RABIES OUTBREAK IN DOMPU, WEST NUSA TENGGARA, INDONESIA: A CASE STUDY

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ABSTRACT

Rabies, transmitted through a bite from a dog, is a highly fatal disease that is a health hazard throughout the world including Indonesia. In February 2019, there was an outbreak of rabies at Dompu, West Nusa Tenggara (WNT), Indonesia. As such, Dompu district has become one of the beginning points for many rabies cases being experienced in WNT. Lately, there have been fatal cases of the outbreak to the tune of 1,315 victims due to rabies-borne animal bite. Among these cases, nine of them are human rabies. Out of the 182 samples examined for brain rabid animal, 90 turned positive. Efforts from local, provincial, and federal agencies representatives activated a rabies response involving update of policies, enhancing of surveillance, a campaign to educate the public as well as widespread vaccination of domestic and wild animals. There has not been experienced a rabies outbreak like this in WNT region, Indonesia, over the years. Therefore, there require integration of all intervention strategies as well as a collaboration of all human health, animal health, and wildlife authority to bring to a halt the outbreak. To further enhance the intervention strategies, the government is recommended to respond immediately.

KEYWORDS

Government of Dompu District, Emergency Response, One Health, Rabies Outbreak, Zoonotic Disease.

INTRODUCTION

The viral zoonosis disease, rabies, has occurred in 89 countries. Rabies also kills about 60,000 individuals a year of which over 60,000 are killed every year. Forty percent are children under 15 years of age, predominantly in rural areas of economically deprived African and Asian countries. Up to 99 percent of all human cases are derived from the bite of an infected dog.[1]

The case-fatality incidence of rabies is almost 100% and the disease can be absolutely avoided by prompt post-exposure prophylaxis (PEP). Many people at very low risk of contracting the disease are still pursuing PEP, irrespective of the advice of health professionals. The symptoms of rabies are primarily correlated with human PEP, therefore there is immediate economic result.[2] However, with good preventive management, these economic impacts can be overcome immediately. Elimination program is an option besides vaccination.[3] The rabies disease has a significant global economic burden estimated at $8·6 billion per year.[4]

Of the 34 provinces in Indonesia, only 8 provinces are free of rabies, while 26 other provinces are still endemic. Riau Island, Bangka Belitung, Papua, West Papua, DKI Jakarta, Central Java, Yogyakarta and East Java are the eight provinces. In the last 5 years (2015-2019), 404,306 cases of bites from animal-transmitting rabies have been recorded, with 544 deaths. There were 5 provinces with the largest number of fatalities at the time, including North Sulawesi, West Kalimantan, South Sulawesi,

North Sumatra and East Nusa Tenggara. Meanwhile, the last rabies outbreak in 2019 was reported in West Nusa Tenggara.[5]

In February 2019, there was a rabies outbreak at Dompu, West Nusa Tenggara, Indonesia. The rabies cases have been emanating from Dompu district then to the rest of the West Nusa Tenggara. A month later, after the outbreak, victims of the disease that were reported were around 1,014. This paper describes case distribution of rabies according to sub districts, animal host, human victims, and public health response from the local government as well as the measures employed in limiting the spread of the disease by use of the One Health approach in Dompu, West Nusa Tenggara (WNT), Indonesia in 2019.

MATERIALS AND METHODS

The monthly case number of rabies covering eights sub districts for the study area were collected from the Health Office of Dompu Sub District and Animal Husbandry Department of Dompu Sub District. We collected data of cases of animal bite transmitted rabies, postexposure Prophlaxis (PEP), anti rabies serum (ARS), positive lyssa, brain sample of rabid animal from each sub districs. We also collect data of vaccination among animals. The data were displayed by tables and analyzed descriptively

RESULTS

Outbreak Site and History

West Nusa Tenggara, Indonesia, — a province that had been declared rabies-free — was hit hard by the rabies outbreak in 2019. West Nusa Tenggara is located east of Bali and it includes Lombok and Sumbawa islands.

Until now, there are around 1,500 victims of rabies-borne animal bite spread in West Nusa Tenggara Province. About 1,315 cases were found in Dompu District, 81 cases in Sumbawa District, and 55 cases in Bima. Rabies cases originated from Dompu district, specifically Kempo and Manggelewa subdistricts, which then spread to other areas in the Sumbawa island. In February 2019, an emergency status for rabies outbreak has been declared in Dompu District. The local government has set the status of an outbreak of rabies, which will change depending on the conditions of the outbreak. All rabies-borne animal bite caused by dog. Dompu district is an agricultural area, which most of population work as farmers, they use dogs to guard farms against animal pests which most of the dogs are unvaccinated.

Outbreak Report

Table 1. Cases of Animal Bite Transmitted Rabies in Dompu District, West Nusa Tenggara, Indonesia During Outbreak in 2019

The Dompu District consists of eight subdistricts namely Kempo, Manggelewa, Woja, Dompu, Hu'u, Pajo, Pekat, and Kilo. Most cases came from Kempo Sub-districts which contributes 362 cases. The total animal bite transmitted rabies were 1315 cases. Rabies Postexposure Prophylaxis (rPEP) was given to 1291 cases and Anti-Rabies Serum (ARS) was given to 86 cases. Lyssa positive was found in 9 cases, which all of them died.

Emergency response by local government

Indonesia's national strategies on rabies control are based on the recommendation of the WHO and International Animal Health Organization including dog vaccination, dog population control with selective elimination of stray dogs, human post-exposure prophylaxis, would management and public awareness campaign. The Ministry of Agriculture, through the Directorate General of Livestock and

Animal Health Services (DGLAHS), is taking immediate actions to control the current rabies outbreak in Dompu, WNT, Indonesia.

After previously sending a Joint Veterinary Team to conduct investigations and immediate vaccination of dogs against rabies, the DGLAHS together with the Emergency Center for Transboundary Animal Diseases of the Food and Agriculture Organization of the United Nations (FAO ECTAD) held vaccination training for district livestock and human health officers in Dompu, Bima, and Sumbawa regencies, as well as training on the Procedures for Integrated Bite Case Management (IBCM). This training was held to improve the knowledge and skills of officers to prevent and control rabies in Sumbawa.

Rabies Post Exposure Prophylaxis (rPEP)

Medical consultants were sent out by the WNT Public Health Services with the responsibility of informing about the rabies epidemic to care providers. They formed a campaign on rPEP administration by setting its criteria. Almost 1291 cases were treated with Rabies Postexposure Prophylaxis (rPEP) and 86 cases with Anti-Rabies Serum (ARS). (Table 1).

Animal Vaccination

For reducing the spread of rabies by oral vaccination of animal transmit rabies, animal vaccination proves beneficial, until June 2019, almost 14,000 baits were distributed by the government to all the sub-districts of Dompu, which contains the vaccine for oral rabies. Other than this, rabies vaccination posts were held for the domestic animals by the Dompu Public Health Services and local veterinarians.

Table 2 and Figure 1 demonstrates the scope of vaccination of rabies vector animal at the start of 2019 in the district of Dompu, and West Nusa Tenggara, Indonesia. There were mainly 11,810 numbers of rabies vector animals, out of which most were dogs. Mostly 6,659 animals were treated with vaccination which is an almost 56,38% population of rabies vector animal.

Interisland Animal Quarantine and Movement of Animal Control

Based on Directorate General of Animal Husbandry and Animal Health Degre, Agriculture services in Dompu conducted a strict supervision of Rabid traffic, especially dogs. They include animal quarantine and local government cooperate in vaccination programs in border areas.

Public Awareness Campaign

The campaign for public awareness is developed by the Dompu Public Health Services which solicit the public to refrain from wild animals; pas on all the dead or strangely behaving animals to local animal services; immediately call the public health in case of any scratch formed by an animal , and to get their pets injected. Posters, coloring booklets, newspaper articles and in-person or group information sessions for high-risk groups are the material required for the campaign.

One Health Approach

One Health (OH) is viewed as a synergistic, cross-sectoral, and transdisciplinary strategy that exists at a local, regional, national, and international level for gaining favorable outcomes of health by focusing on the zoonosis and the chain that connects the people, animals, plants and their environment. This approach is practical, cost-effective, and sustainable.[8] The close intersectoral cooperation, interdisciplinary skills, and the participation and empowerment of different stakeholders are enhanced by one Health intervention.[9] OH is not only beneficial in addressing the different types of disease problems that encompass all the connection among different people, animals, and the environment but also deals with the methodologies for developing and implementing the effectual strategic plan.[10] In February 2019, just after the release of the outbreak report, the hearing and meeting with the local body

of Dompu district were executed and we get inspired by the Dompu government on their implementing process of OH for managing and controlling the outbreak of rabies.

DISCUSSION

Rabies is a lethal zoonotic viral disease that remains endemic in 24 provinces out of 34 provinces in Indonesia. The disease presents a significant economic burden to the region due to costs associated with diagnosis, treatment, and control programs.[10]

The Roles of Government

The outbreak in Dompu, WNT, Indonesia was declared by the government in February 2019 and the incursion was caused by people's customary movement of dogs to Sumbawa and their use of dogs to guard farm crops such as maize. This outbreak is the first to occur in WNT that historically has been rabies-free. In this situation, public knowledge regarding rabies is still low, the rate of vaccination of rabies-carrying animals is very low, skills and knowledge of health service facilities and livestock service are very minimal, and policies and cooperation across sectors in the local government have not yet been established.

The Ministry of Agriculture's Directorate General of Livestock and Animal Health Services (DGLAHS) has taken immediate action to deal with the current rabies outbreak in the district as an emergency response. The directorate has sent a joint veterinary team to operate investigations and the vaccination of dogs against rabies, and hold vaccination training programs for livestock and human health officers in the district. The two parties also held a training on the Procedures for Integrated Bite Case Management (IBCM) to improve the knowledge and skills of officers to prevent and control rabies in Sumbawa Island.

Previous Case

A previous study by Susilawathi et al showed that rabies has emerged as a major public health problem in Bali. Bali was previously free of rabies, however, it experienced an outbreak in 2008 causing mass human fatalities. In response, both mass dog culling and vaccination have been implemented.[11, 12]

Human rabies fatalities have occurred because of knowledge inadequacy regarding rabies risk and lack of management skills of dog bite incidents, including poor wound cleaning and failing to seek PEP. The limited availability of treatment of high-risk rabid dog bites also contributed to the high fatality rate.[11] The situation is almost similar to the recent rabies outbreak in Dompu which previously free of rabies. Before the rabies outbreak, rabies animal vaccination in Dompu was very low and mostly undocumented. It may lead to rapid spread of rabies between animals. At the beginning of the outbreak, there is a lack of knowledge regarding rabies in the community, dog owners refused to vaccinate their pets and the victims of animal bite refused PEP, leading to high lyssa cases and fatality rate.

Indonesian government declares rabies-free in 2030, by actualizing rabies control and control strategies. The strategies including a minimum vaccination program of 70%, population management; movement monitoring, and other supporting activities. Another study on the rabies outbreak in Bali showed that mass vaccination of the dog population has proven effective and rabies cases in dogs and people have decreased. Besides, increasing the efficiency and effectiveness of vaccination campaigns is also needed.[13] Until July 2019, the scope of animal vaccination in Dompu is 56.38%. This level of the vaccination program is still below target. The 70% of the vaccination program is very difficult to achieve due to community opposition and the distribution of dogs where stray dogs are not proprietary, and dogs that are used to maintain corn farms in the mountains are difficult to reach. If vaccination coverage is still below 70%, it will be ineffective in preventing transmission of rabies among animals.

Vaccination

However, the turnover of the population is a great challenge to maintain an adequate amount of vaccination coverage.[11,13] The vaccination coverage reduces with the death of vaccinated animals that occur, the birth of puppies, and the presence of new unvaccinated animals. A vaccination campaign can also reduce the coverage of the vaccination for the next period. Other than this, the tenacity of infection can be vacillated by the small gaps in the coverage of vaccination.[11,13] Rabies can be eliminated from Dompu, WNT, Indonesia by understanding all the challenges for maintaining the high coverage of vaccination between campaigns.

One Health Approach

One Health is defined by WHO and others as a concept and approach to "designing and implementing programs, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes. The areas of work in which a One Health approach is particularly relevant to include food safety, the control of zoonoses and combatting antibiotic resistance". It needs to involve the "collaborative effort of multiple health science professions, together with their related disciplines and institutions—working locally, nationally, and globally—to attain optimal health for people, domestic animals, wildlife, plants, and our environment".[14]

Meeting and hearing with the local government of Dompu district was implemented soon after the outbreak report was released in February 2019. Furthermore, we encourage the Government of Dompu to adopt the implementation of OH in managing and control rabies outbreak.

In the current outbreak, OH approach has been promoted to accelerate the prevention of rabies outbreaks in Dompu, WNT, Indonesia. Institutional and legal frameworks need to be designed and established to effectively implement an OH approach. Raising awareness among policymakers including political leadership and increasing the government's regular budget for OH activities would be a great help to promote OH approach.

CONCLUSIONS AND SUGGESTIONS

The region of Dompu, WNT, Indonesia, has never experienced such a severe outbreak of rabies before. Kempo is a sub district with the highest number of rabies cases in Dompu district in which lyssavirus was founded. Dogs are the main animal that spreads rabies.

As the outbreak was new cases, the community is not prepared to face it. However, the local government has done many things to prevent the expansion of the case. As such to curb the menace, the integration of intervention strategies as well as increased cooperation of animal health, human health as well as wildlife authority should be strengthened. Additionally, it is recommended that the government should respond immediately to curb the situation.

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Table 1. Cases of Animal Bite Transmitted Rabies in Dompu Disrtric, West Nusa Tenggara, Indonesia During Outbreak in 2019

NO	SUB-DISTRICTS	Cases of Animal Bite Transmitted Rabies	Postexposure Prophylaxis (PEP)	Anti Rabies Serum (ARS)	Positive LYSSA	Brain Samples of Rabid Animal			
						Positive	Negative	Not Checked Yet	Total
1	**Kempo**	362	358	9	5	5	8	9	22
2	**Manggelewa**	165	163	6	2	8	9	4	21
3	**Woja**	190	190	11	1	8	6	1	15
4	**Dompu (Area A)**	113	113	6		21	14	3	38
5	**Dompu (Area B)**	97	96	8	-	-	-	-	-
6	**Hu'u**	145	144	5	1	17	7	4	28
7	**Pajo**	63	62	9	-	16	15	-	31
8	**Pekat**	149	136	29	-	-	1	-	1
9	**Kilo**	24	23	2	-	2	1	-	3
10	**Regional Public Hospital**	7	6	1	-	-	-	-	-
		1315	**1291**	**86**	**9**	**77**	**61**	**21**	**159**

Table 2. Rabid Animals Vaccination in Dompu Disrtric, West Nusa Tenggara, Indonesia During Outbreak in 2019

NO	DISTRICTS	Rabid Animals Population				Rabid Animals Vaccination				Rabid Animals Vaccination Scope (%)			
		Dogs	Cats	Monkey	Total	Dogs	Cats	Monkey	Total	Dogs	Cats	Monkey	Total
1	**Kempo**	2838	NA	NA	2838	1058	150	13	1221	37,28	NA	NA	43,02
2	**Manggelewa**	1514	NA	NA	1514	781	44	NA	825	51,59	NA	NA	54,49
3	**Woja**	823	NA	NA	823	585	178	1	764	71,08	NA	NA	92,83
4	**Dompu**	1496	NA	NA	1496	514	159	15	688	34,36	NA	NA	45,99
5	**Hu'u**	1300	NA	NA	1300	806	297	3	1106	62,00	NA	NA	85,08
6	**Pajo**	650	NA	NA	650	409	51	1	461	62,92	NA	NA	70,92
7	**Pekat**	1489	NA	NA	1489	818	19	NA	837	54,94	NA	NA	56,21
8	**Kilo**	1700	NA	NA	1700	738	18	1	757	43,41	NA	NA	44,53
	Total	**11810**	**NA**	**NA**	**11810**	**5709**	**916**	**34**	**6659**	**48,34**	**NA**	**NA**	**56,38**

NA= Not Available

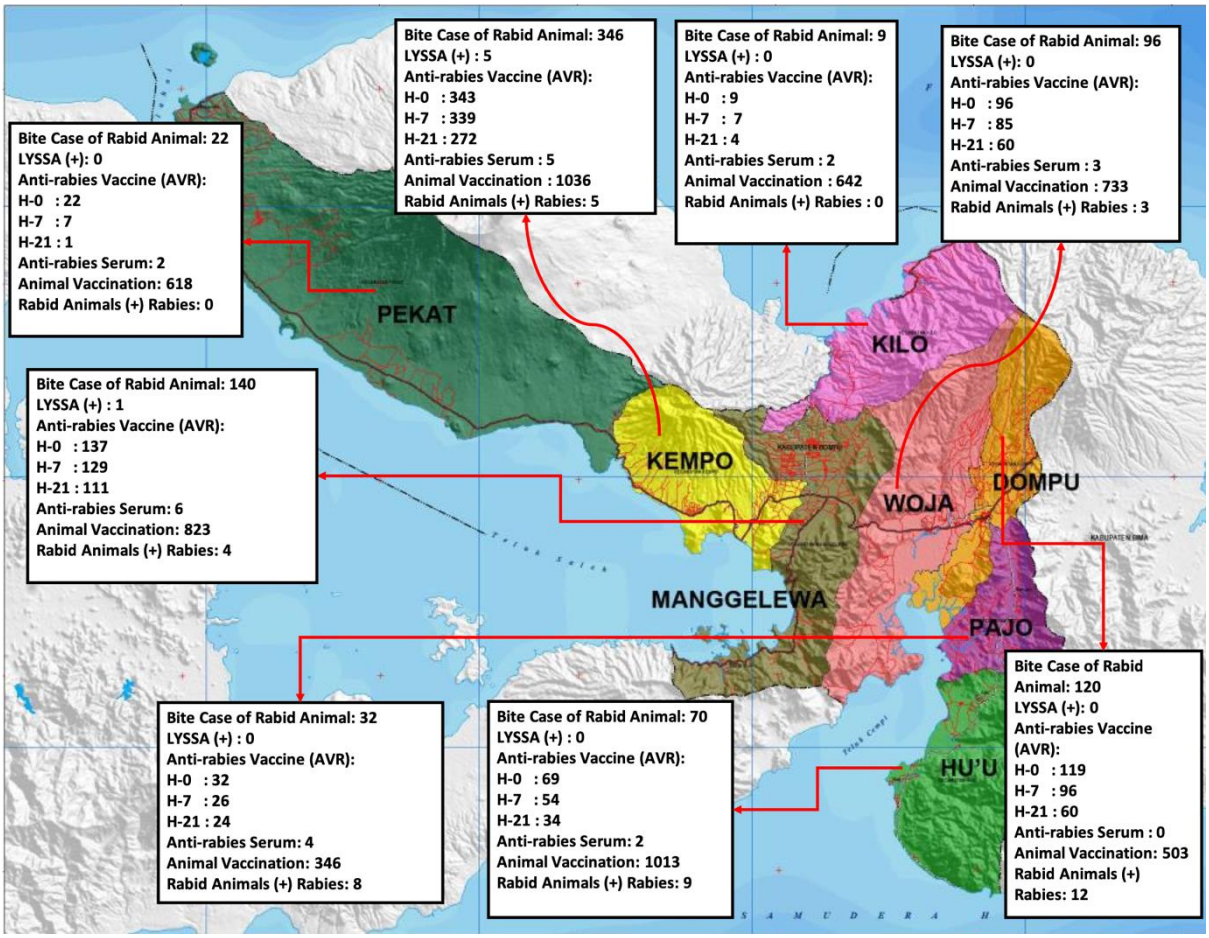

Figure 1. Distribution of Rabies Outbreak in Dompu, West Nusa Tenggara, Indonesia