The Influence of Public Awareness on Prevention of Rabies Cases in Several Asian Countries: A Review

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Abstract. Rabies is a zoonotic disease caused by a viral infection. The rabies virus is often referred to as re-emerging zoonosis, which belongs to the genus lyssavirus. Rabies in humans is spread through the bite of an infected animal. Animals that are at risk of spreading the rabies virus are called HPR. Animals that are at risk of exposure to the rabies virus are all warm-blooded. For Indonesia, the source of rabies transmission comes from 3 animals, namely: dogs, cats, and monkeys. The risk of transmission through bites is speedy and occurs almost every day, primarily through dog bites. Deaths from rabies in children are generally under the age of 15 years. The South Asia region recorded the maximum incidence of rabies outbreaks, with India and Bangladesh at the highest position compared to other countries in the region and beyond. Indonesia is a country that has high rabies cases. Bali is an area that has increased rabies incidence every year. The increase in cases of dog bites is very closely related to people's awareness patterns. The predetermined pattern of awareness includes: handling after HPR bites, HPR maintenance systems, actions taken when dealing with HPR, and treatment of products (meat or organs) from HPR. Efforts are being made to prevent rabies outbreaks, namely vaccination, depopulation, rabies prevention education for school children, and surveillance of rabies-carrying animal traffic (HPR).

Keywords: Rabies, zoonosis, vaccination.

1. Introduction
Rabies is a zoonotic disease caused by a viral infection (RABV), which is included in the lyssavirus genus and Rabdoviridae family. RABV infects all types of warm-blooded animals including humans. Generally, the case of rabies begins with carnivorous animal bites. Bite cases even cause death in humans, especially in Asia and Africa. In Mongolia from 1970 to 2005, cases of death from the rabies virus ranged from 21,302 animals and 34 fatalities from humans [1].
Typical clinical symptoms of rabies include: the emergence of severe anxiety, sufferers become afraid of water (hydrophobia), and the presence of fear of air (aerophobia). During the incubation period of the disease, the virus is excreted in saliva, which is then the process of transmission between hosts mainly through the bite of an infected animal, but sometimes the process of transmission can occur through contact with viruses and mucous membranes. Although not all bite cases result in asymptomatic infection, so when there is a case of a bite from an animal affected by rabies it can end in death. In humans, the healing process which is a rare occurrence of the clinical condition of patients infected with rabies has been documented, but intensive care is needed and does not always result in complete recovery [2].

Dogs are the most common rabies reservoir. But human bite cases have also been reported as a result of bites from cats and other wildlife. Wildlife that has been confirmed has given a positive response to the rabies virus including monkeys, mongoose, and wolves (Canis spp.) are suspected as a reservoir of rabies viruses in wildlife in Bangladesh, India, and Nepal [3]. Rabies cases in humans develop from the bite of infected animals, especially dogs (91.5%) who have contracted the virus from wildlife and fellow dogs. Transmission of the virus can only occur when the saliva of an infected animal enters a wound in the skin or mucous membrane. A high risk of infection has been reported through bites (5% -80%), licks (0.1% -1%) of animal reservoir rabies. The severity depends on the location of the bite and titer of the virus contained in the saliva of the biting animal [4].

2. Method
2.1 searching of source
The source of the article comes from Google and Google Scholar searches by citing English articles from 2011 to 2019. The articles used are articles related to Rabies cases that occur in several countries. Searching for sources of articles is conducted by using keywords: rabies cases, rabies vaccination in humans, rabies prevention efforts, and epidemiology of rabies cases.

2.2 article criteria
The article used is an article from articles and international journals discussing the epidemiology of rabies cases related to public health, as well as patterns of public awareness in efforts to prevent rabies cases.

Figure 1. Article Review Flow Chart
| Study and Language | Research Area | Collection Data | Methods | Mind Finding |
|--------------------|---------------|-----------------|---------|--------------|
| English | Nigeria | Death case in human because of rabies | Dog meat | Review | Incidence of death cases due to rabies caused not only through bites but also consuming the meat of animals infected with rabies |
| English | Philippines | Case of rabies bites in children | Dog | Experiment | The efforts taken by the government in suppressing the number of rabies dog bites in children, with rabies prevention education |
| English | Bali | Elimination effect of rabies-carrying animals | Dog | Experiment | Provide an overview of the impact of dog elimination on the number of rabies cases in each district |
| English | Turkey | Bite cases in children | Dog | Experiment | Showed the highest rabies dog bite cases occurred in the young or teenage age group. |
| English | Srilanka and Thailand | Effort of decreasing of rabies bites cases level | Dog | Case report | Efforts to reduce rabies dog bite cases through a mass dog vaccination campaign program |
| English | New Caledonia | Rabies encephalomyelitis | Dog and wildlife | Experiment | Rabies *encephalomyelitis* cases occur as a result of bites from dogs, and the risk of not being vaccinated in bite victims after dog bites. |
3. Discussion

The incidence of rabies-carrying animal bites in Asia is quite high, occurring around 30,000 deaths each year (1 death every 15 minutes). Death rates that occur in children generally occur at the age of 15 years or adolescent category. In the South Asian region, the highest incidence of rabies was found in India and Bangladesh compared to other countries in the region and beyond, whereas, countries with a moderate category of rabies prevalence are Nepal, Bhutan, Myanmar, Thailand, and Indonesia. The prevalence of rabies cases in animals in this region ranges from 20-50%. In India, rabies is found in almost all regions except Andaman and Nicobar Island. The trend of increasing wild dog population, the process of urbanization and the lack of maintaining environmental cleanliness in densely populated rural communities are considered to be factors supporting the transmission of rabies in Asia as well as African countries [4]. In a study conducted by Kilic et al. in Turkey, the highest rabies dog bite cases occurred in the young or adolescent age group. This is due to the link between the breeding season of wild dogs and the school holidays of children and adolescents. They (adolescents) tend to be outdoors even at night, so their potential for contact with dogs, cats, and other animals are enormous [5].

The main problem in eliminating rabies in India is the lack of coordination and the lack of a comprehensive national program since India borders six countries where a total rabies outbreak occurs. According to statistical analysis conducted by the government, in India currently, vaccines are produced under 15 million doses for humans, the amount of this vaccine meets national requirements. Meanwhile, the government carried out more socialization to promote public awareness of rabies in the form of a pilot project to prevent human deaths due to rabies launched by the National Center for Communicable Disease Control. In 2008 in five cities in India, a global health care company, Schering Plow Company sponsored two projects in 10 villages around Bangalore and Pune, this program focused on education awareness and mass vaccination of dogs. Indonesia is a country with a high incidence of rabies cases, in some regions in Indonesia, it is an endemic rabies area, and not even a few are categorized as red zone areas in the spread of rabies cases. One example of a region that has a high rate of rabies spread in Bali. Rabies cases that occurred in Bali were first reported precisely in Badung Regency around 2008 and caused human deaths. Cases in animals and humans were later found in all districts in Bali in the following years. The average time of death after a victim who was bitten was 3.8 months, ranging between 0 and 19 months. Anti-rabies vaccination in dogs was initially only carried out in Badung and Denpasar districts, then thoroughly in all districts. However, until 2015 rabies vaccination does not reduce the emergence of rabies cases. Many factors might influence the success of the rabies release program to current time such as the type of vaccine used, efforts to depopulate stray dogs and rabies control in dogs. Aside from Bali, Southeast Sulawesi was the province with the endemic case of dog bite. Kendari Agricultural Quarantine Service reported that from bite cases happened at Kendari in 2018, 11 samples were positive by passive laboratory test and 7 samples were positive by the Seller test. In 2019 there were 17 bite cases reported at North Kolaka which happened at 4 districts: Lasusua, Ngapa, Tiwu, and Pakue. The problems in eliminating rabies at South-east Sulawesi were: low education about rabies to people, low attentiveness of local government to rabies, high population of unvaccinated wild dogs, and low cooperation from agencies [6].

Sri Lanka and Thailand have decreased the number of human rabies deaths through the implementation of a mass dog vaccination campaign, increased accessibility for PEP (post-exposure prophylaxis), and a vaccine delivery system that takes into account the cold chain is the basis for both prevention and control of rabies cases, especially rabies which attack humans [3]. Post-exposure prophylaxis (PEP) approach: Management of cleaning animal bite wounds. The cleansing means
when the rabies virus enters the human body through biting or mucous membrane through saliva intermediaries. The efficient way that can be done is by washing as soon as possible and gently washing the area with soap and watering it using flowing water for 10 to 15 minutes. Considering the importance of this effort, all clinics receiving dog bite victims must have facilities for washing wounds [7].

Rabies encephalomyelitis, in this condition, can be prevented by post-bite vaccination and application of serum, but rabies encephalomyelitis will occur in people who are not vaccinated after a bite. When the virus has already entered the body then there is no proven effective treatment. Providing bite wound care is effective to minimize patient suffering. The incubation period varies but usually ranges from 20 to 60 days after the bite occurs [8]. The spread of the rabies virus to both animals and humans is inseparable in terms of culture and customs and traditional habit adopted by residents of a region or country. The habit of consuming dog meat is common to people of Nigeria. Dog meat is consumed for various reasons including potential as a cure for malaria and as a protection against evil spirits. It is worth noting that in most developing countries, especially in Nigeria, dogs are transported together with goods and people in the same cabin in land and sea transportation. This further increases the spread of the rabies virus from dogs to humans. Also, wild dogs that starve for days make them irritable and trigger a biting reaction. This can trigger fights between dogs, resulting in injuries from bites on themselves that might easily help the process of spreading the rabies virus [9]. Although dangerous, rabies can be prevented through vaccination, depopulation, and socialization/education programs. An effective form of socialization/education can be given to children, as implemented in 2012 in the Philippines. Children are at high risk of getting bitten by rabies dogs. Therefore the Philippine government issued a policy of education called EPrP (education and pre-exposure prophylaxis), while the targets of this policy are school-age children in rabies endemic areas with limited access to animals and rabies prevention services and human control. Rabies prevention education for children is effective in reducing the incidence of dog bite cases, especially dogs with rabies [10].

4. Conclusion
Rabies is a zoonotic disease, caused by a virus, and has a high mortality for humans and animals exposed to the virus. When infected with this rabies virus, there is no single treatment that can be done. Therefore prevention of disease is one way to prevent rabies from spreading. Various efforts that can be done are vaccination, depopulation, rabies prevention education for school children, and traffic control. But the whole series of efforts to prevent rabies will not run optimally if it is not accompanied by awareness from the public.

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