



2023

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Extreme Weather and Melioidosis: An Endemic Tropical Disease in the Penampang District of Sabah, Malaysia

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Abstract

Background: Melioidosis is a fatal, but preventable communicable disease that is endemic in several parts of the world, including the state of Sabah, Malaysia, which is located in the northern part of Borneo Island. Flooding is one of the most regular natural disasters affecting some parts of Malaysia, including Sabah. The main aim of this study was to determine if rainfall and floods were significant risk factors contributing to the substantial burden of melioidosis in the Penampang district from 2015 to 2020.

Method: We analyzed 64 culture-confirmed cases of melioidosis in the Penampang district, Sabah, between 2015 and 2020 to determine if rainfall and floods were significant risk factors that contributed to the substantial burden of melioidosis. Fisher's exact test was used to examine for associations between risk factors and melioidosis mortality. We used Poisson regression to calculate the incidence rate ratio for melioidosis cases based on different risk factors.

Results: There was a linear association between rainfall and floods with cases of melioidosis. Our Poisson regression results indicated that the number of melioidosis cases was 1.002 times greater with every 1 mm increase of rainfall and 2.203 times greater with every flood event. There was a linear association between cases of melioidosis with rainfall and floods, with most patients having comorbidities.

Conclusion: Prevention of melioidosis in the Penampang district should primarily focus on avoiding direct contact with soil or contaminated water, especially during or after extreme weather events. Continuous and community-empowered health education targeting the high-risk group is essential, as flash floods in certain parts of the state and districts are seasonal and unpredictable.

Keywords: Melioidosis, Extreme weather, Heavy rainfalls, Malaysia

1. Introduction

Melioidosis is predominantly a disease in tropical climates. Whitmore and Krishnaswami first discovered the disease in 1912 [1]. In some parts of the world, melioidosis is seasonal and frequently occurs during the tropical monsoon season [2]. Other meteorological events, such as disasters, increase the incidence rate. Since its

discovery in Malaysia, several localities have been categorized as endemic, including the state of Sabah [3]. There were reported cases in livestock and wild animals. Existing studies defined an incubation period of between 1 and 21 days in the 25% of cases where exposure is defined [4]. In a particular area, exposure to mud and the water's surface can be seasonal depending on agricultural practices such as paddy and vegetable farming.

Received 16 July 2022; revised 11 August 2022; accepted 29 August 2022.
Available online 1 March 2023

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<https://doi.org/10.56808/2586-940X.1023>

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