etc.led to fragmentation of health systems by creating parallel systems for surveillance and planning, overburden on logistics and supply chain, depletion of scarce health care resources for achieving time bound targets of different programs by delivery of services like distribution of insecticide treated bed nets, mass chemotherapy etc. Therefore a single programmatic management including integrated delivery of health services by the designated health workers, involving holistic approach for vector control strategies and amalgamating all services will be more cost effective.[7-8]

Vector control measures like indoor residual spray is beneficial for Malaria and Kala azar while use of larvicides is helpful for control of Malaria and Filariasis. Source reduction measures and improvement in environmental sanitation is fan important strategy for control of breeding places of all vectors. Appropriate implementation of integrated vector management measures along with other strategies have potential to reduce the burden of three vector borne diseases that are targeted for elimination i.e. malaria, visceral leishmaniasis and lymphatic filariasis are targeted for elimination (visceral leishmaniasis and lymphatic filariasis by 2021 and malaria by 2030).[8-10]

To improve public health and Socioeconomic development

Public Health is an important determinant of socioeconomic growth and development of a nation. Vector borne diseases like Malaria, Dengue etc are major threats to public health in India. Factors like deforestation, urbanization, construction projects, climate changes etc have significant impact on vector ecology and transmission of VBD.

Globalization, increased global trade and travel, development of insecticide resistance human migration and trade, and insecticide and larvicide resistance lead these vectors to serve as vectors of emerging diseases. This rapidly changing trend leads to burden on health care systems and creates social and health inequities. VBDs are one of the major hurdle of socioeconomic development as it affects vital economic sectors like tourism, labor force.[11-12] Appropriate implementation of strategies for control of vector and vector borne diseases is therefore essential. Integrated vector management has is an effective tool to attain optimal health for people, animals and our environment.[13]

Control of emerging and re emerging diseases

Increases in global trade and travel, migration, deforestation and urbanization led to increase in opportunities for vector human contact. As a consequence to these, incidence of Dengue and Chikengunea is increasing worldwide. In many countries outbreaks of Yellow fever and Zika Virus disease are reported which indicate that many countries are not well prepared to deal with these emerging and re emerging vector borne diseases.[14-15] These trends clearly recommend stringent implementation of integrated vector management measures and need to emphasize IVM in health care delivery system.

To reduce the financial burden due to Vector borne Diseases

Vector borne diseases significantly causes financial burden as resources are required for diagnosis, treatment and for personal protective measures.It also indirectly leads to financial losses due to decreased productivity as a result of sickness absenteeism. Integrated vector management is therefore a need of hour as it is cost effective, ecofriendly and sustainable measure to control vector borne diseases in India.[16]

Systematic analyses of the existing vector control measures indicate that there is an immense scope to ameliorate the Limitations and Challenges.

Following Vector control strategies are the pillars of integrated vector management. 1. Source reduction 2.Appropriate methods to control larva 3. Adult mosquitoe control measures 4. Community education & Participation for risk assessment and interventions.[17]

Access and availability of Technology - For effective control of vectors through source reduction; identification of breeding places and its continuous monitoring for detection of larvae is needed. It requires advanced technologies like Geographic Information system (GIS) global positioning systems and Environmental Remote Sensing (RS) to understand ecological conditions related to breeding places of vectors accordingly environmental measures can be implemented to eliminate breeding places. GPS and GIS also help to understand temporo spatial distribution of VBDs so that vector control measures can be more focused on susceptible populations.[18]

Insecticides have major role in vetor control. However Insecticide résistance is a major concern in control of adult vectors in India. In a multicentric study conducted by ICMR insecticide résistance was noticed for Malaria vectors.[19] Another review article regarding insecticide resiastence also mentions that there was a mounting evidence of development of tolereance against commonly used insecticides like pyrethroids and organophosphorus compounds.[20]

However Insecticide treated bednets and indoor residual spray both these measures are effective in control of adult mosquitoes. Hence it is recommended that India's integrated vector management policy, which uses both ITNs and IRS, must adhere to the policy of using insecticides with different modes of action during codeployment. [21]

Challenge of Community participation and education IVM emphasizes that community can play major role in vector control and prevention of disease instead of passive participation as a receiver of government program packages.[22]

Community participation both active and passive plays a key role in effective implementation of integrated Vector management in terms of risk assessment and interventions to control vectors and use of vector control measures like environmental measures for source reduction, indoor residual spray, use of mosquito nets etc. Though the insecticide bed nets are provided,the actual use of mosquito net varies 30-6% in India[23] It has been reported in various community studies that there is lack of adequate knowledge and practices in vector control among the people. To improve community involvement more emphasis should be given on impact of VBD on health and economy of people.[24]

Other challenges in implementation of IVM are lack of capacity building and poorly defined the role of advocacy. Supportive legislative framework is lacking and also there is inadequate intersectoral co ordination.[25]

Human Resource development is a major Challenge because skilled manpower and

adequate infrastructure from central level to grass root level are the prerequisites for effective implementationof IVM.[26]

CONCLUSION

Implementation of integrated vector management strategies need strengthening. The implementing agencies should analyze the opportunities depending upon the situational and for effective implementation co operation from all stake holders is essential.[27]

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