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Prevalence of COVID-19 in flood relief centre

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ABSTRACT

Since the beginning of 2020, people all around the world have been struggling with the impacts of the COVID-19 pandemic. Concurrently, major flooding and a pandemic have struck numerous regions of the world. As a result, relief centres for flood victims have been established in the affected regions. There is a risk of COVID-19 infection spreading among flood victims and workers at flood relief centres due to the enormous number of flood victims. This study focused on the Johor, Malaysia flood catastrophe. From the 1st to the 16th of January 2022, a cross-sectional study was conducted in johor flood relief centres using secondary data from E notification and COVID-19-line listing. 1,531 flood victims were examined for COVID-19 and Rapid antigen testing was performed. 711 victims were asymptomatic, whereas 820 victims were symptomatic. Six patients were identified as positive. During audits of multiple evacuation centres, few concerns were found. There was no sufficient ventilation, there was no distribution of face masks to victims, and there were no daily health checks. COVID-19 preventive measures in all evacuation centres need to be practiced and given attention by all occupants and agencies.

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1. INTRODUCTION

The COVID-19 pandemic has had a negative influence on people's health and well-being all around the world [1]. The pandemic had exposed countries throughout the world on the vulnerability of our healthcare system's overall unpreparedness to deal with large-scale disasters [2]. Aside from an increase in the number of patients, a high rate of infectivity, mutations, and death, the situation was aggravated by the occurrence of natural catastrophes in some nations [3]. A disaster is defined as an incident that causes disruption of social activity and national business, as well as loss of life, property damage, economic loss, or environmental degradation, and which is beyond society's ability to overcome and necessitates a large pooling of resources [4]. Flooding occurs when a drainage system's excess water overflows. Furthermore, flooding is one of the consequences of nonstop heavy rains, which causes water flow to swiftly peak. This will cause the drainage system to receive an unusually large amount of water, causing the drain water to flow out [5].

Flood frequency and severity have grown in recent decades, with forecasts to continue to rise, as global warming increases [6]. Besides that, floods strike somewhere in the world every few days, causing havoc for people. Most roads are disrupted, and many people are unable to travel due to a shortage of boat availability and financial affordability [7]. Most of them have been forced to flee to limited elevated locations and live in cramped quarters [8]. People have been compelled to live aboard boats due to a lack of land and area that is not affected by flooding. Families will cook on higher ground before returning to their boats to eat and sleep.

Hand-washing facilities are likewise in short supply. A considerable number of flood victims were displaced and transported to relief facilities during the flood. People may need to seek temporary shelter in evacuation shelters if a calamity strikes which are called evacuation centres [9]. Short-term (hours or days) or long-term (weeks or months) accommodations may be required (weeks or months). People can reside into evacuation shelters in the days leading up to, during, and after a disaster. During and after a flood or other similar disaster, national surveillance systems may have limited capability or be stopped or non-existent, resulting in the collapse of the health system at the local level, necessitating regional and/or national assistance [10].

The fact that evacuees had to share facilities like restrooms and toilets, which raised the risk of infection with the COVID-19 virus, was necessary due to a shortage of resources. As a direct consequence of these events, new clusters of the COVID-19 virus have emerged in several flood relief centres [11]. Together with the disruption of health and sanitation services, this increases the likelihood that displaced populations will be exposed to poisonous animal bites, non-communicable diseases exacerbated by stress, skin infections, food-borne diseases, vaccine-preventable diseases due to a lack of access to immunisation services, acute respiratory infections, leptospirosis, and arboviruses in endemic areas. Aside from that, flood victims put their lives and essentials ahead of packing personal protective equipment (PPE), such as face masks and hand sanitizers [12]. PPE items were destroyed by floodwaters, making standard operating procedure compliance even more difficult. And meanwhile, a lack of clean water produced an increase in waterborne infections, further straining an already taxed health-care system. Due to the fact that mobile phones and electronic gadgets were either destroyed or rendered inoperable by the floods, contact tracing was conducted manually, either via telephone interviews at rescue facilities or by recording information in a log book [13]. According to the Health Ministry's standard operating procedures, the authorities subsequently identified and referred symptomatic persons to hospitals, while asymptomatic individuals were quarantined. Furthermore, during disaster relief, there is an increased chance of COVID-19 transmission, with asymptomatic COVID-19 positive volunteers infecting flood victims, or vice versa [14].

Malaysia has a tropical climate with high relative humidity and persistent high temperatures. Malaysia is a Southeast Asian country having a land size of roughly 330,000 km [15]. The northeast and southwest monsoons have an impact on the climate. The former, which occurs primarily between November and February, produces torrential rainfall (up to 600 mm in 24 hours in severe circumstances) to Peninsular Malaysia's east coast, as well as Sabah and Sarawak [16]. From April through September, rain-bearing winds accompany the southwest monsoon, however rainfalls are often lower than during the northeast monsoon [17]. In addition, there are two transitional times (inter monsoon) between the monsoons when convectional thunderstorms are widespread [18]. Flooding has become a national issue in Malaysia, posing a threat to life and property while also disrupting social and economic activities [19]. Among all the calamities that have struck Malaysia, flood has been identified as the most serious and widespread threat. This study therefore describes the prevalence of COVID-19 in flood relief centres and identifies the risk assessments undertaken in flood relief centres that contribute to the spread of COVID-19.

2. RESEARCH METHOD

A cross sectional study was conducted in flood relief centres using secondary data source from e-notification platform and state COVID-19 data from January 1-16, 2022. A risk assessment was conducted on 55 flood relief centres in the state of Johor Malaysia. The risk assessment was conducted by selected medical assistant that trained in auditing flood relief centres. Data analysis was performed using Statistical Package for Social Science version 25. Meanwhile, Spearmen's correlation was used for non-normally distributed data as per outcome of the normality test. Descriptive results were presented using tables and figures. A p-value<0.01 was considered statistically significant. Table 1 shows the scoring done based on the risk assessment conducted in flood relief centre. Table 2 shows risk assessment conducted at 55 districts in the state of Johor. A total of 12 variable were tested during the risk assestment. The variables were flood relief centres capacity, practicing social distance, usage of facemask, vaccination coverage, number of positive COVID-19 cases, isolation facility for COVID-19 cases and close contact, no COVID-19 screening (RTK Ag saliva test) for victims with symptoms during admission to flood relief centres, food hygine and packaging, bathroom and toilet facilities availability, ventilation adequacy, hand washing/hand sanitation facilities adequacy, and disinfection activities.

Table 1. Scoring was done based on the risk assessment

High risk	0-4
Medium risk	5-8
Low risk	9-12

Table 2. Risk assessment conducted in flood relief centres based on district

District	Total flood relief centres
Batu pahat	4
Johor Bahru	1
Kota Tinggi	3
Muar	7
Segamat	36
Tangkak	4
Total	55

3. RESULTS

Figure 1 shows the total number of flood relief centres activated in the state of Johor, Malaysia and the number of flood victims. The highest number of flood relief centres activated was on January 5, 2022 (81) and the highest number of flood victims was on the January 4, 2022 (5,479). A total of 1,531 Antigen Rapid Test Kit (RTK-Ag) as shown in Figure 2 was conducted at the identified flood relief centres. RTK-Ag is a prevalent method for determining COVID-19 virus [20]. This method detects coronavirus-related viral protein to determine a positive or negative result. Hence, 820 victims (53%) were symptomatic victims and 711(47%) victims were asymptomatic victims (close contact to positive). More over, six victims (0.3%) were positive and were sent to hospital for further assessment. Risk assessment were conducted in 55 flood reliefs centre by the State Health department in the affected districts in Johor as shown in Table 2. Flood relief centres were randomly chosen by the department. Based on the risk assessment conducted, 46 (83.6%), flood relief centres were in the low-risk category and 9 (16.4%) flood relief centres were in the medium risk as presented in Table 3. Normality test (Shapiro-wilk) test were conducted all the means variables(questions). As the variables were not normally distributed, non-parametric test was used to compare the means of risk and seven variables from the above questions. Consequently, all means were statistically significant (p-value <0.001) except two variables as shown in Table 4.

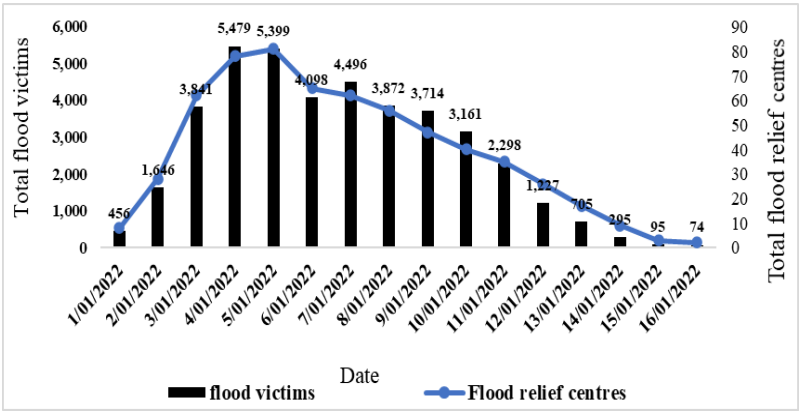

Figure 1. Total number of flood relief centres activated

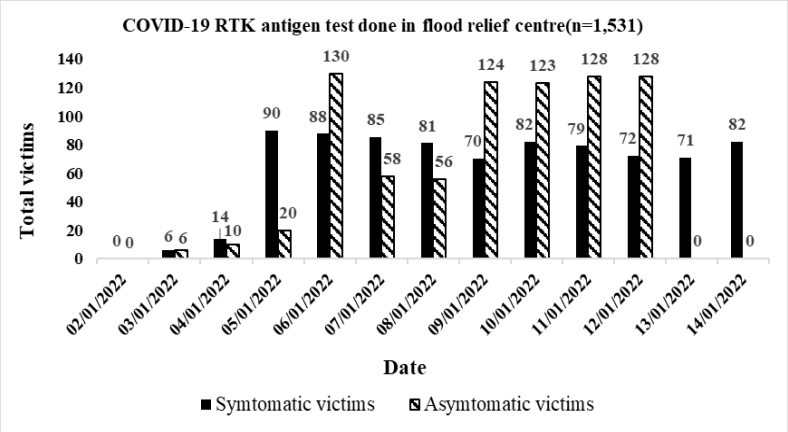

Figure 2. COVID-19 RTK-Ag test conducted in flood relief centres

Table 3. Results of risk assessment centre

Category risk	Frequency	Percent	Mean	SD
Low risk	46	83.6		
Med risk	9	16.4	2.84	0.73
High risk	0	0.0		

Table 4. Non-parametric test

Risks	Mean	Std. deviation	p-value
Flood relief centres capacity	0.53	0.504	0.047
Most victim do not practice social distancing	0.75	0.440	0.001
Most victims do not use face masks	0.87	0.336	0.002
Vaccination coverage was less than 70% among the victims	0.82	0.389	0.551
No COVID-19 screening (RTK Ag saliva test) for victims with symptoms during admission to flood relief centres	0.87	0.336	0.875
Disinfection activities are not performed	0.80	0.404	0.047

4. DISCUSSION

The study revealed factors that can contribute the spread of COVID-19 in flood relief centres. Flood relief centres capacity, social distancing, usage of face mask and disinfection activities were all factors that can contribute to COVID-19 infections [21]. Flood relief centres should be identified and prepared as early as possible in the event of a crisis to guarantee that plans, enough equipment and supplies, and trained personnel can be mobilised quickly in the event of a disaster [22]. When a large-scale crisis strikes, government and local health officials may be forced to evacuate. Preparing relief centres can be tough, especially when there are a significant number of evacuees [23]. At the beginning of the flood period in the State of Campeche, 536 COVID-19-positive cases were recorded [24].

Firstly, the capacity of the flood relief centres. Within an evacuation shelter, different capacity should be assigned and properly marked to ensure that members from the same home are physically isolated from those from other houses. This will help to avoid commingling and, if necessary, contact tracing [25]. A distinct location for vulnerable and high-risk groups, such as individuals over 60 years old, pregnant women, and those with comorbidities that put them at increased risk of serious illness, should be considered. Practicality and adaptability are essential. Evacuees with suspected or confirmed COVID-19, as well as disaster evacuation shelter professionals providing aid or services to these individuals, should have adequate PPE ready and accessible [26].

The sanitation procedure in a flood relief centre should be performed consistently and precisely. In addition to routine environmental cleaning, frequently touched surfaces (such as buttons, handrails, doorknobs and handles, tables, and chairs) should be regularly cleaned and disinfected to reduce the risk of transmission [27]. In operational areas used for food preparation, sleeping, bathrooms, and showers, greater care should be taken with surfaces that are regularly touched [28]. Administrative and registration areas, as well as entry and exit zones, may be included in the additional areas. Furthermore, Hand hygiene stations should be accessible and functional throughout the disaster evacuation shelter, with a concentration on high-traffic areas [29]. This is especially true in operating areas including entry and departure points, catering and food service facilities, restrooms, showers, and waste management areas [30]. Besides that, when comes to food areas, COVID-19 is unlikely to be transferred through food or food packaging. Food preparation and serving areas, on the other hand, require individuals to operate in close quarters. As a result, efforts in the food service industry should be undertaken to limit the risk of transmission [31].

5. CONCLUSION

In conclusion, the monsoon floods in Malaysia exacerbated the COVID-19 scenario, mandating effective risk mitigation and risk assessment for future catastrophes. To respond to emergencies while simultaneously managing the COVID-19 epidemic, new methods must be devised. Even during COVID-19 pandemics, countries and cities are susceptible to flooding disasters. To effectively prepare for the next disaster, it is necessary to incorporate key stakeholders such as city planners, civil engineers, and other professions. Additionally, an effective warning system should be in place in advance to prepare the impacted population, save lives, and avoid further damage.

Authorities should collaborate with and instruct these communities on emergency readiness. It is essential to emphasise the significance of developing a resilient health care system through intersectoral collaboration among health care providers and other important stakeholders. One of the primary contributions of this study is a greater understanding of how to better prepare flood relief centres for outbreaks. Future surveillance and investigation of communicable diseases should be conducted in a flood relief centre.

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