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ONE HEALTH STRATEGIES FOR RABIES OUTBREAK CONTROL IN DOMPU, WEST NUSA TENGGARA, INDONESIA: RECOMMENDATIONS FOR EMERGENCY RESPONSE

LILIK ZUHRIYAH[1], MIRA FATMAWATI[2], NUGROHO NURPONCO PRIYANTO[2], NINIK DJAJATI[3], ZAINAL ARIFIN[3], IRIS JUITA KASTIANTI[4], SRI ANDARINI[1], HARUN AL RASYID[1], SHABRINA NARASATI[1], RAHMAD[1*]

[1]Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia, [2]Faculty of Veterinary and Animal Husbandry, Universitas Brawijaya, Malang, Indonesia, [3]Livestock and Animal Health Services of Dompu District, West Nusa Tenggara, Indonesia, [4]Regency Health Office of Dompu District, West Nusa Tenggara, Indonesia
Email: rahmadanwar1983@ub.ac.id

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ABSTRACT

Objective: Almost 1,315 cases of rabid animal bites and 9 fatal cases of human rabies were declared in February 2019 due to the outbreak of rabies in Dompu, West Nusa Tenggara (WNT), Indonesia, and this outbreak has affected more than 240,000 people. We report a recommendation for emergency response of one health strategies for rabies outbreak control in Dompu, WNT, Indonesia.

Methods: We implemented the OH approach to expedite the management of outbreaks in Dompu. A meeting with the local government of Dompu district (GoD) was held after an outbreak report was released in February 2019. Furthermore, we encouraged the GoD to adopt OH to manage and control the outbreak.

Results: In Indonesia, the concept is not clear but gradually developing. The burgeoning issues are tackled by GoD through some initiatives, but implementing OH is itself a challenge. We encourage GoD to focus on these gaps and prioritize the health issues for which the best suitable results can be achieved by OH approach.

Conclusion: The OH approach accelerated the prevention of rabies outbreaks in Dompu. To effectively implement the OH approach, it is important to design a legal and institutional framework. In addition, it is essential to raise awareness among policy-makers, including political leadership and enhance the government's regular budget for the OH approach.

Keywords: One Health, Rabies Outbreak Control, Dompu, West Nusa Tenggara, Emergency Response

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INTRODUCTION

Rabies, an acute and fatal disease, is caused by a single-stranded, negative-sense RNA virus, which belong to the Lyssavirus genus of the Rhabdoviridae family. Every year, almost 55,000 human deaths occur worldwide due to this virus, which is mostly transferred from infected dogs [1, 2].

To optimize the health of animals, humans, and their environment, the One Health (OH) approach is beneficial, as it is cost-effective, sustainable, and practical [3]. It is also used to deal with health issues that involve holistic and multi-disciplinary approaches, especially in resource-poor nations4. To improve the health and welfare outcomes of humans, animals, and the environment and to promote environmental resilience through a collaborative method, OH helps educate and form networks5. It also aims to control typical zoonotic issues, including rabies and tuberculosis, and since the past few decades, it has been practiced in many ways. Since 2000, this idea has been promoted by the World Organization for Animal Health (OIE), World Health Organization (WHO), and Food and Agricultural Organization (FAO) [2].

This article focuses on the update of a rabies epizootic for which the outbreak was first considered in February 2019 in an area of Indonesia, mainly in and around Dompu, West Nusa Tenggara (WNT). It highlights all the factors needed to control the spread of the epizootic and the combined OH methods utilized by many agencies involved in the response.

MATERIALS AND METHODS

This case study was conducted during the rabies outbreak in Dompu, WNT, Indonesia, from February 2019 to April 2019. In this study, we implemented the OH approach and introduced the OH Systems Mapping and Analysis Resource Toolkit (OH-SMART™) to accelerate the management of rabies outbreaks in Dompu, WNT, Indonesia. This study did not obtain ethical approval because of the type of study which describe an update of a rabies epizootic during an outbreak in Indonesia.

The OH approach

One strategy that can help accelerate the management of zoonotics or outbreaks, such as rabies, is the OH approach [5]. OH is comprised of individuals of different disciplines and sectors at the local, national, and global levels who work in collaboration to achieve optimal health for humans, the environment, and animals. OH recommends recognizing mutual interests, setting shared goals, and leveraging teamwork to improve the health of the country. Like in most countries, in Indonesia, the health of the environment determines the health of the economy and the population6. The OH approach is an effort to achieve optimal health and has been recognized by experts to have the ability to address complex obstacles [6].

The University of Minnesota, in collaboration with the US Department of Agriculture (USDA), developed the OH-SMART™ mapping process. The purpose of OH-SMART™ is to improve the OH system in several countries. The process has been expanded to enhance national action plans for antimicrobials, amend the emergency response framework, and develop collaborative protocols on different multi-agency infectious diseases [4]. The OH-SMART™ tool was successfully implemented in West Sumatra, Indonesia, in 2017. The tool provided an adaptable, measurable process and effectively-identified and improved the operations and infrastructure required by OH [4, 7]. Therefore, OH-SMART™ is a reliable tool that can assist in addressing the outbreak of rabies in WNT and other future outbreaks.

The Faculty of Medicine through the One Health Study Team of our university and the university in Bali, Indonesia through their One Health Study and One Health Collaborating Center under the auspices of the Indonesia One Health University Network intend to discuss related experiences managing rabies in Bali and efforts to

handle and provide OH-SMART™ training as a form of support to the NTB provincial government and GoD in overcoming rabies in NTB.

Meeting with and hearing from the local government of Dompu district (GoD) occurred promptly after the release of the outbreak report in February 2019. Furthermore, we encouraged the GoD to implement of OH to manage and control the rabies outbreak.

RESULTS

Outbreak site and history

WNT—a province that had been declared as historically rabies-free—was overcome by the rabies outbreak in 2019. WNT is east of Bali and includes the islands of Lombok and Sumbawa.

Previously, there were approximately 1,500 victims of rabies-borne animal bites across the WNT district. Approximately 1,315 cases were found in the Dompu district; 81 cases were found in the Sumbawa district; and 55 cases were found in Bima. The rabies cases originated from the Dompu district, specifically the Kempo and Manggelewa subdistricts, and then spread to other areas on the islands of Sumbawa and Lombok. In February 2019, an emergency status for rabies was declared in the Dompu district.

Emergency response by the local government

This outbreak of rabies was controlled by the actions taken by The Ministry of Agriculture through the Directorate General of Livestock and Animal Health Services (DGLAHS).

Investigations were conducted by the joint veterinary team. Vaccination training for district livestock and human health officers was jointly conducted by the DGLAHS and the Emergency Center for Transboundary Animal Diseases of the Food and Agriculture Organization of the United Nations (FAO ECTAD) in the Dompu, Bima, and Sumbawa regencies. In addition, training for the procedure for Integrated Bite Case Management (IBCM) was offered. The purpose of this training was to improve the skills and knowledge of officers for to preserve human lives and control rabies in Sumbawa.

The OH approach

After the implementation of the OH approach, the GoD was willing to work in teams with the One Health Center Team-Indonesia One Health University Network (OHC-INDOHUN) to form an integrated team to handle outbreaks, including rabies outbreaks, which consisted of the regional GoD team and representative of the OHC-INDOHUN team. This agreement will be set forth in the form of a decree of the GoD, which will be immediately prepared and ratified by the GoD. The OHC-INDOHUN team will conduct a scientific study of the outbreak in Dompu with the OH-SMART™ approach so that they can provide input, direction, and assistance to the integrated rabies outbreak management team. The GoD was involved. to accelerate the attenuation of the outbreak through a cross-sectoral approach. Outbreak management is expected to be completed within 2-3 y. The active role of academics from universities under the auspices of the OHC-INDOHUN is a tangible form of the implementation of the Tri Dharma College in the community and government.

The concept of OH is still new in Indonesia but is progressively developing. The GoD has taken some initiative to tackle burgeoning problems, but there are several challenges to OH implementation. We encourage the GoD to address these gaps and prioritize the health problems for which the OH approach would result in the best outcome.

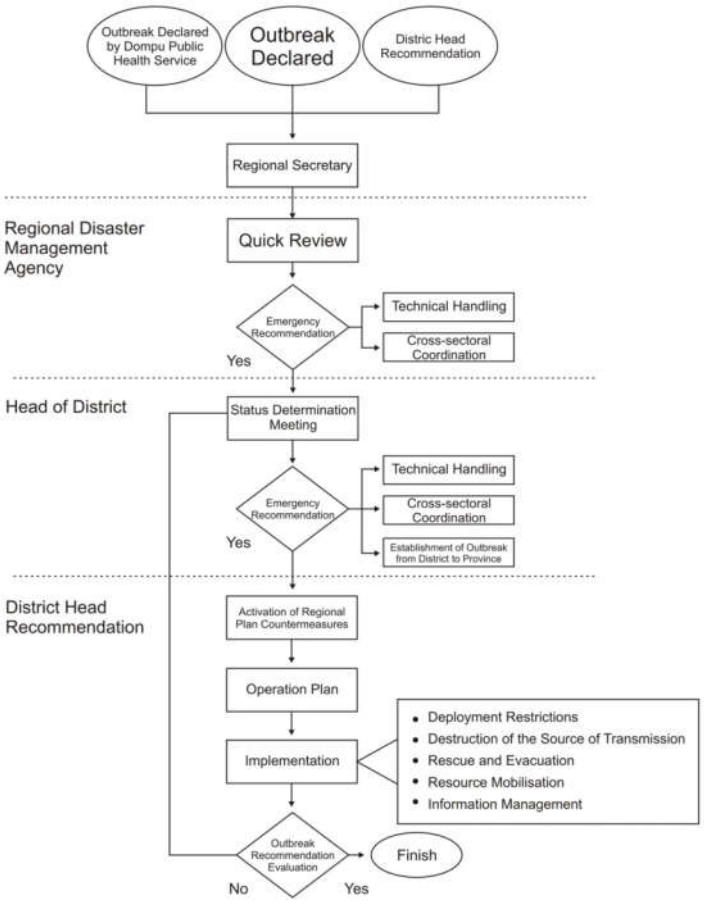

Fig. 1: Diagram of the cross-sectoral approach in the outbreak emergency response recommended by the one health initiative

DISCUSSION

Several severe outbreaks have occurred that show that the health of the environment, humans, and animals are interconnected and require interdisciplinary coordination and collaboration aimed at improving the preparedness and response to global disease. Collaboration at the interface of the environment, humans, and animals is critical to ensure that there are unified global workforce transformative initiatives [8].

It is more evident that interdisciplinary collaboration, teamwork from the governmental, educational, and other non-governmental institutions, and intersect oral knowledge are vital to formulate solutions for complex global health problems. OH intends to form a collaboration of several disciplines and sectors at a local, national, and global level to achieve the optimal health of humans, animals, and the environment. In OH, all the disciplines will have shared interests, set common objectives, and promote teamwork to increase the overall health of a country [9]. A previous study in West Sumatra demonstrated that OH-SMARTTM is a reliable tool that intensifies the OH approach [7].

This study used approaches to prevent human fatalities caused by rabies and illustrated the benefits of OH interventions. Rabies transmission to humans can be prevented through two corresponding interventions. The first intervention is post-exposure prophylaxis (PEP), which is a multi-dose course of rabies immunoglobin, which is used to vaccinate individuals bitten by rabid animals. The second intervention is the mass vaccination of animal reservoirs, particularly domestic dogs. Mass vaccination reduces the risk of exposure to and can eradicate the rabies virus. In addition, mass vaccination of animal reservoirs (especially domestic dogs, the reservoir in most human cases) reduces the risk of human exposure and can lead to the elimination of the rabies virus [10].

Using PEP has prevented the deaths of people exposed to the rabies virus. However, there are hindrances to the use of PEP, such as the inability of poor people living in rural areas to access and complete PEP regimens. In addition, there is always a delay in delivering the first dose of the vaccine, which can lead to severe health outcomes, since the vaccine can only be obtained from large healthcare facilities. Other limitations include poor transportation and the challenge of raising money to cover medical and transportation costs [10, 11].

Human and animal health professionals have gained some understanding of OH issues. However, there are various challenges in the implementation of OH. One of the significant challenges is the lack of independent institutions to pioneer OH initiatives. Limited coordination efforts among stakeholders and policies to aid collaboration across different sectors are also significant challenges. These challenges exist because every sector has different sectoral priorities that cause OH to receive less consideration than it requires. In addition, while the sectors observe the data, there is minimal cross-sectoral data sharing mechanisms and combined planning. There are different chains of command among the affiliated agencies, which is a significant barrier to intersectoral collaboration.

Low community awareness, inadequate technical capabilities for the implementation of OH, and reduced laboratory infrastructure are other challenges. There are similarities between the Indonesian and US governments, as they are both decentralized governments. For instance, the government of Indonesia operates from central, provincial, and district levels of government, which has helped the country effectively prevent and respond to infectious diseases in more than 17,000 islands[7]. However, the three government levels raise confusion in their roles and responsibilities. In addition, another challenge in implementing OH in Dompu is the lack of the regulatory capacity of the government.

Compared to another study in Colombo, Sri Lanka, a new complete OH intervention was started in 2007 that developed education, vaccination, sterilization, and dog managed zones. In 2011, the results showed that in the four-year intervention, they reduced the number of dog rabies cases and human distress as a result of dog bites, reduced other animal distress, and generated a perception of positive changes in the population [12].

Improving the efficiency of the OH approach requires the development of a clear strategy. More substantial institutional reforms may require substantial time. In addition, a coordinated approach has to be continued in parallel to address possible OH challenges. It would also be helpful to enhance mutual understanding through continuous collaboration. The three levels of government may also prioritize situations for which OH is useful and provide funding for the initiative. The inclusion of OH-related courses in the education curricula at various educational levels can also help increase awareness. Organizations such as the Centers for Disease Control and Prevention (CDC) have interdisciplinary human resources, including environmental health, human health, animal health, and other key stakeholders that can help address global multi-sectoral issues, including those in Indonesia [3].

CONCLUSION

One Health effectively promoted and accelerated the prevention of rabies in Dompu, WNT, Indonesia. To authorize the implementation of the OH approach, legal and institutional frameworks should be designed. In addition, political leadership and an increase in the government's regular budget for OH initiatives would substantially assist the promotion of the OH approach.

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AUTHORS CONTRIBUTIONS

All the author have contributed equally.

CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

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