

# Statistical Trend Analysis of COVID-19 and Impact of Islamic Outbreak Control Practices in Malaysia

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DOI : <https://dx.doi.org/10.47772/IJRISS.2024.8080291>

Received: 09 August 2024; Revised: 28 August 2024; Accepted: 03 September 2024; Published: 20 September 2024

## ABSTRACT

**Purpose:** This study was conducted to examine the trend of daily positive cases and cumulative cases of infection and death in Malaysia based on statistical records released by the Ministry of Health Malaysia, from January 25, 2020 until August 20, 2021.

**Methodology:** The statistical analysis for this study using Mann-Kendall is further linked to Islamic aspects involving control measures practiced in Islamic life.

**Findings:** The results of Mann-Kendall statistical analysis showed a sen-slope value at a significant value of alpha 0.05, hence the spread of the infection cases and death cases due to COVID-19 demonstrated that there was a positive association throughout the research period. The steady rise in COVID-19 infection cases in Malaysia resulted in high sen-slope values of 10.099 and 1239 for positive and cumulative infection cases, respectively. Deaths cases and cumulative cases owing to COVID-19 with sen-slope values at 0.039 and 4.229 from January 2020 to August 2021. In Islam, Muslims need to be aware that this test is a conviction in many aspects and that COVID-19 is not just a plague. Practicing Islamic teachings in preventing illness transmission and eliminate its harm on to other people from all walks of life is within the scope of ma'ruf.

**Research implication:** These findings indicate that policymakers and public health authorities should take into account culturally and religiously suitable strategies to improve adherence and the efficacy of health interventions. Recognizing and adhering to Islamic doctrines in disease prevention can significantly aid in managing the spread of illnesses, thereby protecting public health while respecting cultural and religious values.

**Keywords:** COVID-19 Pandemic, Islamic COVID-19 Outbreak Control Practices, Mann-Kendall Statistical Trend Analysis, Malaysia

## INTRODUCTION

Multiple cases of pneumonia with an unknown aetiology were reported to the World Health Organization (WHO) on December 31, 2019, by the China Health Authority in Wuhan, Hubei Province, central China. When the cases were originally reported on December 8, 2019, several patients worked at or lived near the adjacent Huanan Seafood Wholesale Market, although other early cases had no relation to the market (Lu et al., 2020).

On January 7, a novel coronavirus, 2019-nCoV, was detected in a patient's throat swab sample, according to the World Health Organization (Hui et al., 2020). The WHO designated this pathogen as severe acute

respiratory syndrome Coronavirus 2 (SARS-CoV-2) and the illness as Coronavirus disease 2019 (COVID-19) by the Coronavirus Study Group (Gorbalenya, 2020).

As reported by the WHO, there are presently more over 170 million cases worldwide, with over 3.5 million fatalities (WHO, 2021). COVID-19 infection cases and death cases data have varied greatly across geographies and time (Hasell et al., 2020). As of May 31, 2021, cumulative infection rates varied from 0.3 to 17,700 per 100,000 population, whereas COVID-19 associated mortality rates ranged from 0.03 to 308 fatalities per 100,000 population, depending on the country (Dong et al., 2020). Meanwhile, the case fatality rate (CFR) is predicted to be between 0.8 and 15.2 percent (Bulut & Kato, 2020; Noor et al., 2020).

China has reported 7,736 verified and 12,167 suspected cases as of January 30, with 82 confirmed cases found in 18 other countries (Burki, 2020) and on the same day, WHO declared the SARS-CoV-2 pandemic a Public Health Emergency of International Concern (PHEIC) (Burki, 2020). As of February 4, 2020, the death rate among confirmed cases in China was 2.1 percent (NHC, 2020), whereas cases outside China had a mortality rate of 0.2 percent (NHC, 2020; WHO, 2020). The mortality rate for hospitalized patients ranged from 11 to 15 percent (Huang et al., 2020; Chen et al., 2020).

Furthermore, the trend of COVID-19 infection by continent showed a continuous increase in cumulative cases on August 17, 2021, with the American continent leading the way with 80,203,540 cases, followed by Europe with 62,600,959 cases; Southeast Asia with 39,992,613 cases; the Eastern Mediterranean with 13,665,080 cases; the Western Pacific with 5,393,767 cases, and Africa with 5,316,363 cases (WHO, 2021). The COVID-19 pandemic caused significant disruptions to daily life, worldwide economies, and healthcare systems. Hospitals had an unparalleled burden, leading to an expedited worldwide effort to create efficient remedies and vaccines. The commencement of human vaccination trials occurred in March 2020. The commencement of vaccination campaigns took place in the latter part of 2020 and the early part of 2021, utilising vaccines created by pharmaceutical companies such as Pfizer-BioNTech, Moderna, and AstraZeneca. These endeavours have been important in mitigating the intensity and dissemination of the infection. Nevertheless, novel strains of the virus persist in presenting difficulties, necessitating continuous attentiveness and adjustment of public health measures. Currently, the global community is still dealing with the difficulties presented by COVID-19, with a particular emphasis on vaccination, booster doses, and public health efforts to control and reduce the virus's effects.

Indeed, the number of persons infected with COVID-19 was constantly increasing across the world, especially in Malaysia. As of August 17, 2021, total of 460,516 cases of COVID-19 positive infection have been reported throughout the world, increasing the total number of cases to 207,784,507. In terms of death approximately 8,565 cases were recorded, with a total of 4,370,424 cases occurring on the same day. In Malaysia, the total number of reported cumulative instances of COVID-19 infection was 110,495 in December 2020, with 1,870 positive cases and 461 cumulative mortality cases (MOH, 2021).

Overall, Malaysia is navigating the pandemic with a balanced approach, focusing on both prevention and treatment to minimize the impact of COVID-19 on its population. The current trend of COVID-19 cases in Malaysia shows a gradual decline, reflecting the effectiveness of ongoing public health measures and vaccination efforts (Table 1). Public health officials are urging people to continue practicing preventive measures such as wearing masks and maintaining social distancing, especially in crowded places.

**Table 1:** The current trend of COVID-19 in Malaysia

No.	Details	Cases
1.	Local Cases	5,272,700
2.	Active Cases	8,614
3.	Imported Cases	39,220
4.	Home Quarantine	8,531

5.	Quarantine and Low-Risk Treatment Centre	0
6.	Hospitalised	83
7.	ICU (Unventilated)	0
8.	ICU (Ventilated)	0
9.	Recovered	5,265,955
10.	Death (Including BID)	37,351
11.	Brought in Dead (BID)	7,943

Source: Ministry of Health Malaysia, 2024

Recently, various research on pandemics have been completed as a result of the international response to the COVID-19 pandemic outbreak. These studies include those done by Talha (2020); Greyling et al., (2020); Brooks et al., (2020), Jiao et al. (2020); Orgiles et al. (2020); Sahid et al., (2020), Papadopoulos et al., (2021), Fradelos et al., (2022), Jones (2022) and Cusinato et al., (2020). The community's daily life has changed as a result of the continuing COVID-19 outbreak.

Malaysia's political, economic, social, health, and educational institutions have been impacted by the social constraints that most countries, including Malaysia have established (Rashid & Hassan, 2020). Preventive measures like the installation of Movement Control Orders (MCO) that restrict certain social activities have changed the community's everyday lifestyle from the way it was before (Talha, 2020). With the implementation of the curfew (lockdown) to stop the spread of the COVID-19 virus, this does not just occur in Malaysia but is felt by the whole global population (Greyling et al., 2020).

This enforcement is seen as a highly effective preventative strategy from the standpoint of public safety. Nevertheless, despite the societal constraints put in place against certain people, families, and communities, there are still negative impacts that cannot be ignored. According to analysts from both the West and the region, the labor market will have an influence on global economic variables including output and demand in the year 2020. There is little doubt that this disrupts all economic activity that have an impact on rural households' and businesses' revenue (Phillipson et al., 2020).

This demonstrates that several research have been conducted on the impact of the epidemic on people's psychology, mental health, and emotions as they call for solutions. However, there haven't been many research conducted explicitly on the Islamic perspective's solutions. Islam offers the most solid and dynamic set of teachings that may be used to address contemporary issues. In order to combat the COVID-19 pandemic, this study focuses on the trajectory of COVID-19 infection distribution in Malaysia, including the reported number of daily cases, cumulative cases, death cases, and cumulative death cases and how to control the infection of COVID-19 pandemic from Islamic perspectives.

## DATA AND MATERIALS

### Data

The trend of COVID-19 infection cases in Malaysia is based on the main data input of the number of positive cases, cumulative number of cases, death cases, and cumulative daily death cases obtained from the Ministry of Health Malaysia (MOH) website, which is <https://covid19.moh.gov.my/terkini/2021/03/keadaan-terkini-COVID-19-di-malaysia-21032021> as reported from the entire nation from 25 January 2020 to 20 August 2021.

### Mann-Kendall statistical trend analysis

The statistical analysis of Mann-Kendall used to analyze the distribution trend of COVID-19 cases in Malaysia

only. The statistical analysis using the Mann-Kendall test was further linked to Islamic control measures practiced in daily life.

The trend analysis of positive cases, cumulative positive cases, death cases and cumulative death cases input data from January 25, 2020 to August 20, 2021 across Malaysia have passed the Mann-Kendall trend test in XLSTAT software. Statistical trends are patterns of substantial data change found over time using parametric and non-parametric tests. The daily COVID-19 infection cases trend across Malaysia was investigated by utilizing the Mann-Kendall train test and sen-slope value to evaluate the size of the daily COVID-19 infection cases trend in this research. The Mann-Kendall (MK) test (Mann, 1945; Kendall, 1975) is a nonparametric test that evaluates rainfall distribution patterns. It has no requirements on normal data (Tabari et al., 2015).

The MK test was done using the null hypothesis (H0), which states that there is no trend in distribution data, as well as the alternative hypothesis (Ha), which indicates that there is a trend pattern in distribution data in the area of study (Gadedjisso-Tossou et al., 2021). The sen-slope value, which is a positive value to indicate a rising trend of distribution data and a negative value to show a lowering trend of distribution data, determines whether the trend flow is growing or decreasing (Hussain et al., 2015). Equation 2 and Equation 3 were used to do MK trend analysis:

$$S = \sum_{k=1}^{n-1} \sum_{j=k+1}^n \text{sgn}(x_j - x_k) \quad (2)$$

In which:  $x_i$  and  $x_k$  are sequential data series

And:

$$\text{sgn}(x_j - x_i) = \begin{cases} 1 & \text{if } x_j - x_i > 0 \\ 0 & \text{if } x_j - x_i = 0 \\ -1 & \text{if } x_j - x_i < 0 \end{cases} \quad (3)$$

The value of variance S is estimated using Equation 4 below:

$$\text{VAR}(S) = \frac{1}{18} \left[ n(n-1)(2n+5) - \sum_{p=1}^g t_p(t_p-1)(2t_p+5) \right] \quad (4)$$

Whereby:

$t_p$  = determine the pth value relationship

$q$  = number of bound values

The standard static test for the Mann - Kendall (Z) test is calculated using Equation 5 below:

$$Z = \begin{cases} \frac{s-1}{\sqrt{\text{var}(s)}} & \text{if } S > 0 \\ 0 & \text{if } S = 0 \\ \frac{s+1}{\sqrt{\text{var}(s)}} & \text{if } S < 0 \end{cases} \quad (5)$$

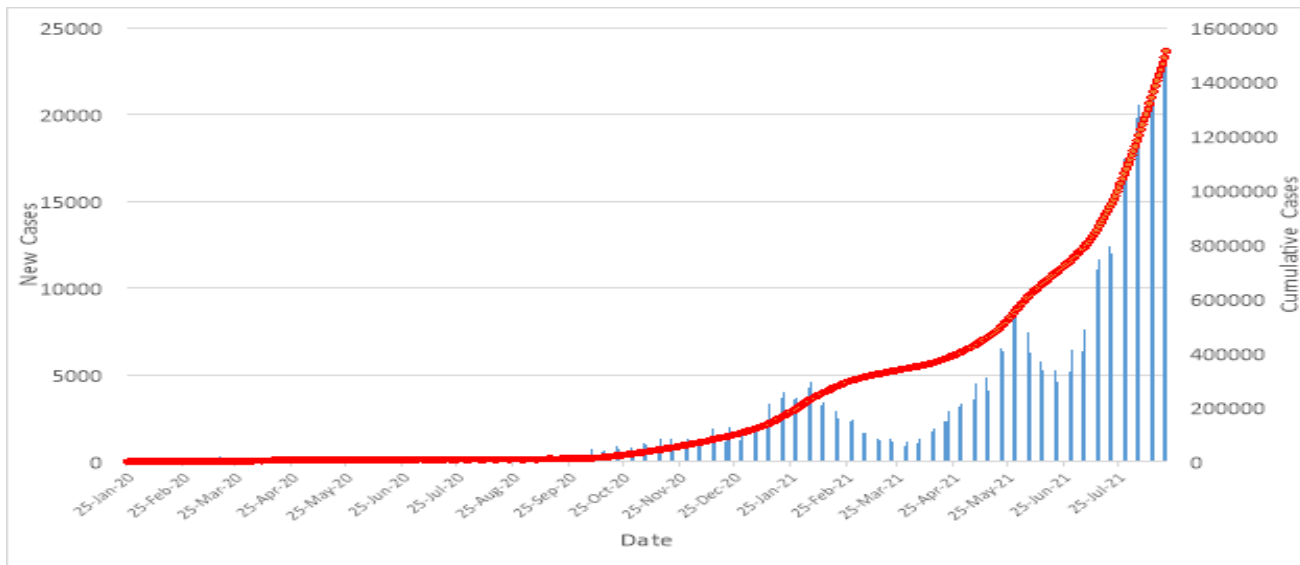
Whereby:

$Z$  = trend direction. A negative  $Z$  value indicates a downward trend and vice versa. At the 5% significance level, the null hypothesis ( $H_0$ ) i.e. no trend is rejected if the absolute value of  $Z$  is higher than 1.64.

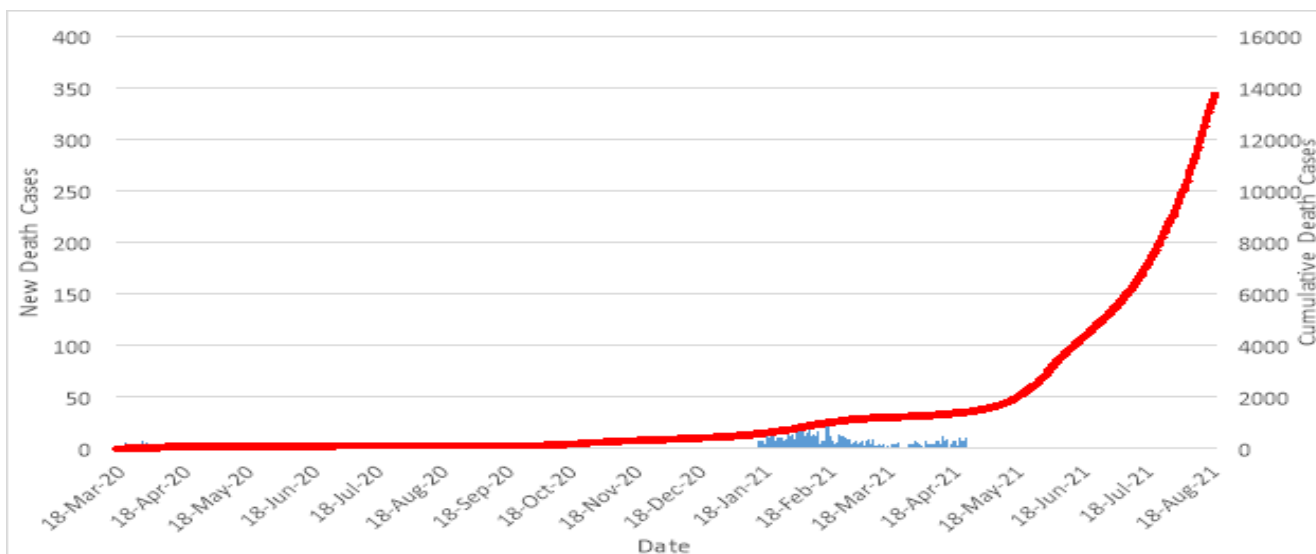
## FINDINGS

### Distribution Trend of COVID-19 Infection Cases in Malaysia

Overall, COVID-19 infection distribution patterns in Malaysia were found to be constant, with COVID-19 infection cases in Malaysia steadily increasing. As of August 17, 2021, the globe has seen 460,516 instances of COVID-19 positive infection, bringing the total number of cases to 207,784,507 (Figure 1). In terms of death, a total of 8,565 instances were documented, with 4,370,424 cases being cumulated on the same period (Figure 2). On August 20, 2021, the total number of documented cumulative cases of COVID-19 positive infection in Malaysia was 1,513,024, including 13,713 fatalities. Hence, the continuous rising trend in COVID-19 infection cases in Malaysia from mid-July to mid-August 2021, as well as the similar pattern in its mortality cases, demonstrate this condition.



**Figure 1:** Trend of new cases and cumulative new cases of COVID-19 in Malaysia from January 25, 2020 until August 20, 2021



**Figure 2:** Trend of new death cases and cumulative death cases of COVID-19 in Malaysia from January 25, 2020 until August 20, 2021

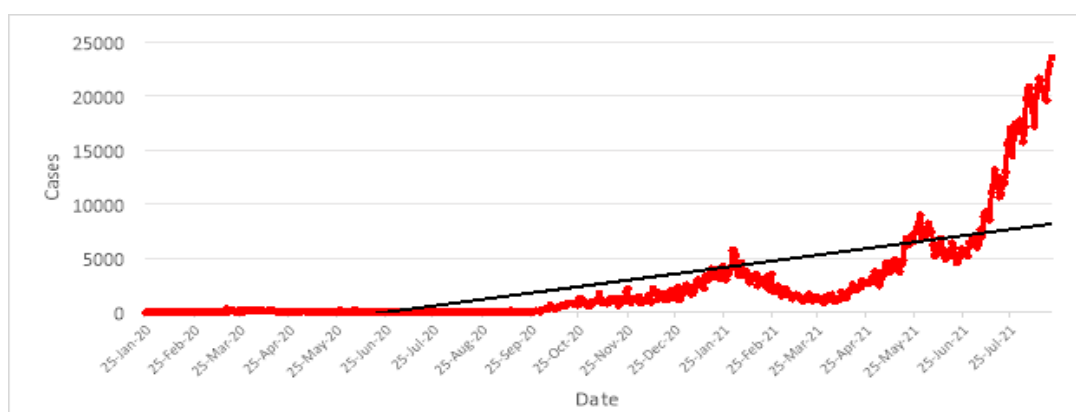
### Statistical Analysis Trend COVID-19 Cases in Malaysia

The data overview of COVID-19 infection cases in Malaysia up to August 2021 is shown in Table 2. The highest number of COVID-19 positive infection cases in Malaysia was 23,564, recorded between January 25, 2020 and August 20, 2021, with a mean value of 2,636.72 and an SD of 4,536.19. This circumstance demonstrates that the COVID-19 positive cases trend has accelerated to the point where just three cases were reported in January 25, 2020. As a consequence of the constant growth in positive COVID-19 instances, the cumulative cases of COVID-19 climbed to 1,513,024 cases, with a mean value of 224,955.50 and an SD of 331,493.67 recorded during the same time. In terms of fatality, the maximum number of cases was 360 that was recorded from January 25, 2020 to August 20, 2021, with a total of 13,713 deaths due to COVID-19.

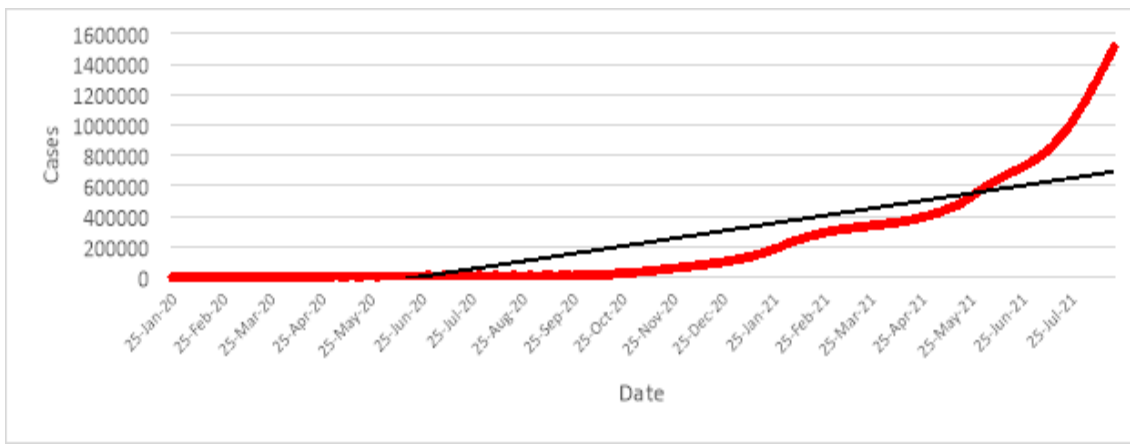
**Table 2:** Statistical summary of COVID-19 cases in Malaysia (from January 25, 2020 until August 20, 2021)

Details	Minimum (people)	Maximum (people)	Mean	Standard deviation (SD)	p-value	Alpha	Sen-slope	Interpretation
New positive cases	0	23,564	2,636.72	4,536.19	< 0.0001	0.05	10.099	Reject H0
Cumulative positive cases	4	1,513,024	224,955.50	331,493.67	< 0.0001	0.05	1239	Reject H0
New death cases	0	360	23.93	53.43	< 0.0001	0.05	0.039	Reject H0
Cumulative death cases	0	13,713	1393.71	2585.46	< 0.0001	0.05	4.229	Reject H0

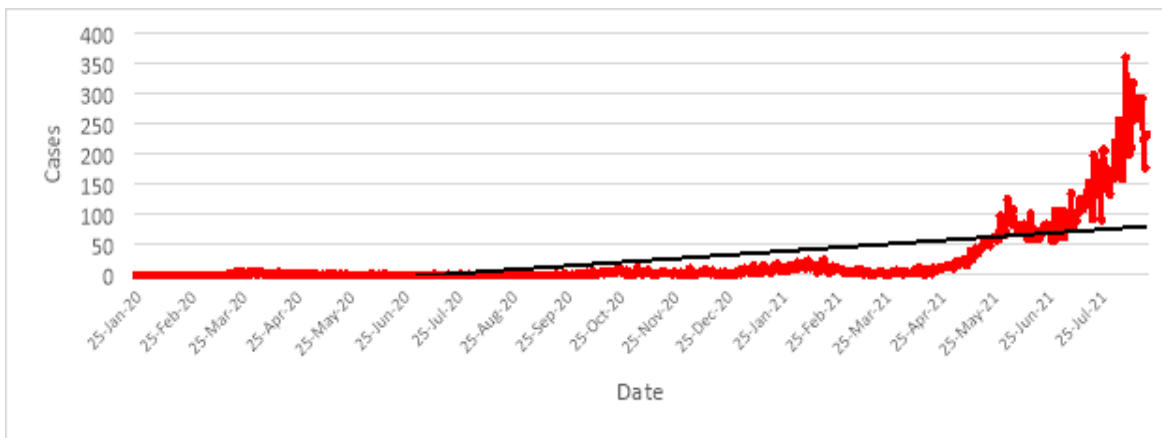
Based on the sen-slope value at a significant value of alpha 0.05, the trend in the distribution of instances of infection and mortality due to COVID-19 demonstrated that there was a positive association throughout the research period. The steady rise in COVID-19 infection cases in Malaysia resulted in high sen-slope values of 10.099 and 1,239 for positive and cumulative infection cases, respectively (Figure 3 & Figure 4). Deaths and cumulative cases as a result of COVID-19 with sen-slope values of 0.039 and 4.229 from January 2020 to August 2021 illustrate the same issue (Figure 5 & Figure 6). Because of the distribution of death cases, the sen-slope values for cumulative cases owing to COVID-19 are high. Therefore, the number of such incidents was increasing continuously throughout the period of time in Malaysia.



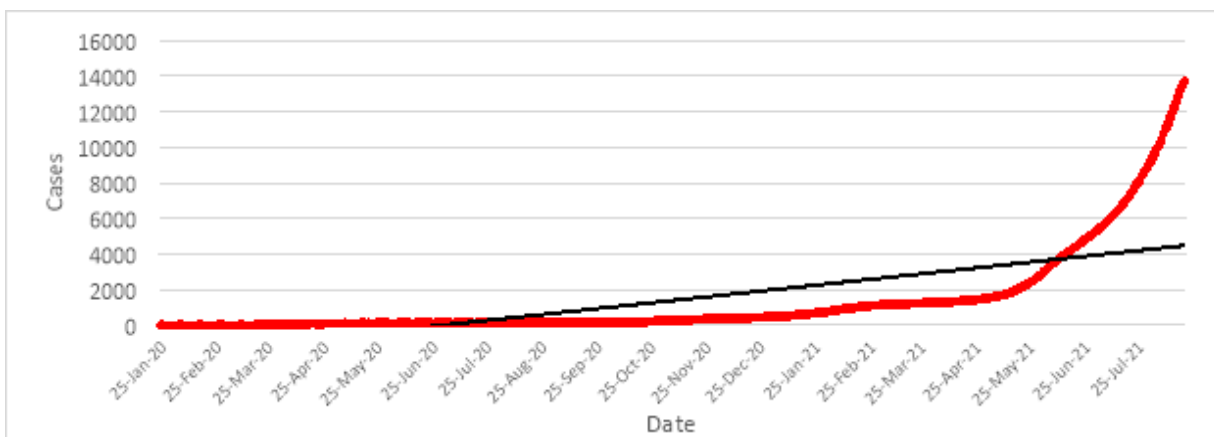
**Figure 3:** Statistical trend of new cases of COVID-19 infections in Malaysia



**Figure 4:** Statistical trend of cumulative cases of COVID-19 infections in Malaysia



**Figure 5:** Statistical trend of new death cases of COVID-19 infections in Malaysia



**Figure 6:** Statistical trend of cumulative death cases of COVID-19 infections in Malaysia.

### COVID-19 Outbreak Islamic Control Practices

The discussion related to the Islamic perspective is only as data support, to see the Islamic view to stop the COVID-19 from continuing. It is also obtained from secondary research through document analysis from the literature review of the researched field.

The emergence of new plagues and diseases, such as COVID-19, is a test for this ummah, unlike anything experienced by previous generations. Muslims must recognize that this current trial is multifaceted and that COVID-19 is more than just a plague. It is crucial to be sensitive to this test from Allah SWT by drawing closer to Him, as every individual is tested for their deeds. When calamity strikes, Muslims should be

reminded to devote themselves to Allah SWT by increasing their prayers and striving to break the chain of disease transmission.

The public often misunderstands that tests and rebukes from Allah SWT can come in various forms. Therefore, the notion that the COVID-19 pandemic is merely a plague is incorrect and misleading. Such a perception could lead to rejecting the qada' and qadar of Allah SWT. Generally, it is inappropriate to harbor negative suspicions about any test, trial, or disaster that befalls humanity. The critical phase of the third wave of COVID-19 should be seen as an opportunity to test one's faith and encourage self-reflection.

Every Muslim must strive to prevent the spread of infection. Consequently, the government's actions to curb COVID-19 through the Movement Control Order (MCO) align with Islamic teachings. Preventive measures are highly emphasized in Islam and are in accordance with the principle of *usul fiqh*, namely *sadd al-dhari'ah*, which means blocking the means to harm or destruction (Mohd Subri, 2016). Therefore, the community, especially Muslims, must avoid causing harm to others, particularly in the ongoing COVID-19 outbreak. Failing to take preventive actions when afflicted with a dangerous infectious disease endangers the lives of others.

There is no doubt that we need to place our full trust in Allah SWT that He is the one who creates disease and only Allah SWT is powerful to cure diseases on His servants. Therefore, the implementation of Movement Control Order (MCO) is done to prevent the spread of COVID-19 disease from spreading quickly. Being ignorant and refusing to abide by the rules and laws proposed by the government shows that we have not yet succeeded in possessing the positive personal values of a faithful Muslim.

The concept of surrendering (*tawakal*) alone to the provisions of Allah without making any effort to fight the COVID-19 pandemic is something that should not be practiced by Muslims. There are several arguments related to the prevention of this disease as in Surat al-Baqarah (2: 195) which means "Do not throw yourselves into the valley of destruction". This verse of the Qur'an does not explain in detail about the preventive measures that can be taken, but it is one of the ways that can be followed by people to keep themselves safe so as not to be exposed to things that can bring something dangerous and destructive (Irwan, 2020).

While the hadith related to preventive measures was also mentioned by the Prophet SAW which means: "When you hear it (epidemic) in a place, then do not go there. And when it happens in your place, then do not run away from him" (Hadith al-Bukhārī). Prophet Muhammad SAW ordered his people who were in a plague-transmissible area not to leave. At the same time, healthy people were ordered not to enter a place affected by an epidemic. Cholera prevention measures were seen from events of the time of Saidina 'Umar. When Saidina 'Umar was on his way to Sham on an affair, he was told that Sham was being hit by a cholera epidemic. Once the discussion was made, he has decided not to enter Syria. In fact, he has turned back as a preventive measure to against the epidemic. This coincides with the objective of Syarak (*maqasid syariah*) which is to take care of life (*ḥifẓ al-nafs*) and property (*ḥifẓ al-Mal*).

Keeping lives can be realized through barring outsiders from entering a place that is being hit by a contagious disease like COVID-19. On the other hand, allowing a patient who is prone to the disease from getting out of an area can in turn infect others. Thus, the practice of hygiene is very important to prevent oneself from contracting diseases such as by washing hand frequently, especially after coughs and colds, refraining from shaking hands and hugging and avoiding public gatherings when facing illness.

Among the preventive measures that can be practiced by Muslims is to consume halal and good diet in order to prevent themselves from getting ill. Allah SWT forbids human beings from eating blood and carcasses. It is lawful for His servants to eat good food to take care of their body and soul. This is because there are many bacteria in contagious food that could harm human beings and can cause dangerous diseases (al-Ka'bī, 2020). In addition, Muslims are encouraged to practice 'ajwah dates to prevent from getting diseases. Based on a hadith of the Prophet SAW which cites: Whoever eats seven dates 'ajwah in the morning, will not harm him by any poison or magic on that day (Hadith by al-Bukhārī).



The Prophet (peace and blessings of Allah be upon him) taught his people to eat black grain (al-ḥabbah al-sawdā') to cure any disease (Reported by al-Bukhārī). Likewise, consuming honey could contribute to many benefits, as mentioned by al-Imam Ibn al-Qayyim (2000). Based on the words of Allah SWT which means "From the stomach of the bee comes a drink (honey) of various colors, in it there is a medicine that heals for humans" (Surah al-Naḥl, 16:69). In addition, drinking zam-zam water can also prevent and cure diseases (Hadīth by Ibn Majah). Thus, Islamic law has generally and specifically placed great emphasis on prevention methods in medicine and health care.

## LIMITATIONS

This research is focused on the COVID-19 infection scenario that occurs in Malaysia between January 25, 2020, and August 20, 2021 based on the data that could be discovered on the Ministry of Health Malaysia's website. The analysis of the COVID-19 infection based on the value of the null hypothesis (H<sub>0</sub>) and the alternative hypothesis uses the Mann-Kandell statistical trend analysis as the selection technique and is meant to analyze the distribution trend of the infections (H<sub>a</sub>). The sen-slope value also serves to illustrate the direction of data distribution, with positive values indicating growing trends and negative values denoting declining trends.

## CONCLUSION

Based on the latest records released by the MOH, it is reported that the total number of documented cumulative cases of COVID-19 infection in Malaysia was 1,513,024, including the 13,713 fatalities on August 20, 2021. The continuing rising trend in COVID-19 infection cases in Malaysia from mid-July to mid-August 2021, as well as a similar pattern in COVID-19 mortality cases, demonstrates this condition. For sen-slope value at a significant value of alpha 0.05, the trend in the distribution of instances of infection and mortality due to COVID-19 demonstrated that there was a positive association throughout the research period. Therefore, COVID-19 infection in Malaysia is very serious and requires comprehensive monitoring and observation from various authorities and stakeholders from various fields in Malaysia, such as medicine, health sciences and spirituality. This can directly control and reduce the negative impact of COVID-19 virus infection from becoming increasingly dangerous to individuals. Meanwhile, Muslims need to be aware that the current test is a conviction in many aspects and it is not just a plague. Being sensitive to the test of Allah SWT by getting closer to Allah SWT is something that is highly demanded to remind that every human being will be tested for every deed he does. If a calamity befalls Muslims, they need to remember Allah SWT by increasing their prayers, trusting, being patient and striving to curb the spread and break the chain of transmission of this epidemic from continuing to spread. There is no doubt that we need to place our full trust in Allah SWT that He is the one who created this disease and only Allah SWT is powerful to cure diseases on His servants. Then, the concept of surrendering (tawakal) alone to the provisions of Allah without making any effort to fight the COVID-19 pandemic is something that should not be practiced in Muslims.

Finally, this study can be a reading material and references to scientists, nurses, patients and the Muslim community so as not to be distraught by this epidemic infection. In addition, this study can be further evolved from a different angle. Practicing Islamic beliefs in preventing transmissible diseases and eliminate their harm on fellow Muslims from all walks of life is within the scope of ma'ruf, while letting yourself be exposed to an illness without any prevention is prohibited. Imagine if disease such as COVID-19 the pandemic was left free contagious without control, inevitably human life will never be at peace.

## ABBREVIATIONS

COVID-19: Coronavirus disease; WHO: World Health Organization; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus 2; CFR: Case Fatality Rate; PHEIC: Public Health Emergency of International Concern; MOH: Ministry of Health Malaysia; MCO: Movement Control Orders; MK: Mann-Kendall; H<sub>0</sub>: null hypothesis; H<sub>a</sub>: alternative hypothesis; SD: standard deviation.

## ACKNOWLEDGEMENTS

This research was funded by Universiti Teknologi MARA (UiTM), Melaka. The authors expressed their appreciation and gratitude to the Director General of Health Malaysia, Ministry of Health, Tan Sri Dato' Seri Dr. Noor Hisham Abdullah for all his contributions and significant role in managing and handling the COVID-19 epidemic in Malaysia. Special thanks are also extended to the front liners, especially medical practitioners from various positions under the Ministry of Health Malaysia in facing the COVID-19 pandemic in Malaysia.

### Authors' contributions

Data curation, methodology and analysis: SHMS. Writing—original draft: SHMS and INAZR. Writing—review and editing: SHMS and INAZR. All authors have read and agreed to the published version of the manuscript.

### Data Availability

Data used in this research are available upon the request.

### Conflict of Interest

The author declares no competing interests.

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