VECTOR CONTROL FOR
THE 21ST CENTURY

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Abstrak
Penyakit tular Vektor masih merupakan masalah dimasa depan, dan telah diramalkan akan meningkat sesuai dengan perkembangan suatu negara. Malaria dan pest adalah dua penyakit yang diramalkan akan meningkat. Sistem dan metode pengendalian yang telah dilakukan akan dibahas. Masalah yang dihadapi selama penanggulangan yang lalu telah dipelajari dan dibicarakan juga bagaimana melakukan pendekatan penanggulangan vektor dimasa yang akan datang sebagai rekomendasi untuk kebijakan HFA abad 21. Contoh penanggulangan vektor secara terpadu yang telah dilakukan terdahulu juga dibahas dalam makalah ini.

Introduction

Vector-borne diseases reported since the beginning of recorded history, such as malaria, plague and other diseases, are still a problem and are predicted to increase in the near future. This implies that in the 21st century vector remains a problem in many countries, including Indonesia. Facing the 21st century, many policies and recommendations were made to strengthen, adapt and reform as appropriate the country’s health systems, including developing health system to respond to the current and anticipated health conditions, socioeconomic circumstances and needs of the people, communities and countries concerned, through appropriately managed public and private actions for health. Emerging and re-emerging diseases, are some of the diseases predicted to increase in the future. Questions are raised, why these diseases are presently not under control. Many efforts have been implemented to control these vector-borne diseases. Should we learn from the past? How can we obtain better control for the future? Are the right systems involved in the control activities are campaigns?

Malaria for example is one of major vector borne diseases problems predicted. It has been studied for many years, control methods have been recommended, investigated and implemented, through activities by the various health sectors, organized as a battle against malaria during the malaria eradication program. This was then integrated as a part of the communicable diseases control program. In the past activities were concentrated on those implemented through and by the government. Realizing the impossible task of controlling vector-borne diseases through government support only, more emphasis is now being given to another approach, the integrated approach. This approach not only concentrates on the activity of eliminating adult vector population through the conventional residual house spraying, but is now also focusing on the holistic approach, placing more emphasis on "prevention" rather than "cure". More and more attention is paid on educating the community, e.g. both the general community as well as the various groups and departments (accidentally) involved in generating vector populations, such as the Department of Agriculture, Horticulture, Fisheries, etc. More sophisticated methods such as the use of bio technical methods are presently under investigation, however, no real success has been achieved so far with these bio technical methods. This paper will concentrate on the more practical approaches and describes the various changes over time in vector control methods implemented, including future activities, which could fulfill the Health-for-all for the 21st century.

Past Vector Control Methods Implemented as Adjusted to Local Needs

Various vector control were conducted prior to the Malaria Eradication Program. These methods concentrated mostly on larval control, some of which implemented the following.
1. Water “Assainecring” of lagoons on the North coast of Java
2. Intermittent irrigation of rice fields
3. The use of cattle barrier as protection in villages surrounding rice fields
4. Cleaning of Irrigation Ditches in Rice field, lagoons, etc.
5. The Use of Paris Green on Lagoons, oiling of lagoons

In addition various other methods mostly physical alterations of the environment were implemented, both temporary as well as permanent alterations, organized by the governmental health officials.

The Malaria Eradication Approach

With the invention of DDT, the outlook of vector changed into a new perspective, taking advantage of the residual effect of DDT, which was found effective for 6 months. This approach considered that spraying of malarious areas every 6 months would prohibit breeding of the vector and thus finally eradicate the vectors. No more attention was paid to the environment and the control of vectors was considered as a war against vectors. During this period vector control was conducted as a war against the vectors, where big organized teams would control through various phases such as the Preparatory phase, Attack phase and the Consolidation phase. These control methods were implemented in the developing countries mostly through the assistance of USAID (US Agency for International Development). These activities were a quiet costly, and most developing country could not afford these activities. In various countries malaria subsided, in India only 4000 cases were left. The consolidation phase was implemented. Less pressure was placed on the vector control activities, more emphasis was directed toward surveillance of the vector. Budgets for control were reduced, since foreign assistance was withdrawn, and local government could not afford big budgets. In addition, due to the heavy pressure of DDT on the vector population during the attack phase, resistance against DDT was developed in many species. In Indonesia resistance was reported in 1965 in Central Java. Malaria, which decreased during the malaria eradication program, started to increase again and presently due to resistance of the vector against the insecticide as well as the Plasmodium sp. Against the various drugs, cases are increasing, and even predicted to increase in the future.

The Integrated Approach

During the Malaria Eradication Program, vector control was the full responsibility of the Department of Health and the government. In epidemic and endemic areas, the community relied heavily on the activities of the health personnel, even for vector control. Malaria control was very difficult to achieve, and malaria remained one of the main health problems in many areas. One of the causes, which could be mentioned, was the green revolution. To fulfill Indonesia’s need for rice, permanent rice fields were created and these in turn created permanent breeding sites for Anopheles aconitus, which breeds mainly in rice fields. Realizing the shortcoming in the past, WHO through TDR revised the Vector Control strategy into the Integrated Vector Control Approach. This approach has abandoned the universal approach of routine spraying of insecticides/adulticides (6 months once) to eradicate the vectors, and has adopted the local specific approaches as appropriate for respective situations, breeding sites and conditions. Past vector control activities conducted in the past are reviewed, investigated for its appropriateness in problem area and implemented.

Vector Control in The 21st Century

It is stated in the Health –for-all policy the 21st Century, that to ensure the availability of the essential of primary health care has defined in the Declaration of Alma-Ata and developed in the new policy, we will continue to develop health systems to respond to the current and anticipated health conditions, socioeconomic circumstances and needs of the people, communities and countries concerned, through appropriately managed public and private actions and investments for health. Vector control for 21st Century should therefore emphasize on the education and participation of “Partners in Public Health” Partners constitutes everybody individually, in group or institutions, who incidentally either contributes to generation of the vector should therefore
Figure 2
Implementation of Vector Control by Various Partners

Vector Control Method

Mosquitoes
- Weekly cleaning of water containers in or outside houses
- Continuous use and provision of Bed nets through community participation (arisan kelambu)
- Environmental management, such as intermittent irrigation, installing drainage systems, filling of ponds

Implementing Partner

Fleas
- Control of fleas through insecticide provided bamboo tubes with bait for rats
- Community (in high endemic areas with close supervision of health authorities

Monitoring System

Dept. of Education Promotor Family Welfare Education (Penggerak PKK) Local; Government/health
- Local Health (PUSKESMAS) official and Government infrastructure
- Local Government infrastructure Local Health Authority

Habitat
- Manmade water containers such as Cisterns, Clay pots, broken bottles/glass, tyres, etc
- Vast Breeding Sites where larvicides are difficult to apply swamps, rice field
- Vast Breeding site such as rice fields, open pits, standing water, lagoons

Houses, fields, forest fringe area
participate in the vector control activities. A partnership approach, uninhibited by territorial boundaries offers the best prospect for governments seeking to discharge their responsibilities in public health 5). Vector control for 21st century concentrates on the socioeconomic circumstances and needs of the people, communities and other sectors which sometimes are affected by the diseases. Figure 1 illustrates the Vector control activities as appropriate for the 21st Century, which can be implemented by the public health sector as well as private (partners) sector. Emphasis is placed on the education of the various partners to improve the knowledge on the various problems creating, transmitting, and preventing vector-borne diseases to arouse their awareness to participate in prevention and control of the diseases. It is hoped the interest of the various partners is stimulated through their knowledge on the problem, and participation is enhanced through such approaches. Two major vector control approaches will be available, (1) the biotechnology approach using recent findings of biotechnology with gene transfer, DNA recombination etc. and (2) the Conventional Integrated Approach emphasizing on conventional methods, some of which once already used in the past. Considering the participation of partners, studies should be conducted who partners should be and how partners can assists or even conduct vector control methods. Vector control methods to be implemented would refer to methods mentioned in Figure 1, where respective methods should be applied simultaneously, in sequence or separately. A holistic approach, where all parties (whoever could be responsible for either accidentally generating vector breeding sites, or could contribute to the prevention of breeding sites are involved in the vector control and prevention 6). Figures illustrate examples of the implementation of various vector control methods by the various partners. As many parties sometimes contribute to the vector control problems, these parties are responsible for the vector control activities. As an example, due to the green revolution, constant rice fields are present, and Anopheles aconitus the vector, which breeds in rice fields, is always present too. Therefore, intermittent irrigation (which needs the support of the farmers and Agriculture Department) should be conducted. This method should be integrated in the activities of the farmer and the agricultural system. Another example is the involvement of the Department of Education in the cleaning of Aedes aegypti larvae in schools by the “dokter kecil” (little doctors, a system established in Indonesia responsible for health in grade school) and the involvement of the Dasawisma in household. Various other vector control methods are presently the responsibility of various group. It is hoped that with more awareness and participation of the various partners, vector control methods can be sustained in the future as routine activities of the community and the various others parties.

Summary

- Vector control methods in the past were conducted mostly adjusted to habits and needs
- Due to the invention of DDT, followed by various insecticides, vector control concentrated on the use of these insecticides through residual house spraying
- With less success in Vector Control, WHO/TDR has altered the vector control methods to the integrated approach using more habitat specific methods.
- Vector Control in the 21st century emphasizes on educating the various partners and thus stimulating activities by those partners than the Health Department alone

References:

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Penyakit Menular Seksual......

*Trichomonas vaginalis.* Metronidazol 2 g po dosis tunggal, alternatif 250 mg po 3 dd selama 7 hari. Untuk wanita hamil dalam trimester 1 digunakan kotrimoksazol 100 mg per vagina sebelum tidur selama 7 hari. Bila menyesuui tetap dengan dosis tunggal tetapi kemudian tidak boleh menyusui selama 24 jam. Untuk bayi digunakan *metronidazol* 20 mg/kg bb/hari selama 5 hari.

*Sarcoptes scabiei.* Untuk usia lebih besar dari 10 tahun digunakan Lindan 1% selama 8 jam atau benzilbenzoat 25% selama 2 malam atau krotonitron 10% atau sulfur 6%. Sedangkan untuk usia lebih kecil dari 10 tahun atau wanita hamil/ menyusui hanya boleh digunakan krotonitron 10% atau sulfur 6%.

*Lithirus pubis.* Digunakan Lindan 1% topikal selama 8 jam atau piretrin dan piperonil butoksida secara topikal selama 10 menit.

Kesimpulan

Infeksi jamur merupakan infeksi utama dari infeksi vagina dan biasanya disebabkan oleh *C. albicans* dengan gejala khas yang meningkat seminggu sebelum dan sedikit berkurang dengan mulainya menstruasi. Sedangkan pada trikononisasi lingkungan vagina mempengaruhi patogenitas trikomonad dan bevariasi dari waktu ke waktu pada orang yang sama.

Terapi primer semua bentuk diare akibat protozoa patogen enterik yang juga dapat ditularkan melalui hubungan seksual oro-anal adalah penggantian cairan dan elektrolit. Sedangkan pada ektoparasi yang kerap kali ditularkan dari orang ke orang melalui hubungan erat, khususnya hubungan seksual, penatalaksanaan dan disinfeksi harus diindividualisasikan dengan memperhitungkan efektifitas dan toksisitas.

**Daftar Pustaka**