

Conference Paper

One Health Approach to Dengue Haemorrhagic Fever Control in Indonesia: A Systematic Review

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Abstract

Indonesia is an endemic area of Dengue Haemorrhagic Fever (DHF). The prevalence of DHF is increased each year. Some programmes and control efforts have been performed, but still not showing significant changes. This study aimed to analyze the information in the literature about DHF control using One Health approaches. This study uses systematic review analysis. The information was collected using EndNote program from various sources, such as Springer and PubMed. Other sources were such as an article from libraries, national and international health reports and published in the last five years. One Health is a global strategy to develop collaboration and communication of interdisciplinary in the health care aspect. In the DHF control, one health approach can explain the position of human, animal, and environment. DHF has multi-factor causes, among others virological factors, vector spreading, the environment and human factors. Some efforts to address the DHF problem during this time are controlling DHF vectors, mosquito nest eradication, health promotion and community action. One Health approach will manage the strategy of the health workforce in multidisciplinary and others community to providing health service and collaborate to control all factors in the DHF.

Keywords: Dengue hemorrhagic fever; one health

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1. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is a major public health concern throughout tropical regions of the world. It is the most rapidly spreading mosquito-borne viral disease. The World Health Organization estimates that 50–100 million dengue infections occur each year and that almost half the world's population lives in countries where dengue is endemic [85]. Indonesia is an endemic area of DHF vectors. Almost 97% province in Indonesia are endemic of DHF. The prevalence of DHF is more increase each year [42].

DHF has multi factor causes, among other virological factors, vector spreading, the environmental factors, and human factors [34]. Some programs and control efforts have been performed, but still not showing significant changes. The efforts among others are controlled in DHF vectors, mosquito nest eradication, health promotion and community action, etc. This study aimed to systematically review the existing literature on the relevance of DHF and one health approach.

2. METHODS

This study was a systematic review of the DHF Control using One Health Approach based on the guidelines outlined by the Preferred Reporting Items for Systematic Literature Reviews and Meta-Analysis (PRISMA) [44]. The systematic review was performed in two databases (Springer and PubMed). Other sources were such as books from libraries, nationally accredited journals, national and international health reports. The study tried to collect literature published in the last five years, but if the information was still relevant to the topic. Some references exceeded the time limit of five years was still used to enrich the discussion. The information collected related to the topic, grouping according to the theme/sub-theme that would strengthen and support the main topic and be documented using End Note program until September 15, 2016. Reference lists and gray literature were also searched for relevant articles.

The next stage was to study literature to ensure that the steps taken were not out of the main topic. The keywords were dengue hemorrhagic fever and one health approach. Inclusion criteria for studies in this review were public health studies, studies about DHF (risk factor and control) or one health approach in disease control and English language. Articles were excluded based on the clinical or laboratory studies, DHF or one health not mentioned not in English and full text unavailable.

3. RESULTS

A total of 140 articles from Springer, 235 articles from PubMed, and 30 articles from other sources were initially identified. A total of 82 articles were retrieved from inclusion and exclusion criteria.

TABLE 1: Total of Reviewed Articles

Source	Topic		
	Risk factor of DHF	DHF control	One health approach
Springer	8	7	12
PubMed	18	9	13
National accredited journals	3	8	-
International reports	-	4	-
Total	29	28	25

TABLE 2: Title and Discussion of the Articles

Title of Article	Discussion
A dengue outbreak in a floating village on Cat Ba Island in Vietnam	Dengue outbreak on an island re-confirms that virus transmission is not locally sustained in small populations and that these epidemics are less frequent and predictable than larger outbreaks occurring in urban areas.
A social-ecological analysis of community perceptions of dengue fever and <i>Aedes aegypti</i> in Machala, Ecuador	There are thirty biophysical, political-institutional, and community household risk factors for dengue.
Analyzing the spatiotemporal relationship between dengue vector larval density and land-use using factor analysis and spatial ringmapping	The study concluded that gasoline stations/workshops, rice paddy, marsh/swamp and deciduous forests played a highly significant role in dengue vector growth.
Climate change and the emergence of vector-borne diseases in Europe: case study of dengue fever	Dengue fever hot spots were clustered around the coastal areas of the Mediterranean and Adriatic seas and the Po Valley in northern Italy.
Climatic-driven seasonality of emerging dengue fever in Hanoi, Vietnam	In terms of mosquito population dynamics and immunological interactions between the different dengue serotypes in the human compartment.
Cross-sectional community-based study of the socio-demographic factors associated with the prevalence of dengue in the eastern part of Sudan in 2011	Lack of knowledge about dengue fever disease and a household density of more than 3 people per room were the most important factors associated with dengue infection among the study population.
Dengue in peri-urban Pak-Ngum district, Vientiane capital of Laos: a community survey on knowledge, attitudes, and practices	There is a lack of depth of knowledge regarding dengue in Pak-Ngum community.
Effects of the El Niño -Southern Oscillation on dengue epidemics in Thailand, 1996-2005	El Niño is one of the important driving forces for dengue epidemics across the geographically diverse regions of Thailand; however, spatial heterogeneity in effect exists.
Analysis of Effects of Meteorological Factors on the Dengue Incidence in Sri Lanka Using Time Series Data	Weekly average maximum temperatures and the weekly total rainfall did not significantly affect dengue incidence in three geographically different areas of Sri Lanka.
Arterial Hypertension and Skin Allergy Are Risk Factors for Progression from Dengue to Dengue Hemorrhagic Fever: A Case Control Study	Hypertension or skin allergies in health units can increase progression from dengue to DHF.
Demographic and Clinico-Epidemiological Features of Dengue Fever in Faisalabad, Pakistan	Demographic, clinical and laboratory features of dengue cases studied could be used for the early diagnosis and treatment of the patients at risk of severe dengue fever.

Title of Article	Discussion
Dengue fever and dengue haemorrhagic fever in adolescents and adults	Dengue infection is generally considered to be a pediatric disease but is currently a growing problem in adults throughout the tropics.
Dengue Fever and International Travel	Dengue infection in international travelers occurs frequently and may be associated with substantial morbidity.
Epidemiological and demographic characteristics of dengue disease at a tertiary care centre in Saurashtra region during the year 2013	Dengue predominately affected males and urban population.
Epidemiological Trends of Dengue Disease in Brazil (2000–2010): A Systematic Literature Search and Analysis	The risk for dengue disease and socioeconomic, demographic and infrastructure characteristics.
Epidemiology of Dengue Disease in Malaysia (2000–2012): A Systematic Literature Review	There has been an increase in the incidence of all forms of dengue disease over 2000–2012. The predominant age group for dengue disease was young adults. Outbreaks tend to follow changes in predominant circulating DENV serotypes. Increasing levels of rainfall, humidity, temperature, and urbanization are also risk factors for outbreaks.
Epidemiology of dengue: the past, present and prospects	The expansion of dengue is expected to increase due to factors such as the modern dynamics of climate change, globalization, travel, trade, socioeconomics, settlement and also viral evolution.
Evolution of dengue in Sri Lanka-changes in the virus, vector, and climate	Climatic factors play a pivotal role in the epidemiological pattern of DF/DHF in terms of the number of cases, the severity of illness, shifts in affected age groups, and the expansion of spread from urban to rural areas.
Factors related to severe dengue during an epidemic in Vitória, State of Espírito Santo, Brazil, 2011	There was a greater involvement of dengue haemorrhagic fever in young people. Delay in care, poor urban quality, and high endemicity was identified as possible risk factors for dengue severity.
HLA-A*01 allele: a risk factor for dengue haemorrhagic fever in Brazil's population	HLA class I alleles might be important risk factors for DHF in Brazilian patients.
Is transfusion-transmitted dengue fever a potential public health threat?	This review provides a general overview of dengue, its viruses, and their vectors. The risk with blood products from infected donors was only recognized recently.
Recent Weather Extremes and Impacts on Agricultural Production and Vector-Borne Disease Outbreak Patterns	Weather condition associated with DHF
Region-wide synchrony and traveling waves of dengue across eight countries in Southeast Asia	There is strong synchrony across the entire region of multi annual dengue cycles and also, for annual cycles and unfiltered incidence rates. And also there is travelling waves of multi annual dengue cycles in various parts of the region.
Surge of Dengue Virus Infection and Chikungunya Fever in Bali in 2010: The Burden of Mosquito-Borne Infectious Diseases in a Tourist Destination	Climate and environment may have influenced the DHF cases. Decentralization can influence the health authority in Bali.
Surface water areas significantly impacted 2014 dengue outbreaks in Guangzhou, China	Urban environmental changes, especially variations in surface area covered by water in urban areas, can substantially alter the virus population and dengue transmission.

Title of Article	Discussion
The changing incidence of Dengue Haemorrhagic Fever in Indonesia: a 45-year registry-based analysis	The incidence of DHF over the past 45 years in Indonesia increased rapidly with peak incidence shifting from young children to older age groups.
The relation of environmental condition contains the existence of the <i>Aedes aegypti</i> larvae in dengue haemorrhagic fever endemic areas in Banjarbaru	There was a significant relationship between the pH, water temperature, and humidity temperature with the existence of the <i>aegypti</i> larvae while the air temperature was not significant to the existence of the <i>aegypti</i> larvae.
Climate change impact on dengue haemorrhagic fever in Banjarbaru South Kalimantan between 2005-2010	The increased rainfall and humidity affected the increase of dengue cases.
A growing global network's role in outbreak response: AFHSC-GEIS 2008-2009	A multipurpose system with defined goals and pillars of focus, the AFHSC-GEIS network has evolved to become a true model for emerging infectious surveillance platforms at the local, regional and international level.
A survey of core and support activities of communicable disease surveillance systems at operating-level CDCs in China	China has already established a national communicable disease surveillance framework that combines NDRS and disease-specific surveillance systems.
Beyond traditional surveillance: applying syndromic surveillance to developing settings – opportunities and challenges	Syndromic surveillance is widely used in North America and Europe and is typically thought of as a highly complex, technology-driven automated tool for early detection of outbreaks.
Capacity-building efforts by the AFHSC-GEIS program	Capacity-building initiatives related to the public health are defined as developing laboratory infrastructure, strengthening host-country disease surveillance initiatives, transferring technical expertise and training personnel.
Nationwide study of factors associated with public's willingness to use home self-test kit for dengue fever in Malaysia	The use of dengue test kit is vitally important for the early detection of dengue fever.
Sharing experiences: towards an evidence based model of dengue surveillance and outbreak response in Latin America and Asia	The experiences of a number of affected countries, identify strengths and limitations in dengue surveillance, outbreak preparedness, detection and response and contribute towards the development of a model contingency plan adaptable to country needs.
The AFHSC-Division of GEIS Operations Predictive Surveillance Program: a multidisciplinary approach for the early detection and response to disease outbreaks	The AFHSC-GEIS initiated a coordinated, multidisciplinary program to link data sets and information derived from eco-climatic remote sensing activities, ecologic niche modeling, arthropod vector, animal disease host/reservoir, and human disease surveillance for febrile illnesses, into a predictive surveillance program that generates advisories and alerts on emerging infectious disease outbreaks.
Dengue outbreak in a large military station: Have we learnt any lesson?	Future strategy for control of dengue outbreak should include repeated and timely survey of the entire area for correct risk perception, assessment of behavioral change among individuals; operational research to assess the impact of ongoing public health campaign.
Effectiveness of Space Spraying on the Transmission of Dengue/Dengue Hemorrhagic Fever (DF/DHF) in an Urban Area of Southern Thailand	Timely and extensive space spraying used to prevent the spread of dengue fever/dengue hemorrhagic fever (DF/DHF).

Title of Article	Discussion
Health Beliefs and Practices Related to Dengue Fever: A Focus Group Study	The behavioural change towards attaining sustainability in dengue preventive practices may be enhanced by fostering comprehensive knowledge of dengue and a change in health beliefs.
Knowledge, attitudes, and practices of Florida physicians regarding dengue before and after an educational intervention	The train-the-trainer approach with grand-rounds style presentations appears to be an effective intervention to improve knowledge of dengue among physicians.
Manipulation of immunodominant dengue virus E protein epitopes reduces potential antibody-dependent enhancement	Reducing cross-reactivity in the envelope glycoprotein of DENV may be an approach to improve the quality of the anti-DENV immune response.
Morbidity Rate Prediction of Dengue Hemorrhagic Fever (DHF) Using the Support Vector Machine and the Aedes aegypti Infection Rate in Similar Climates and Geographical Areas	The infection rates of the Ae. aegypti female mosquitoes and larvae improved the morbidity rate forecasting efficiency better than the climate parameters used in classical frameworks.
Partial cross-enhancement in models for dengue epidemiology	A new modeling framework in which the population susceptible to secondary infection is split into a group prone to enhanced infection and a group with some degree of cross-protection.
Study on Entomological Surveillance and its Significance during a Dengue Outbreak in the District of Tirunelveli in Tamil Nadu, India	The significance of entomological surveillance, the house index (HI), container index (CI), and Breteau index (BI) was determined to estimate the degree of a major dengue outbreak in Tirunelveli, TamilNadu, India.
Community Partnership in Vector Control for Dengue	An approach to involve the community in dengue control is through mobilizing the community organization to participate in daily observation activities. Furthermore, The Family Welfare Education (PKK) and village cadre will control these activities.
Evaluation Study of Policy Implementation on Dengue Hemorrhagic Fever Prevention in Pati Regency	There is a policy on DHF prevention in Pati Regency, such as the policy of mosquito nest eradication movement (PSN).
Integrated control model of dengue vector in Salatiga	Alternative DBD vector control using a combination of chemical control method (using insecticide permethrin plus ethyl cellulose curtains) and biological control method using predator larvae <i>Mesocyclops aspericornis</i> .
Community participation for dengue hemorrhagic fever vector control in Semarang city, central Java province	This study developed methods of empowerment through participatory rural appraisal, participatory learning, action, and communication for behavioral impact; the modification was called empowerment in dengue vector control (EDVC).
Vector control	Vector control is to recognize, evaluate, and control vector. Furthermore, in order to evaluate the status of a region in terms of vector-borne disease is necessary to understand the epidemiology, parasitology, and ecology of vectors in relation to various indices of vectors. As for vector control, in particular, reducing the vector population density, need to understand ecology, environmental management techniques, physical control, and chemical.

Title of Article	Discussion
The role of Islam in the DHF vector control	The effort to support programs to eradicate DHF by eliminating breeding places of <i>Aedes aegypti</i> mosquito requires the active participation of Muslims and the need for cooperation between the health department with the clergy and religious leaders because Islam teaches environmental hygiene.
The Role of Juru Pantau Jentik (Jumantik) in Dengue Haemorrhagic Fever Early Warning System in Indonesia	Jumantik role is very important in the early warning system outbreaks of dengue hemorrhagic fever because it serves to monitor the presence and inhibit the early development of vector-borne dengue fever.
A portrait of DHF control in Indramayu District	The "main strategy" of DHF controlling is the improvement of healthy living environment; the "main actor" is the Government of Indramayu district; the "main factor" is the environment; the "main objective" is zero DHF in Indramayu district; and the "main criteria" is the quantity and quality of human resources.
The Global Strategy for dengue prevention and control, 2012–2020	The Global strategy by the multiple WHO the Member States, for advice on how to move from a reactive response to an emergency situation to proactive risk assessment, early warning systems, and preventive measures, guided by entomological as well as epidemiological surveillance.
Integrated Management Strategy for Dengue Prevention and Control in the Caribbean Subregion	The IMS-Dengue aims to promote the integration of six key components for dengue prevention and control at the national, sub-regional and regional levels. These include social communication (with emphasis on the application of the planning methodology Communication for Behavioral Impact (COMBI)), epidemiological surveillance, laboratory diagnosis, environment management, clinical case management, and Integrated Vector Management.
India fights dengue. There are methods for dengue control, which are environmental sanitation measures, biological methods, chemical methods, personal protection and community activity.	Strengthening Implementation of the Global Strategy for Dengue Fever/ Dengue Haemorrhagic Fever Prevention and Control The Global Strategy for prevention and control of dengue fever DHF comprises of five major elements (i) selectively integrated vector control, with the community and intersectoral participation, (ii) active disease surveillance based on a strong health information system, (iii) emergency preparedness, (iv) capacity building and training, and (v) vector control research
Characterizing Rabies Epidemiology in Remote Inuit Communities in Quebec, Canada: A "One Health" Approach	One health approach to preventing rabies: animal rabies tests and confirmed cases, dog vaccination, and human consultations for potential rabies exposures.
Climate Change in the North American Arctic: A One Health Perspective	This research to identify and monitor changes in the prevalence of zoonotic pathogens in humans, domestic dogs, and wildlife species of critical subsistence, cultural, and economic importance to Arctic peoples.

Title of Article	Discussion
Eco bio social Community Intervention for Improved Aedes aegypti Control Using Water Container Covers to Prevent Dengue: Lessons Learned from Girardot Colombia	The transdisciplinary study under the Ecobiosocial framework to assess linkages between ecological, biological and social factors and the current A. aegypti density in urban areas of Girardot and to determine a baseline.
Experiences in Participatory Surveillance and Community based Reporting Systems for H5N1 Highly Pathogenic Avian Influenza: A Case Study Approach	Participatory surveillance (PS) is the application of participatory rural appraisal methods to the collection of epidemiological information to inform decision-making and action.
Finding a Place for Systems-Based, Collaborative Research in Emerging Disease Research in Asia	The need to adequately predict, prevent and respond to infectious diseases emerging unexpectedly from human-animal-environmental systems have driven interest in multisectoral, socio- economic, systems based, collaborative (MSC) research approaches such as Eco Health and One Health.
Has the Time come for Big Science in Wildlife Health?	A big science approach to wildlife health research is needed if we are to make significant and enduring progress in managing these diseases.
Integrating Human Health and Environmental Health into the DPSIR Framework: A Tool to Identify Research Opportunities for Sustainable and Healthy Communities	The Driving forces–Pressures–State–Impact–Response (DPSIR) framework as a basis for integrating social, cultural, and economic aspects of environmental and human health into a single framework. To
Lessons from the Ebola Outbreak: Action Items for Emerging Infectious Disease Preparedness and Response	Lessons from the Ebola outbreak that interdisciplinary can be clustered into three areas: environmental conditions related to early warning systems, host characteristics related to public health, and agent issues that can be addressed through the laboratory sciences.
Limited Knowledge About Hydatidosis Among Farmers in Northwest Portugal: A Pressing Need for a One Health Approach	Farmers’ lack of knowledge in relation to hydatidosis and a high prevalence of potentially zoonotic parasites in dogs, thus pointing to the need for health education and a closer collaboration between the veterinarian and public health professionals.
Malaria Control in Amerindian Communities of Venezuela	Adaptive management and eco health frameworks were developed for malaria elimination in Amerindian riparian communities of Venezuela.
Merging Economics and Epidemiology to Improve the Prediction and Management of Infectious Diseases	The economic Epidemiology or epidemiological economics, the approach explores the determinants of decisions about the number and type of contacts made by individuals, using insights and methods from economics.
Need for Enhanced Environmental Representation in the Implementation of One Health	One Health encourages the collaboration of many disciplines—including human and veterinary medicine, public health, social science, public policy, environmental science, and others—to address global and local health challenges.
A One Health Framework for the Evaluation of Rabies Control Programs: A Case Study from Colombo City, Sri Lanka	One Health addresses complex challenges to promote the health of all species and the environment by integrating relevant sciences at the systems level. Rabies requires an interdisciplinary approach for effective and efficient management.

Title of Article	Discussion
Academic Institutions and One Health: Building Capacity for Transdisciplinary Research Approaches to Address Complex Health Issues at the Animal-Human- Ecosystem Interface	There should be a significant shift in academic institutions research capacity to achieve the added value of a transdisciplinary approach for addressing One Health problems.
Implementing a One Health approach to emerging infectious disease: reflections on the sociopolitical, ethical and legal dimensions	One Health represents a call for health researchers and practitioners at the human, animal and environmental interfaces to work together to mitigate the risks of emerging and re-emerging infectious diseases (EIDs).
Integrating one health in national health policies of developing countries: India's lost opportunities	The adoption of One Health approaches in health and related sectoral policies is a critical policy requirement for India and other developing countries.
One Health and EcoHealth in Ontario: a qualitative study exploring how holistic and integrative approaches are shaping public health practice in Ontario	One Health and Ecosystem Approaches to Health (EcoHealth), can help us to understand the use intricate and complex connections better and appear to hold great promise for tackling many modern public health dilemmas.
One Health approach to controlling a Q fever outbreak on an Australian goat farm	Reduction in the incidence of human cases was achieved through an intensive human vaccination program plus environmental and biosecurity interventions. Subsequent non-occupational acquisition of Q fever in the spouse of an employee indicates that infection remains endemic in the goat herd, and remains a challenge to manage without source control.
One Health: Past Successes and Future Challenges in Three African Contexts	There is no 'one size fits all' approach to achieving the intersectoral collaboration, significant resource mobilization and political cooperation required to realize a One Health approach. Individual country requirements cannot be underestimated, dismissed or prescribed in a top-down manner.
Operationalizing the One Health approach: the global governance challenges	The One Health approach, which sees human health as inseparable from the health of the planet as a whole, seeks to achieve a critical paradigm shift. Indeed, as globalization continues apace, One Health will arguably become increasingly relevant.
Paradigm shift: contribution of field epidemiology training in advancing the "One Health" approach to strengthen disease surveillance and outbreak investigations in Africa	One Health approach has coincided with the present, paradigm, shift that calls for multi-sectoral and cross-sectoral collaboration towards disease surveillance, detection, reporting and timely response.
Preventing and controlling zoonotic tuberculosis: a One Health approach	One Health response to TB will consider the effects of disease on socioeconomic well-being and allows for addressing the social, cultural and economic conditions that facilitate spread and maintenance of this disease.
Taking Forward a One Health approach for turning the tide against the Middle East respiratory syndrome coronavirus and other zoonotic pathogens with epidemic potential	One Health platform is the creation of a multidisciplinary team with a range of expertise including public health officers, physicians, veterinarians, animal husbandry specialists, agriculturalists, ecologists, vector biologists, viral phylogeneticists, and researchers to cooperate, collaborate to learn more about zoonotic spread between animals, humans and the environment and to monitor, respond to and prevent major outbreaks

Title of Article	Discussion
The application of One Health concept to an outdoor problem-based learning activity for veterinary students	Delivery of an outdoor problem-based learning activity for Veterinary students using OH approach was very successful in terms of participation, knowledge delivery and understanding, and the willingness of students to integrate OH into their future practice.
Zoonotic tuberculosis, a comprehensive one health approach	Sharing resources and increasing interaction between public health and veterinary medical scientists can raise awareness of 'shared risk' of bovine TB between humans and animals and, in resource-limited situations, can maximize use of existing infrastructure and reduce unnecessary duplication of effort in disease control programs.

4. DISCUSSION

Risk Factor of Dengue Hemorrhagic Fever

4.1. Host

People at the periphery identified a higher number of risk factors. Common misperceptions included confusion with other febrile diseases, lack of knowledge of transmission mechanisms, and misconceptions about mosquito behavior [79]. There was also in Pak-Ngum community, a lack of depth of knowledge regarding dengue [40].

Dengue predominately affected males and urban population [43]. Dengue infection in international travelers occur frequently and may be associated with substantial morbidity [58].

Dengue infection is generally considered to be a pediatric disease but is currently a growing problem in adults throughout the tropics [68]. Hypertension or skin allergies in health units can also increase progression from dengue to DHF [69].

A matched case-control study conducted in Salvador (2002–2003) and Fortaleza (2003–2005) in DENV seropositive individuals demonstrated a significant association between DHF and both high income and increased years of schooling [21]. In another study one- storey, homes and a high number of residents per household were identified risk factors for dengue disease [46]. Teixeira et al. demonstrated a high risk for dengue disease in towns characterized by urbanization, poor sewer networks, and limited piped water supplies [71]. Factors significantly associated with high-risk compared with low-risk areas were lower income of the head of the family, higher house hold density, and larger proportion of children and elderly women (de Mattos et al., 2007).

Dengue disease declined in children but was more stable in adults during the review period. Similar age distributions were reported for both males and females and in the Malay and Indian racial groups, with the highest proportion of dengue disease cases occurred in people aged 10–29 years [2].

The highest incidence of DHF was observed among children aged 5 to 14 years up to 1998. In those aged 15 years or older, DHF incidence increased and surpassed that of 5 to 14-year-olds from 1999 onwards. The incidence of DHF over the past 45 years in Indonesia increased rapidly with peak incidence shifting from young children to older age groups. The shifting age pattern should have consequences for targeted surveillance and prevention (Karyani et al., 2014).

4.2. Agent

Aedes mosquitos often take a blood meal on multiple hosts; it increases the chance of infecting dengue viruses to multiple individuals from infectious mosquitos within short spatial and temporal distances (determined by the mosquito flight range) [67]. Dengue provides an excellent model of the transfusion-transmitted disease [55].

4.3. Environment

Dengue outbreak on an island re-confirms that virus transmission is not locally sustained in small populations. The chance of becoming infected in the floating villages was higher than on the island. In principle, dengue transmission was very local and constrained by space and time [67]. Gasoline stations/workshops, rice paddy, marsh/swamp and deciduous forests played a highly significant role in dengue vector growth [62].

Temperature, rainfall, and vapor pressure show strong seasonality. DF and relative humidity show both strong seasonality and a sub-annual periodicity [17]. Temperature is known to play a role in adult vector survival, viral replication, and infective periods. Increases in temperature may result in increased survival and or migration of vectors into previously non-endemic geographic areas outside the tropics [25].

The rain may have influenced the increases in DHF and CHIKF cases [88]. El Niño is one of the important driving forces for dengue epidemics across the geographically diverse regions of Thailand; however, spatial heterogeneity in effect exists [75].

The decentralization of the health sector that took place in 2001 is an essential aspect of current public health measures in Bali. The responsibility to implement public services was transferred to local governments, which now have full autonomy in mobilizing local resources and making budget decisions [60].

4.3.1. Dengue Hemorrhagic Fever Control

WHO has recommended that a structured approach to strengthening national communicable disease surveillance must include an evaluation of existing systems which usually begins with a systematic description, the first survey of communicable disease surveillance systems was conducted in China, in order to understand the situation of core and support surveillance activities at province-level and county-level centers for disease control and prevention [28].

The commonly established concept of syndromic surveillance in developed regions encompasses the use of pre-diagnostic information in a near real-time fashion for further investigation for public health action [86]. Country information on dengue is based on compulsory notification and reporting (“passive surveillance”), with laboratory confirmation (in all participating Latin American countries and some Asian countries) or by using a clinical syndromic definition [39].

The Global strategy emphasizes the many new opportunities, opened by country experiences and recent research, also on vaccines, that can be seized to reduce morbidity and mortality, rationalize the disease response, and build capacities that increase resilience to future outbreaks [61].

4.3.2. One Health Approach to Disease Control

Participatory surveillance (PS) is the application of participatory rural appraisal methods to the collection of epidemiological information to inform decision-making and action. The approach resulted in markedly increased case detection in countries experiencing highly pathogenic avian influenza (HPAI), and a better understanding of the epidemiological situation [37].

The priority areas for EID study in Asia included (1) understanding host-pathogen-environment interactions; (2) improving tools and technologies; (3) changing people’s behavior, and (4) evaluating the effectiveness of interventions. The need to

adequately predict, prevent and respond to infectious diseases emerging unexpectedly from human–animal–environmental systems have driven interest in multisectoral, socioeconomic, systems based, collaborative (MSC) study approaches such as EcoHealth and One Health. MSC study can be considered a type of ‘pragmatic research’ and might be most useful in describing the change in complex human–animal–environmental systems, accelerating research-to-action and evaluating the effectiveness of interventions in ‘real world’ settings [12].

Adaptive management and eco health frameworks were developed for malaria elimination in Amerindian riparian communities of Venezuela. These frameworks were developed as a strategy to capture, organize, and communicate connections among key factors related to local malaria complex systems. Important causal relationships between social, economic, and environmental stressors which are a determinant of malaria were identified at different levels and assumptions that guide interventions are offered, based on available scientific knowledge and input from stakeholders. The eco-health approach can benefit from the capability approach, and we explain why [8].

Implementing a One Health approach in an integrated and considered manner can be challenging, especially in the face of a perceived crisis. The effective control and prevention of EIDs, therefore, requires social science research to improve understanding of how EID threats and responses play out; the development of an analytic framework that catalogues case experiences with EIDs, reflects their dynamic nature and promotes inter-sectoral collaboration and knowledge synthesis; genuine public engagement processes that promote transparency, education and capture people’s preferences; a set of practical principles and values that integrate ethics into decision-making procedures, against which policies and public health responses can be assessed; integration of the analytic framework and the statement of principles and values outlined above; and a focus on genuine reform rather than rhetoric [16].

5. CONCLUSIONS

DHF control and prevention around the world should be using one health or paradigm shift. Global strategy and a global framework to DHF control are suitable for one health approach which uses multidisciplinary sector to this effort. One Health approach will manage the strategy of the health workforce in multidisciplinary and others community to providing health service and collaborate to control all factors in the DHF. In

Indonesia, some efforts which use one health approach is such as community partnership. However, another sector should be involved to DHF control, such as human health (immunes and vaccines), animal health (vector), environmental, socioeconomic, politics, and other sectors related.

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