ANALYSIS OF RISK FACTORS FOR TYPHOID FEVER CASES IN FLOOD-PRONE AREAS

Syah Ariq Zaidaan Najich[1], Ahmad Syarif[1]

Faculty of Medicine Universitas Pembangunan Nasional Veteran Jawa Timur

Corresponding author:

Syah Ariq Zaidaan Najich, Ahmad Syarif

Faculty of Medicine Universitas Pembangunan Nasional Veteran Jawa Timur

Rungkut Madya Number 191, Rungkut Kidul, Rungkut, Surabaya, Jawa Timur 60293

Tel/Fax: +6281515884363

E-mail: 23091010009@student.upnjatim.ac.id

Abstract

Background: Indonesia, a country experiencing severe drought, is highly susceptible to waterborne diseases, such as typhoid fever caused by Salmonella typhi infection. Poor sanitation conditions and high water levels can exacerbate the drought situation and create a conducive environment for waterborne diseases. Understanding the risk factors associated with typhoid fever in drought-prone areas is critical for effective intervention and management. **Objectives**: This study aimed to analyze the risk factors associated with increased incidence of typhoid fever in flood-prone areas. **Method**: This study used the literature review method by collecting data from various sources published between 2018 and 2024, through the Google Scholar and Mendeley platforms. The keywords used in the search were "flood," "typhoid fever," and "risk factors". **Results and Discussion**: The analysis revealed that poor sanitary conditions and high levels of air pollution are the main risks contributing to typhoid disease.Unhealthy environments and inadequate public access in remote areas increase the risk of transmission. Education on personal hygiene and health awareness is essential to prevent typhoid disease, especially in areas with minimal health infrastructure. **Conclusion**: he main risk factors for typhoid fever in flood-prone areas are poor sanitation and limited access to clean water. Community education efforts on hygiene and sanitation should be conducted to prevent a surge in typhoid fever cases and protect overall public health.

Keywords: Flood; typhoid fever; risk factors.

Introduction

A disaster is an event that significantly disrupts people's lives, whether caused by natural or human factors, causing material loss, environmental damage, casualties, and psychological impact.[1] Due to its location in an area prone to natural disasters such as floods and landslides, Indonesia is one of the countries with a high level of natural disaster vulnerability.[2] In Indonesia, floods are particularly frequent, especially during the rainy season, and are one of the major problems faced by the community and the government. More than 4,000 flood events have been reported in various parts of Indonesia during 2020-2023, according to data from the Meteorology, Climatology and Geophysics Agency (BMKG).[1]

Flooding occurs when the volume of water increases more than the drainage or holding capacity of the land. As a result, land areas are inundated.[1] Heavy rainfall, ecosystem damage such as deforestation, and poor governance of the city's drainage system are some of the causes of flooding.[9] This condition is exacerbated by people's habit of not paying attention to environmental hygiene, which leads to clogged drains and increases the risk of flooding. Flooding not only damages infrastructure and the environment, but can also cause diseases such as typhoid fever.

Typhoid fever is a disease caused by the bacterium Salmonella typhi, which spreads through contaminated food and drink.[8] These bacteria are more easily spread due to unsterilized environments, as is often the case after floods. When floods hit, sanitation systems often break down, causing feces and waste containing Salmonella typhi to be contaminated in clean water.[4] These situations increase the likelihood of typhoid fever transmission, especially in areas that have limited access to clean water facilities and health services. The bacteria that cause typhoid fever can live in contaminated water environments, and those who consume unsafe water or food can easily become infected.

The World Health Organization (WHO) states that typhoid fever is a common disease in many developing countries, including Indonesia. The disease is more common in areas with poor sanitation and limited clean water sources.[15] During the rainy season, especially in areas that flood frequently, cases of typhoid fever are frequently reported and often cause major public health problems.[12] Inadequate hygiene behavior, inability to maintain clean water quality, and contaminated environments are some of the risk factors that play a big role in the spread of the disease.

As a result, the researchers wanted to investigate the risk factors associated with the high frequency of typhoid fever cases in flood-prone areas. This study is expected to provide a clear picture of the environmental, social and behavioral factors that influence the spread of typhoid

fever, as well as a basis for policies that will help prevent and control this disease in flood-prone areas.

Methods

The method used in this article is a literature review where analysis is carried out from various literature sources. The literature search was conducted through google scholar and mendeley sources with a range of years between 2018-2024. The keywords used in the literature search were Flood; Typhoid Fever; and risk factors.

Results and Discussion

Definition

Typhoid fever is a systemic infection caused by the bacterium Salmonella enterica serovar Typhi. It is transmitted through contaminated food and water, and is characterized by symptoms such as high fever, malaise, headache, abdominal pain, and gastrointestinal disturbances such as diarrhea or constipation.[8] If left untreated, typhoid fever can lead to serious complications, including intestinal perforation, sepsis and even death.

Epidemiology

Typhoid fever is an endemic disease that is more common in developing countries, particularly in Asia, Africa, and parts of Latin America. According to WHO data, there are an estimated 11 to 20 million cases of typhoid fever reported annually worldwide, with mortality rates ranging from 128,000 to 161,000 people.[15] In areas with poor sanitation and limited access to clean water, children and adolescents are the most vulnerable age group to the disease, especially in rural areas with less health facilities.

Etiology

The etiology of typhoid fever is due to infection by Salmonella enterica serovar Typhi. These bacteria can live in unsanitary places, such as contaminated water and food. Food or water contaminated with the feces of the patient can be contagious. In addition, Salmonella typhi can remain alive in the human body and spread infection to others through unsterilized food.[3] The bacteria can also spread through direct contact with infected individuals.

Risk Factors

Some of the risk factors that increase the chances of developing typhoid fever include:

- Poor Sanitation Conditions: Areas that lack proper sanitation and poorly functioning water and sewage systems are where the disease spreads.
- Limited Access to Clean Water: Lack of clean water sources for consumption and hygiene increases the risk of contamination.
- High Population Density: Especially in densely populated cities, where diseases spread faster.
- Poor Hygiene Behavior: A cause of disease spread is poor personal hygiene practices, such as washing hands with soap after using the toilet.
- Inadequate Vaccination: In some regions, inadequate vaccination programs put the population in danger of infection.[7]

Education

Community education is one of the key steps in the prevention of typhoid fever. People need to be educated about:

- The importance of personal hygiene: Reducing the risk of infection by teaching how to wash hands properly before eating and after using the toilet.
- Food and Water Safety: informing people how important it is to cook food properly and ensure the water used is clean and safe for consumption.
- Health Education: Health campaigns to raise awareness about the symptoms of typhoid fever and the importance of getting immediate medical treatment if experiencing symptoms.[13]

Prevention

Prevention of typhoid fever can be done through several important steps, including:

- Vaccination: High-risk individuals, such as travelers to endemic areas or residents living in areas with high incidence rates, can be vaccinated against typhoid fever.
- Improved Sanitation: Improve sanitation systems and access to clean water to avoid contamination of food and water, which includes building better sanitation infrastructure and providing sufficient clean water to communities.
- Good Hygiene Practices: Advocate regular hand washing, proper cooking, and avoiding the use of unsafe water. This includes avoiding the use of bottled or pre-cooked water for daily needs.
- Early Detection and Treatment: Develop early detection methods to find typhoid fever

cases and conduct appropriate treatment to prevent spread.[6]

Conclusions

Based on the above, it can be concluded that poor sanitation conditions and limited access to clean water are two risk factors that significantly contribute to the increase in typhoid fever cases, especially in areas prone to disasters such as floods. To address these issues, people must be educated on the importance of maintaining personal and environmental hygiene and consuming safe food and water. By conducting effective education and sanitation interventions, it is hoped to prevent an increase in typhoid fever cases after a disaster and protect the overall health of the community.

References :

1. Badan Meteorologi, Klimatologi, dan Geofisika (BMKG). Laporan Banjir di Indonesia 2020-2023 [Internet]. 2023 [cited 2024 Dec 10].
2. Danil M. Manajemen Bencana: Teori dan Praktik. Yogyakarta: Graha Ilmu; 2021.
3. Ghosh AS, Saha M. The burden of typhoid fever in low and middle-income countries: A systematic review and meta-analysis. BMC Public Health. 2022;22:250.
4. Gunawan D, Anwar R, Sari M. The impact of floods on public health: A systematic review. Int J Environ Res Public Health. 2020;17(10):3541.
5. Hafizhan R, Lestari I, Wibowo A. Analisis Faktor Penyebab Banjir di Kota X. J Tek Sipil. 2020;15(2):145-56.
6. Hossain MJ, Ahmed S. Prevention of Typhoid Fever: A Review on Vaccine Development and Public Health Interventions. Vaccines. 2023;11(1):45.
7. Kaur M, Sharma M, Kumar S. Epidemiology of Typhoid Fever in Developing Countries: A Review. J Infect Dis Treat. 2021;7(3):1-5.
8. Kementerian Kesehatan Republik Indonesia (Kemenkes RI). Panduan Penanganan Demam Tifoid [Internet]. Jakarta: Kemenkes RI; 2022 [cited 2024 Dec 10].
9. Rahayu R, Hidayat R, Setyowati E. Environmental factors contributing to flood disasters in urban areas. J Sains Teknol. 2020;11(3):22-30.
10. Rimbawati N, Sugiharti D, Prihantono M. The correlation between flooding and the incidence of diarrheal diseases. J Kesehatan Lingkungan. 2019;4(2):78-85.

11. Saputra A. Pengantar Ilmu Manajemen Bencana. Jakarta: Pustaka Obor; 2022.
12. Setiawan B, Nasution A, Rahmawati S. Banjir dan dampaknya terhadap kesehatan masyarakat di Indonesia. J Kesehatan Masyarakat Indones. 2020;15(1):34-42.
13. Sudarsono R, Fitriani L. The Importance of Community Education in the Prevention of Typhoid Fever: A Literature Review. J Health Promot Behav. 2022;7(1):40-8.
14. Susanti E. Risiko Bencana Alam dan Strategi Mitigasinya. Bandung: Alfabeta; 2021.