

A Review of Social Issues in Relation to the Rabies Outbreak in Sarawak, Malaysia

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ABSTRACT

This article aims to review studies on social issues, patient management, and preventive behaviors related to the human rabies outbreak in Sarawak. The review analysed 19 documents from databases and 6 newspaper reports. Studies highlighted factors such as population density, seasonal patterns, and contact with dogs as contributing to the risk of rabies. Control efforts focused on dog vaccination and public education. Key epidemiological studies revealed a high case fatality rate and low rates of immediate medical treatment post-exposure. Social issues such as mishandling of patients, lack of federal support, and low public awareness were significant obstacles. Community engagement and interventions, including educational tools and behavioral assessments, were essential for improving rabies control. Health-seeking behavior patterns showed a general lack of prompt action post-exposure, with many patients seeking treatment too late. Prevention strategies emphasized the "One Health" approach, integrating human and animal health surveillance to enhance rabies control. Comprehensive public education, community involvement, and resource allocation are critical to addressing the ongoing challenges of rabies prevention in Sarawak.

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Contribution/Originality: This article provides a review of the social issues posed by the rabies outbreak in Sarawak, Malaysia. We examine relevant studies concerning social issues, patient management and preventive behaviors. We believe that our review will contribute to the ongoing discourse on public health strategies to mitigate the impact of rabies.

1. Introduction

The aim of this article is to examine relevant studies concerning social issues, patient management and preventive behaviors associated with the human rabies outbreak in Sarawak. Rabies poses a significant global public health challenge, especially in regions like Sarawak. The disease has the highest case fatality rate but is preventable through prompt and effective post-exposure prophylaxis (Chua et al., 2020). The first rabies outbreak in Sarawak occurred in 2017, involving three children from the Serian Division (Leow et al., 2021). Prior to this, Sarawak was rabies-free with no vaccination practices in place. The source of the outbreak was traced to freely roaming stray dogs moving across the border between West Kalimantan, Indonesia and Sarawak, particularly in Serian (Chua et al., 2020). Analysis confirmed the virus originated from Indonesia (Leow et al., 2021; Navanithakumar et al., 2019). Although wildlife species act as hosts and pose a greater risk of virus transmission to humans and domestic animals in developed nations, dogs are the primary reservoir of infection in underdeveloped countries (Kumar et al., 2023). A key factor contributing to rabies mortality is a lack of public awareness regarding the consequences of animal bites and the immediate management necessary in rabies-endemic areas (Sim et al., 2021).

2. Methods

The review focuses on relevant studies concerning issues, patient management and preventive behaviors associated with the human rabies outbreak in Sarawak. Articles indexed in PubMed, Scopus, and other related databases and published between 2017 and 2024 were identified using keywords such as “human-rabies,” “dog-rabies,” “rabies outbreak,” “Malaysia” and “Sarawak”. Access to these articles was obtained in June 2024. In total, 19 documents were selected for inclusion by the authors. This review also includes 6 reports on the rabies outbreak in Sarawak as reported in local and national newspapers.

3. Epidemiology and modelling

According to a report in the New Straits Times on June 12, 2024, the Sarawak State Health Director stated that there have been 79 human cases of rabies in Sarawak since the outbreak began in 2017, leading to 72 fatalities (Joni, 2024). The report also noted that as of April 2024, three localities in Sarawak, including the divisions of Kuching, Samarahan, Serian, Bintulu, and Sri Aman, have been declared rabies-infected areas (Joni, 2024).

A systematic review by Jane-Ling et al. (2023), regarding rabies in Southeast Asia examined its incidence, risk factors, and mortality. The study highlighted the varying incidence of rabies across countries, illustrating the magnitude of the disease in Sarawak compared to other regions. According to the review by Jane-Ling et al. (2023), the rising risk of rabies virus infection is linked to several sociodemographic factors, such as high population density, illiteracy in certain segments of the population, seasonal patterns, and activities related to dog meat consumption. The systematic review also compared incidence rates across different countries and locations, including Sarawak (1.7 per 100,000), Vietnam (1.7 to 117.2 per 100,000), and the Philippines (0.1 to 0.3 per 100,000) (Jane-Ling et al., 2023).

In a broader context, the World Health Organization (WHO) recommends that countries with endemic dog rabies vaccinate 70% of their dog population annually for a period of 5 to 7 years to effectively prevent rabies (World Health Organization [WHO], 2013). Furthermore, the WHO defines a nation as "free from dog rabies" if there have been no local rabies infections in humans or animals within the past two years (WHO, 2013).

In a recent epidemiological study by Ramping et al. (2022), the authors examined the incidence of human rabies cases in Kuching, Samarahan, Serian, and Sibu from 2017 to 2021. Ramping et al. (2022), indicates a mortality rate of 92.5%, with 37 out of 40 cases resulting in death. The study also highlighted key sociodemographic factors including a mean age of 36.28 years among those infected, a predominance of cases among individuals of Iban ethnicity, and a significant number of cases involving males. Notably, only 27.5% of individuals sought medical treatment at healthcare facilities after being bitten by dogs or cats and most of the reported bites were from unvaccinated dogs or cats (Ramping et al., 2022).

The studies conducted by Abdul-Taib & Safii (2020), and Chia et al. (2021), provides important insights into epidemiological modeling of rabies transmission in Sarawak. For instance, a study by Abdul-Taib & Safii (2020), utilized the SEIRS framework in their research, analyzing data from actual human rabies cases reported between 2017 and January 2019. One of the key findings of their study is that, despite ongoing control measures, rabies continues to spread. However, the study emphasizes that persistent, integrated, and continuous preventive strategies, such as improving the availability and accessibility of dog vaccinations and controlling dog reproduction through neutering, particularly in rural areas, could effectively reduce the ongoing spread of rabies in Sarawak (Abdul-Taib & Safii, 2020). While a study by Chia et al. (2021), aimed to identify hotspot areas of a rabies epidemic outbreak by utilising a Binary Node-Binary Node Matrix Factorisation (BNB-MF), a model to detect what characterises the interaction between stray dogs and the places they frequented for food or shelter. The study predicts the spread of rabies disease based on two significant indicators such as geographic location and host characteristics.

4. Social issues

Several issues related to rabies prevention emerged during the outbreak, as reported by various local and national newspapers. These issues included challenges in handling rabies patients, support from federal agency, difficulties in managing stray animal populations and low public awareness. Additionally, concerns were raised about the staff shortage, highlighting the necessity for a coordinated response to effectively address the outbreak in Sarawak.

4.1. Mishandling of patients by dogs

Issues regarding the mishandling of patients bitten by dogs involving a 59-year-old man from Kuching who sought treatment at a private clinic was not referred to any government health clinic or hospital despite the ongoing rabies outbreak were reported in the New Straits Times (NST) on January 27, 2018 (Povera, 2018). Following this incident, the Sarawak Natural Disaster Management Committee has advised all private hospitals and clinics to comply with Standard Operating Procedures (SOPs), which mandate that all cases of animal bites be referred to facilities operated by the Ministry of Health (Povera, 2018).

4.2. Support from federal agency

According to a report in Malaymail on August 14, 2018, Deputy Chief Minister Datuk Amar Douglas Uggah Embas expressed concerns that a federal agency had halted its support for Sarawak in controlling the rabies outbreak, including sending officers for vaccination activities, due to budget constraints since the initial outbreak in 2017 (Yen, 2018). However, the report also noted that the Department of Veterinary Services (DVS) had responded by deploying nearly 180 personnel from Peninsular Malaysia to the state. Their efforts included assisting with surveillance programs, implementing control strategies, and providing 80,000 doses of rabies vaccine (Yen, 2018).

4.3. High stray animal population and low public awareness of rabies

The Star reported on November 22, 2023, highlighting several factors contributing to the rabies outbreak in Sarawak including the high population of stray animals; particularly unvaccinated and unneutered dogs, low public awareness about the disease; specifically poor compliance among pet owners regarding the importance of anti-rabies vaccination, and resistance from animal rights NGO's opposing the removal of stray dogs (Ling, 2023). Additionally, the report emphasized the need to improve public awareness about the importance of vaccinating pets, recognizing the signs and symptoms of rabies, and seeking immediate medical treatment at government health clinics after a dog bite. The report also addressed social and cultural issues affecting rabies prevention, such as cultural beliefs, misinformation, and concerns about vaccine safety (Ling, 2023).

4.4. Staff shortages in tackling rabies outbreak

The Borneo Post reported on November 14, 2023, that Dato Sri Dr. Stephen Rundi Utom, expressed concerns about staff shortages, particularly veterinarians, in managing the rabies outbreak in Sarawak (Umpang, 2023). The report also highlighted that Sarawak is currently experiencing a manpower shortage and urgently needs to enhance its workforce to address not only the rabies outbreak but also other issues such as the African Swine Fever outbreak.

5. Managing Rabies Patients at Hospital/Division

This review identified three studies on rabies patient management in different hospital and divisions in Sarawak: Sibul Hospital (Sim et al., 2021), Mukah Division (Hassan et al., 2023) and Miri Hospital (Lee et al., 2022). These studies reveal a pattern of poor health-seeking behavior among patients, with a majority seeking treatment late and exhibiting low awareness of rabies transmission and treatment.

5.1. Sibul Hospital

Six rabies cases were identified in a retrospective study conducted at Sibul Hospital from 2020 to 2021 (Sim et al., 2021). The study reported all six cases were fatal, with five of the deaths occurring within 14 days of the onset of rabies symptoms. Additionally, the mortality rate was influenced by the fact that individuals did not seek immediate medical attention after being bitten by dogs or pets which may associated with low awareness regarding the importance of immediate treatment in preventing rabies, particularly in areas where the disease is endemic (Sim et al., 2021).

5.2. Mukah Division

A study by [Hassan et al. \(2023\)](#), conducted in Mukah Division, Sarawak utilised data from reported incidents of animal bites from 2018 to 2019. The authors identified 457 cases of mammal bites for analysis and these cases indicated a prevalence of injuries due to mammal bites in Mukah Division is 0.354% or 354 per 100,000 population. According to [Hassan et al. \(2023\)](#), the risk of human risk exposure in Mukah Division was observed to be associated with three significant factors: contact with stray mammals, ownership of free-roaming pets, and the age group of 0-14 years old. Furthermore, the study suggested it is imperative to raise public awareness and educate healthcare professionals about the identified risk factors to prevent rabies infections ([Hassan et al., 2023](#)).

5.3. Miri Hospital

In a study by [Lee et al. \(2022\)](#), a retrospective descriptive analysis was conducted focusing on pediatric patients (under 12 years old) who were bitten or scratched by animals and attended the Dog Bite Clinic at Miri Hospital between January 2019 and December 2021. The study identified an estimated 791 patients, with a median age of 6.5 years. Additionally, the study revealed that most bite or scratch incidents were caused by dogs, followed by cats, with the majority of these animals being owned pets, 68.1% of which were unvaccinated ([Lee et al., 2022](#)). Furthermore, [Lee et al. \(2022\)](#), further reported that the study conducted a series of follow-up after one year, either at the clinic or via phone call, indicated that 74.6% of the cases were doing well, while 25.4% were uncontactable and no fatalities were reported among these patients.

6. Preventive behaviour

"The Global Framework for the Elimination of Dog-Mediated Human Rabies" is a widely recognized framework in rabies prevention literature, encompassing five key pillars for rabies elimination: sociocultural, technical, organizational, political, and resource-based ([Abela-Ridder et al., 2018](#)). [Abela-Ridder et al. \(2018\)](#), elaborate that the first pillar: sociocultural, emphasizes the importance of recognizing rabies as a preventable disease, promoting prevention education, and encouraging responsible dog ownership. The second pillar technical, underscores the need for affordable, quality-assured rabies vaccines ([Abela-Ridder et al., 2018](#)). The remaining three pillars focus on organizational, political, and resource-based aspects: the organizational pillar advocates for a "One Health approach," fostering active collaboration between human and animal health sectors to raise awareness; the political pillar acknowledges rabies elimination as a national, regional, and global public good; and the resource-based pillar highlights the need for long-term, sustained commitment and resources for rabies control programs ([Abela-Ridder et al., 2018](#)).

In general, the patterns of health-seeking behavior related to rabies in Sarawak are consistent with the findings of the National Health and Morbidity Survey 2020, which highlighted several key issues regarding the low health-seeking behavior among Malaysians concerning dog-mediated zoonotic diseases ([Institute for Public Health \[IPH\], 2021](#)). These issues include limited awareness and knowledge about the risk factors for contracting dog-mediated zoonotic diseases, particularly among individuals aged 13-19 years and those 70 years and older and only 1 in 10 people seek immediate medical treatment after being bitten or scratched by a dog ([IPH, 2021](#)).

In Sarawak, the state government employs the “One Health approach” as a preventive strategy against rabies (Wan Izani et al., 2022). This strategy integrates human and animal health surveillance systems and has been identified as a promising method to enhance rabies control efforts. The “One Health approach” emphasizes the importance of active participation and collaboration across various disciplines, including health department, veterinary department, animal right NGOs, district office and community leaders to achieve comprehensive and effective rabies control and prevention (Abela-Ridder et al., 2018).

As part of the specific rabies intervention strategies developed for specific target group, a mobile game application called “Rabies Hunter” was developed to explore various approaches to rabies prevention, with a particular focus on minors under the age of 15 (Halim et al., 2021). According to Halim et al. (2021), the “Rabies Hunter” application aims to evaluate knowledge and awareness about dog safety, perceived vulnerability to dog bites, precautionary behavior around dogs, and help-seeking behavior.

Aside from that, the rabies outbreak in Sarawak was mitigated through community engagement programs such as rabies preventive training and community mobilisation. For instance, 60 local authority officers from across the state and 60 community leaders from the Kuching Division were briefed on their roles and responsibilities conferred by the state government to manage the rabies outbreak, with a particular emphasis on enforcement and community mobilization (Bruno, 2024).

Additionally, three studies, including Halim et al. (2020), Yong et al. (2021), and Juatan et al. (2023), developed behavioral instruments to assess knowledge, attitudes, and practices (KAP) related to rabies prevention in Malaysia. Halim et al. (2020), created the Dog Bite Prevention KAP scale, a 30-item instrument designed to measure children's safety knowledge about dog behavior, precautionary behavior around dogs, perceived vulnerability to dog bites, and help-seeking behavior following a dog bite. A study by Yong et al. (2021), developed and validated a 14-item questionnaire to assess the cognitive, affective, and behavioral (CAB) aspects of adults regarding household pets and zoonotic diseases, including rabies. Meanwhile, Juatan et al. (2023), developed a 10-item self-report instrument termed as the CAB-IHBR-Zoonoses C-01 acronym for Cognitive Affective Behaviors – Institute for Health Behavioral Research – Zoonoses Children-01. The authors used this validated instrument to assess KAP on zoonotic disease prevention among children. Another study on KAP on rabies prevention in Sarawak focusing on adolescents aged 10 to 17 years (Ugak et al., 2019). The study revealed a weak correlation between knowledge and attitude, practice, and health-seeking behavior.

7. Conclusion

Persistent issues, such as the high stray animal population and low public awareness of rabies, further complicate efforts to control the disease in Sarawak. The large number of unvaccinated and unneutered stray dogs, coupled with insufficient public knowledge about rabies prevention, exacerbates the problem. Cultural resistance and misinformation about vaccination, along with inadequate resources and manpower for mass vaccination campaigns, pose significant challenges. Several modelling studies have suggested that implementing measures to regulate dog reproduction could effectively reduce the ongoing spread of rabies. Addressing these issues requires comprehensive

public education, community engagement, and increased resource allocation to improve rabies prevention and control efforts in Sarawak.

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Conflict of Interest

The authors declare no conflict of interest.

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