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EVIDENCE OF RECOVERY FROM THE RESTRICTION MOVEMENT ORDER BY MANN KENDALL DURING THE COVID-19 PANDEMIC IN MALAYSIA

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Abstract: At the end of December 2019, China faced severe acute respiratory syndrome Coronavirus-2 (COVID-19) which caused a "very high" risk assessment ranking. Unfortunately, it has spread all over the world and has caused a great number of fatalities. In view of this, a study of the non-parametric statistical method was carried out with the aim of detecting and quantifying the outbreak of COVID-19. From the univariate analysis, daily cases had the highest mean value indicating widespread data from the outbreak of COVID-19 in Malaysia. However, the worst output in the future during the RMO must be prepared with the help of the Government of Malaysia's Ministry of Health due to the high standard deviation value recorded. In addition, the western coast of Malaysia has been reported to have the most in comparison with the other regions. The Mann-Kendal test shows a declining trend pattern for new cases during RMO3 compared to RMO1, RMO2 and RMO4, with a dramatic increase in the Covid-19 outbreak during RMO1. Overall, the results show downward trends following the implementation of the RMO. These results have shown that the Malaysian Government has implemented an effective strategy to combat the COVID-19 outbreak.

Keywords: Coronavirus, restricted movement order, univariate analysis, trend analysis, Mann-Kendall test.

Introduction

The World Health Organization (WHO) reports that severe acute respiratory syndrome Coronavirus-2 (COVID-19) occurred in China at the end of December 2019. Moreover, COVID-19's sequence similarity scores with Bat SARS-like, SARS-CoV, and MERS-CoV were around 99%, 96%, and 50% respectively (Kannan *et al*., 2020). Epidemiologically, the COVID-19 outbreak has spread to over 200 countries resulting in a "very high" WHO risk assessment ranking (Sokouti *et al*., 2020). SARS-CoV-2 outbreak started late December 2019 in Wuhan, Hubei Province, People's Republic of China (Li *et al*., 2020). As of May 12, 2020, 186 countries with 4,168,427 cases of coronavirus disease 2019 (COVID-19) were confirmed, total recovery cases 1,452,626 and over 285,445 deaths had been reported globally (WHO, 2020). In view of the global threat, WHO has declared COVID-19 to be a Public Health Emergency for International Concern (PHEIC) (Sohrabi *et al*., 2020).

Malaysia reported the first COVID-19 cases on 25 January 2020 (MOH, 2020). Since then, the number of cases has started to rise, in particular in March 2020 and April 2020. Due to this escalating COVID-19 outbreak the Malaysian government had taken several steps including the installation of a surveillance system to detect cases immediately, rapid diagnosis, immediate identification of cases and stringent tracking and quarantining close contacts of those confirmed positive in COVID-19 (Abdullah *et al*., 2020).

Thus, YAB Tan Sri Muhyiddin Hj Mohd Yassin, the Prime Minister of Malaysia announced that the Malaysian Government had decided to implement the first phase of the Restriction of Movement Order (RMO)/ Movement Control Order (MCO) nationwide from 18 March to 31 March. This order was enforced under the Control and Prevention of Infectious Diseases Act 1988 and the Police Act 1967, with the aim of isolating the source of the outbreak of COVID-19. Several activities, including operations, were not permitted during the RMO, except for essential services (Malaysian National Security Council, 2020). RMO has been implemented in four phases. The number of confirmed cases of COVID-19 at the end of Phase I RMO is 2,766 (31 March 2020), Phase II is 4,987 (14 April 2020), Phase III is 5,851 (28 April 2020) and Phase IV is 6,742 (12 May 2020) (MOH, 2020). At the end of RMO Phase IV on 12 May 2020, Malaysia's Ministry of Health (MOH) announced that 5,223 confirmed COVID-19 cases had completely recovered (77.5% of total cumulative cases). Cumulatively, Malaysia now has (at the time of writing) 6,742 confirmed cases of COVID-19 (2.4% of total reported cases). There are reportedly 1,410 active and infectious COVID-19 cases with 109 COVID-19 deaths in Malaysia (1.62% of total reported cases) (MOH, 2020).

It is assumed that adopting the four-phase RMOs would aid the country entering the recovery state with several precautions. In line with the fight against this pandemic, MOH urges all Malaysians to carry out their responsibilities by maintaining good personal hygiene at all times, such as regular hand washing with water and soap, practising a healthy social distance of at least one meter from others, avoiding public gatherings and promoting face masks in crowded public areas.

Most of non-parametric approaches are based on a Mann-Kendall Test, where the observations are considered independent (Bouza-Deaño *et al*., 2008). The non-parametric test was widely used to detect significant timeline trends (Samsudin *et al*., 2017). Besides that, this approach is suitable to be used for any type of distribution data and it is not affected by the length of the time series. Hence, it is easier to apply this approach to COVID-19 data since it has limitation to access the data that are reliable, valid and timely (Shadmani *et al*., 2012). The application of the Mann-Kendall Test for an independent series and the distribution of data ($x_1, x_2,..., x_n$) indicates the prior acceptance of the null hypothesis (non-existence of the trend). Using the Mann-Kendall test, it is possible to determine the existence of an increasing or decreasing trend, but it is difficult to measure if the Sen's Slope Estimator method developed by Sen (1968) allows the calculation of the slope of the regression line for each parameter at any time without the influence of the outliers (Samsudin *et al*., 2017).

Therefore, in order to apply and check the use of non-parametric statistical methods, the main goal of this study is to detect and quantify data on the outbreak of COVID-19 using the Mann-Kendall Test and the Sen Slope Estimator. The nonparametric Mann-Kendall method was applied to daily data of COVID-19 confirmed cases in Malaysia in order to detect statistically significant trends moving gradually up or down. COVID-19 outbreak data consists of daily recorded cases, cured and discharged cases, daily death rates, number of ICUs and daily ventilator-supported patients during the RMO phases in Malaysia. The objective is to gain a deeper understanding of the situation trend and the recovery phase during the RMO period.

Materials and Methods

This study selected several data variables, including daily cases, daily cured and discharged patients, daily death rates, daily ICU patients and daily ventilator-supported patients. Data were obtained from the official website of the Ministry of Health Malaysia (https://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-kenyataan-akhbar), which reports all information on COVID-19 cases from the Malaysian press release. The findings of this study are from 18 March 2020 (RMO Phase 1) to 12 May 2020 (RMO Phase 4). These are based on daily cases of the RMO phases in 13 Malaysian states and three Federal Territories/ *Wilayah Persekutuan*.

Descriptive Statistics: Univariate Analysis

For variables such as daily cases, daily cured and discharged patients, daily death toll, daily ICU patients and daily ventilator-supported patients, the value of descriptive statistics listed as minimum, maximum, 1st quartile, median, 3rd quartile, mean, variance, and standard deviation were determined. The result in scatter grams for COVID-19 pandemic situation in Malaysia was visualised. Similarly, the descriptive statistics were calculated separately for each Malaysian state for individual comparison within Malaysia.

Trend Analysis: Mann-Kendall Test

The Mann-Kendall test was conducted using COVID-19 outbreak data during all RMO phases in Malaysia. The test is based on the correlation of observed variables and their time series. Usually, the non-parametric Mann Kendall statistical test (Mann, 1945; Kendall, 1975; Bouza-Deaño *et al*., 2008; Samsudin *et al*., 2017) is used to assess the significance of a site trend. The Mann Kendall statistics, S is defined as:

$$S = \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} sgn\,(X_o - X_i) \quad (1)$$

where X_o are the sequential data values, n is the length of the data set, and

$$gn\,(\theta) = \{1\, for\, \theta > 0\; 0\, for\, \theta = 0\; -1\, for\, \theta < 0 \quad (2)$$

Mann (1945) and Kendall (1975) have observed that, when n > 8, the statistic *S* is approximately normally distributed with the mean and variance given by:

$$E[S] = 0 \quad (3)$$

$$Var(S) = \frac{n\,(n-1)(2n+5) - \sum_{i=1}^{n} \quad t_i i(i-1)(2i+5)}{18} \quad (4)$$

where t_i is the number of ties of extent *i*. The standardised test statistic *Z* is computed by:

$$Z = \{\frac{S-1}{\sqrt{Var(S)}}\, for\, S > 0\; 0\, for\, S = 0\; fracS + 1\sqrt{Var(S)}\; for S \leq 0 \quad (5)$$

Under the null hypothesis of no trend, the standardised Mann-Kendall statistic *Z* follows a standard normal distribution with mean zero and variance one. A positive *Z* value indicates an upward trend, while a negative one indicates a downward trend. The p-value (probability value p) of the Mann-Kendall statistic *S* sample data can be estimated using the normal cumulative distribution function:

$$p = 0.5 - \Phi(|Z|) \quad (6)$$

where

$$\Phi(|Z|) = \frac{1}{2\pi} \int_0^{|Z|} \quad e^{\frac{-t^2}{2}} dt \quad (7)$$

If the p value is small enough, the trend is possibly due to random sampling. At the significance level of 0.05, if p < 0.05, the current trend is assessed as statistically significant.

If a linear trend exists, the true slope can be estimated by (a) computing the slope's least square estimate, or (b) linear regression methods. However, (b) can deviate greatly from the true slope if the data set contains gross errors or outliers. Sen (1968) developed a method called Sen's method which is not greatly affected by gross data errors or outliers and can be calculated when data is missing. This test is close to the Mann-Kendall test (Gilbert, 1987).

To obtain the Sen's slope estimator, it is first necessary to calculate the *N'* slope *Q*, as:

$$Q = \frac{x_{i\prime} - x_i}{i' - 1} \quad (8)$$

Where x'_i and x_i are data values at times *i'* and *i*, respectively, and where *i'* >*i*; *N'* is the number of data pairs for which *i'* >*i* is used. *Q*'s median of these N' values is Sen's slope estimator. If there is only one datum for each period of time, then

$$N' = \frac{n(n-1)}{2} \quad (9)$$

The results of the Mann-Kendall trend test are then interpreted. Test processing with p values < 0.05 indicates that there is a significant difference for that particular test. If the Sen 's slope shows a positive value, there's an upward trend and vice versa. For the test showing the p-value > 0.05, there is no significant difference for the parameter.

Results and Discussion

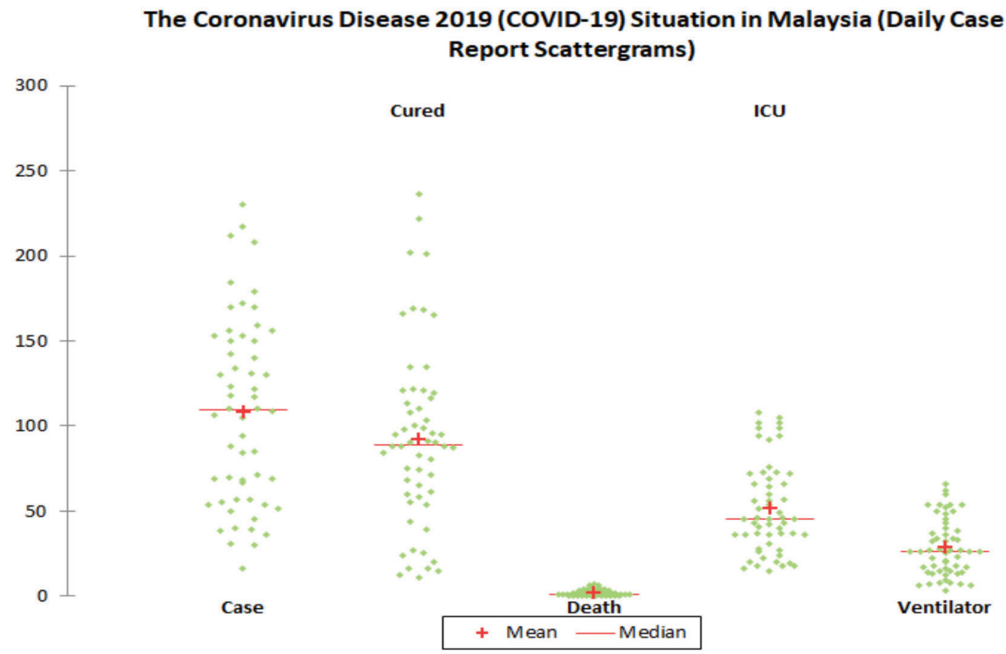
Descriptive statistics were conducted to describe data distribution. Table 1 summarises the minimum, maximum, 1st quartile, median, 3rd quartile, mean, variance and standard deviation of daily registered cases, cured and discharged cases, death toll, number of ICU patients and ventilator-supported patients. The scattergrams in Figure 1 show daily cases gave the highest mean value, indicating that the data is widely spread due to COVID-19 outbreak in Malaysia. Table 2 show the result of distributing daily cases for Malaysian states. For each variable, the standard deviation signifies the mean variation from the average for each case.

From the records (RMO Phase 1 - RMO Phase), the mean value for new cases, cured, dead, in ICU and ventilator-supported patients was 108.29, 92.39, 1.91, 51.82 and 28.52, respectively. From the mean value tabled in Table 1, it indirectly shows that Malaysia has proved that all parties were providing the best facilities and effort. For the record, the daily cured case was slightly lower than the new cases recorded at 14.68%. Malaysia has not only reported a low death toll of 1.91 patients per day, but also 51,82 and 28,52 patients per day, in ICU, and ventilator treatment, respectively. In other words, ICU patients are 55.03% higher than the patients who used ventilator system to recover. However, with a high standard deviation value recorded during RMO, Malaysia's government must be prepared for the worst output in the future with the help of the Ministry of Health. To reduce COVID-19's risk, the cured case should be higher than the new case recorded, and if the patient being monitored in ICU is lower than the one being cared for using ventilator unit, Malaysia may have a better chance of fighting this new pandemic.

The comparison of four major areas is shown in Figure 2 in Malaysia (west coast of Peninsular Malaysia, east coast of Peninsular Malaysia, the northern of Peninsular Malaysia and East Malaysia). Table 2 shows that the most reported cases are on the west coast of Malaysia in comparison with the other regions. Not only that, the west coast of Peninsular Malaysia, W.P. Kuala Lumpur, Selangor, Negeri Sembilan, and Johor have contributed to recent new cases since RMO was ordered since 18th March 2020. With at least four cases per day and a maximum of 105 cases per day, it was clear that Kuala Lumpur and Selangor had a higher potential for COVID-19 to spread even faster. With a higher variance (230.81 & 647.14) and a standard deviation (15.19 & 25.44) calculated, these locations may require a longer period of time to address these issues, since there is inconsistency in previous daily cases and may also affect future cases. For record purposes, both locations are modern, developed and highly populated and overcrowded and are full of both the locals (Malaysian) and/or foreigners seeking better financial support and lifestyle in Malaysia. The only COVID-19 can spread by touching any material that is contaminated or infected with the virus. However, the researchers are debating the limitation of how COVID-19 could infect others. The worst-case scenario is that COVID-19 could be easily transported via airborne particulates. With the lack of control and awareness of COVID-19 before RMO, it is not surprising why Kuala Lumpur and Selangor have consistently recorded a new case on a daily basis. It is obvious that any area of high population density, with a high level of social interaction could be a major factor in the spread of the COVID-19 at a faster rate. However, the process may be accelerated by other factors such as natural and anthropogenic contribution, but up to the present, we lack the latest information.

Table 1: Descriptive statistics daily of the Coronavirus Disease 2019 (COVID-19) for New Cases, Cured and Discharged, Death Toll, Patient in ICU and Patient with Ventilator Situation in Malaysia

Statistics	Case	Cured	Death	ICU	Ventilator
Minimum	16.00	11.00	0.00	15.00	3.00
Maximum	230.00	236.00	7.00	108.00	66.00
1st Quartile	57.00	59.50	1.00	34.75	15.00
Median	109.50	89.00	1.00	45.00	26.00
3rd Quartile	150.75	116.75	3.00	69.75	38.50
Mean	108.29	92.39	1.91	51.82	28.52
Variance	3002.72	2832.53	3.03	716.80	275.45
Standard Deviation	54.80	53.22	1.74	26.77	16.60



Report Scattergrams).

Figure 1: The Coronavirus Disease 2019 (COVID-19) Situation in Malaysia (Daily Case Report Scattergrams)

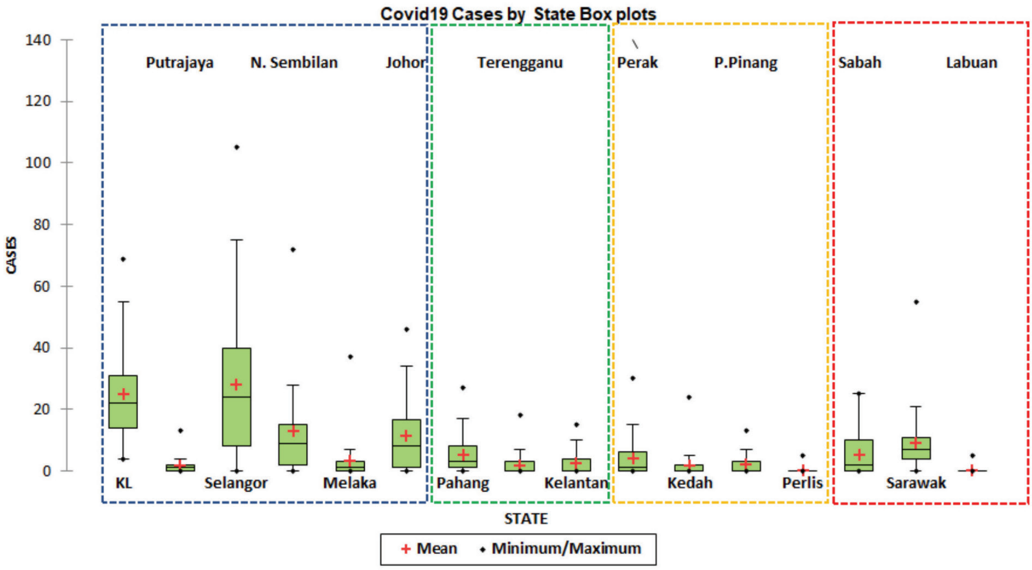


Figure 2: COVID-19 Cases Boxplot (i.e: blue box = west coast, green box = east coast, yellow box = north, red box = East Malaysia)

Table 2: Descriptive statistics of cases by state

Statistics	Minimum	Maximum	1st Quartile	Median	3rd Quartile	Mean	Variance	STDEV
KL	4.00	69.00	14.00	22.00	31.00	25.13	230.81	15.19
Putrajaya	0.00	13.00	0.00	1.00	2.00	1.57	5.83	2.41
Selangor	0.00	105.00	8.00	24.00	40.00	28.11	647.14	25.44
N. Sembilan	0.00	72.00	2.00	9.00	15.00	13.08	291.98	17.09
Melaka	0.00	37.00	0.00	1.00	3.00	3.46	35.35	5.95
Johor	0.00	46.00	1.00	8.00	16.50	11.23	137.37	11.72
Pahang	0.00	27.00	1.00	3.00	8.00	5.11	38.10	6.17
Terengganu	0.00	18.00	0.00	0.00	3.00	1.80	10.39	3.22
Kelantan	0.00	15.00	0.00	0.00	4.00	2.54	16.12	4.01
Perak	0.00	30.00	0.00	1.00	6.00	4.18	39.08	6.25
Kedah	0.00	24.00	0.00	0.00	2.00	1.56	12.12	3.48
P. Pinang	0.00	13.00	0.00	0.00	3.00	1.98	9.12	3.02
Perlis	0.00	5.00	0.00	0.00	0.00	0.30	0.78	0.88
Sabah	0.00	25.00	0.00	2.00	10.00	5.38	46.54	6.82
Sarawak	0.00	55.00	4.00	7.00	11.00	8.90	74.96	8.66
Labuan	0.00	5.00	0.00	0.00	0.00	0.26	0.63	0.79

Trend Analysis: Mann-Kendall Test

The Mann – Kendall Test was applied to in the 56-day trends of all cases (18 March 2020 – 12 May 2020). This study shows the trend either upward trend, downward trend or no trend (NT). When a trend was detected (positive or negative), quantified levels of the above-mentioned trend were found using Sen's slope with the p-value ~~is~~ of 0.05. Table 3 and Table 4 show the trend study results.

The Sen 's slope for new events, cure and death is often different across four RMOs. During the RMO period, new cases of RMO3 showed a declining trend pattern compared to RMO1, RMO2 and RMO4. Whereas, for cured and discharged patients (treated), RMO1 showed an increasing pattern, but it turns out differently during RMO3, which showed a declining trend. The death toll showed a significant increase in the trend pattern only in RMO1 and NT afterward. Finally, both ICU and the patients using the ventilator as a support system showed a similar pattern of increase only in RMO1 and indicated a declining trend pattern towards the end.

Any significant value (p-value < 0.05) for Sen 's slope and Kendall's tau will be used to determine the null and alternative hypothesis. In new cases, the Sen slope is-3.5000, while patients are cured and discharged (4.5714), daily death toll (0.3333), ICU patients (5,8750) and ventilator-supported patients (3.3636). During RMO phase I, the outbreak of COVID-19 has increased dramatically across the country since 15 March 2020. On the basis of the investigation, the majority of these additional cases are related to Seri Petaling (MOH, 2020). After RMO implementation, the results for RMO Phase 2, RMO Phase 3 and RMO Phase 4 showed statistically downward trends. Comparison of RMOs is shown in Figure 3 (daily), Figure 4 (cured and discharged), Figure 5 (death toll), Figure 6 (ICU patients) and Figure 7 (ventilator-supported patients).

Table 3: Summary of Mann Kendall Test result for New Cases, Cured and Discharged, Death Toll, Patient in ICU and Patient with Ventilator in Malaysia During RMO

Test	RMO	Kendall's tau	p-value	Sen's slope	Trend
CASES	RMO1	0.2652	0.2073	2.5000	NT
	RMO2	-0.1768	0.4108	-3.1667	NT
	RMO3	-0.4725	**0.0215**	-3.5000	↓
	RMO4	-0.2747	0.1889	-2.8889	NT
CURED	RMO1	0.6188	**0.0026**	4.5714	↑
	RMO2	0.3626	0.0798	6.6667	NT
	RMO3	-0.4199	**0.0425**	-4.4444	↓
	RMO4	0.3094	0.1388	2.4286	NT
DEATH	RMO1	0.4399	**0.0396**	0.3333	↑
	RMO2	-0.0358	0.9104	0.0000	NT
	RMO3	-0.1189	0.6324	0.0000	NT
	RMO4	-0.2047	0.3957	0.0000	NT
ICU	RMO1	0.8046	**< 0.0001**	5.8750	↑
	RMO2	-0.8429	**< 0.0001**	-3.8571	↓
	RMO3	-0.9269	**< 0.0001**	-1.5385	↓
	RMO4	-0.8493	**< 0.0001**	-1.8571	↓
VENTILATOR	RMO1	0.8556	**< 0.0001**	3.3636	↑
	RMO2	-0.9103	**< 0.0001**	-2.0000	↓
	RMO3	-0.7530	**0.0003**	-1.2500	↓
	RMO4	-0.8591	**< 0.0001**	-1.0000	↓

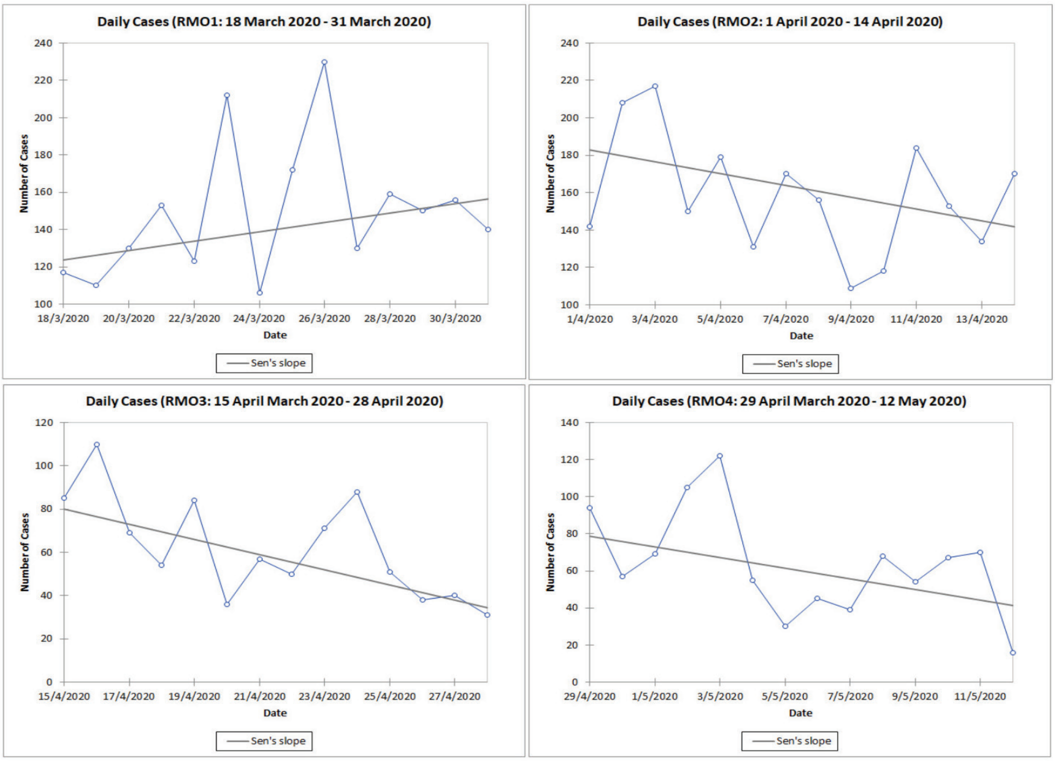


Figure 3: Comparison of Sen's slope between new cases during 4 RMOs

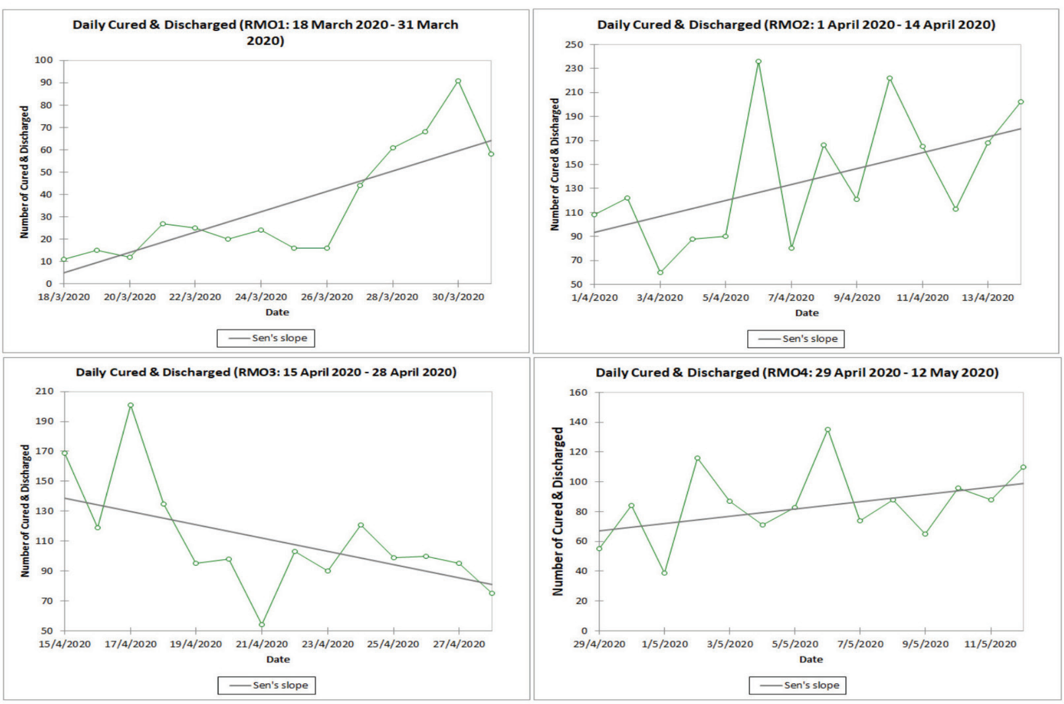


Figure 4: Comparison of Sen's Slope Between Daily Cured and Discharged Patients during 4 RMOs

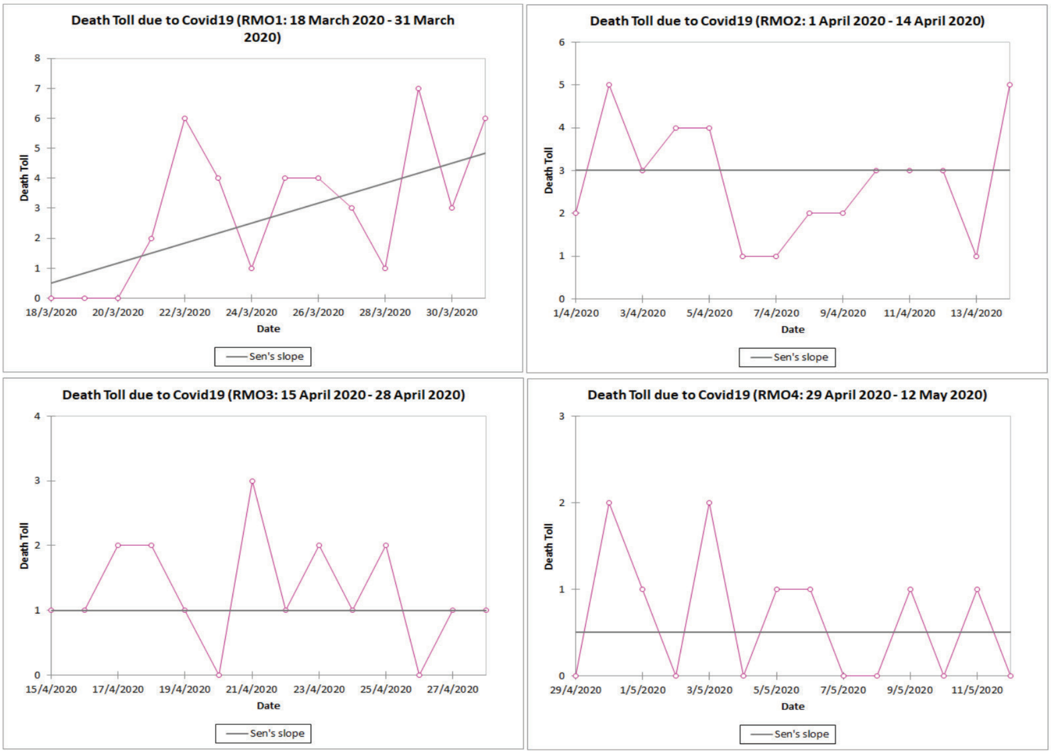


Figure 5: Comparison Sen's slope between death toll during 4 RMOs

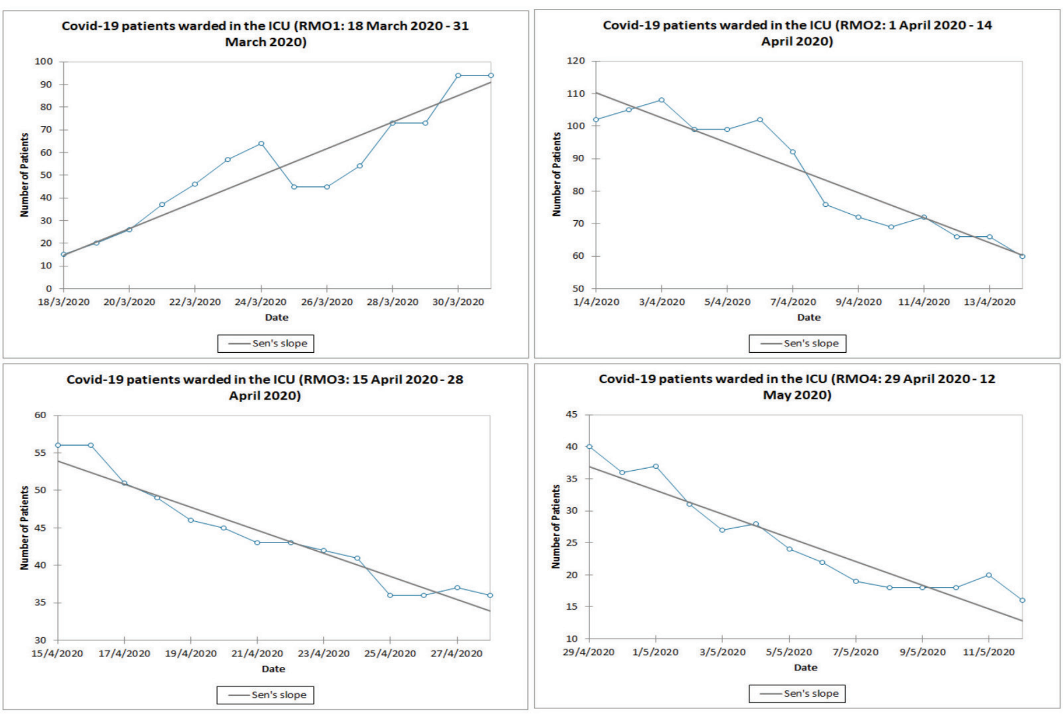


Figure 6: Comparison Sen's slope between patients in ICU during 4 RMOs

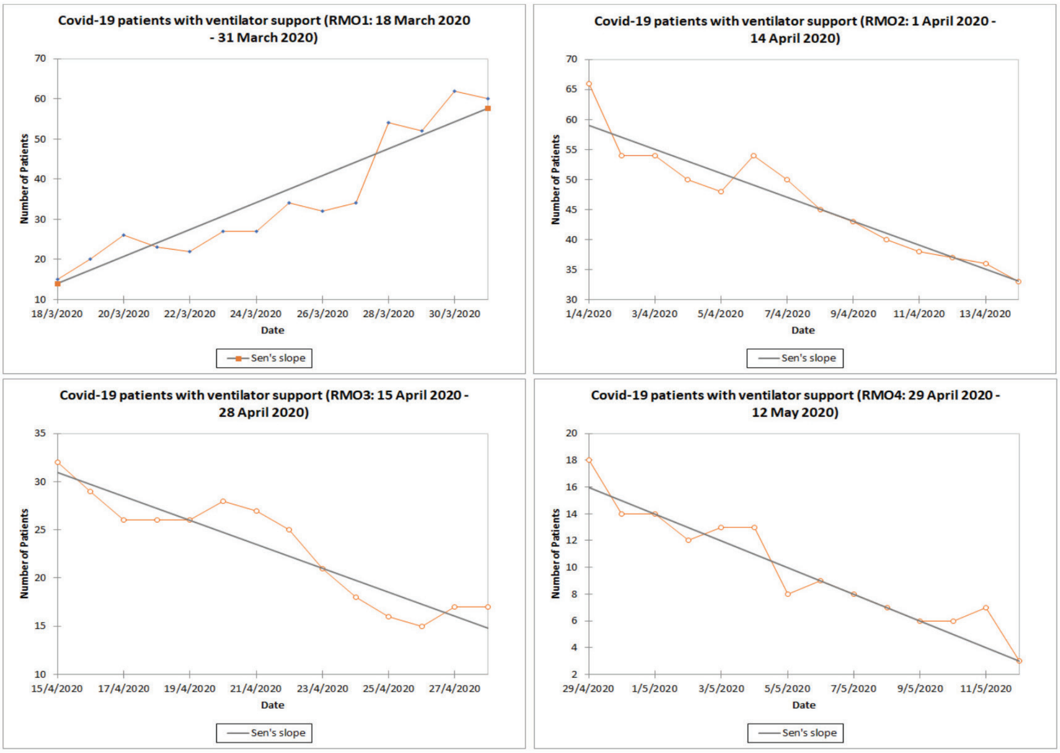
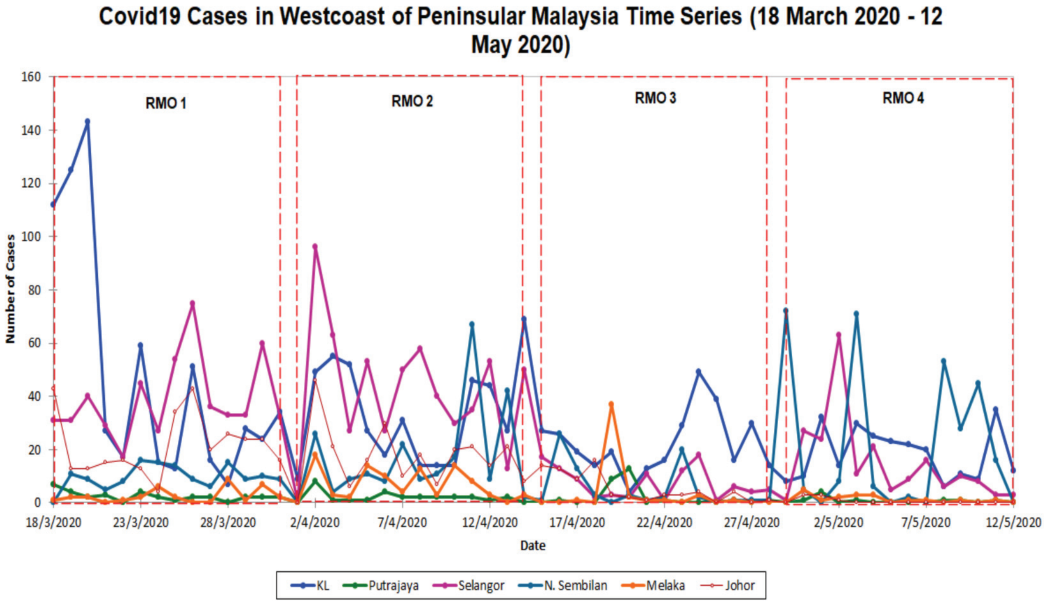


Figure 7: Comparison of Sen's Slope Between Patients with Ventilator Support During 4 RMOs

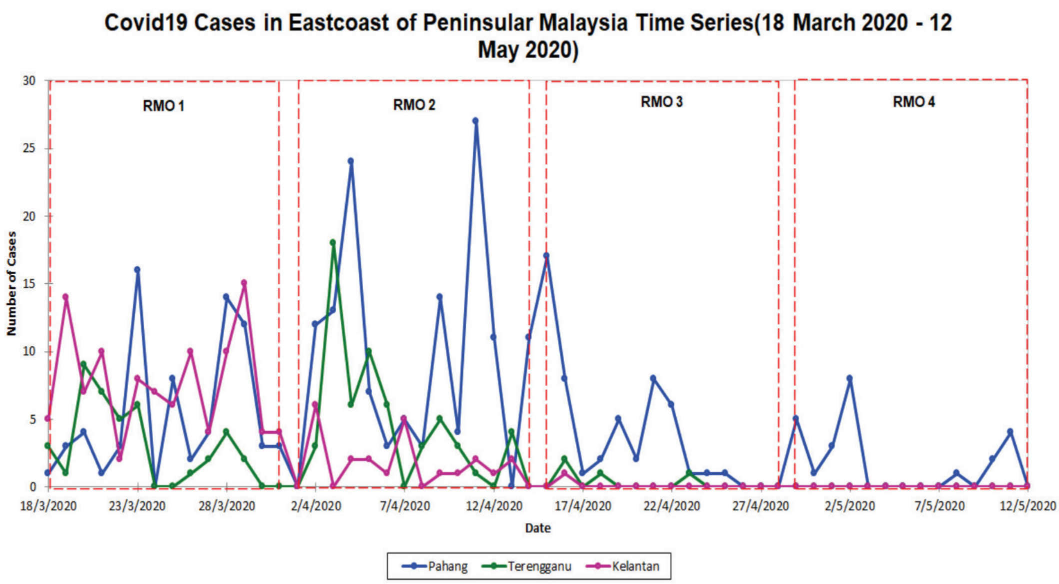
Figure 8 shows the COVID-19 Cases time series during RMOs in four Malaysian regions. The time series indicated falling daily cases for all regions. This result supported the Mann Kendall test in Table 4. Table 4 shows the summary of Mann Kendall test result for daily cases by state in Malaysia during RMOs. At RMOs' end (12 May 2020), all states showed downward trends.

Obviously, there is a significant difference in time series analysis involving the west coast of the Peninsula, the north, east coast and East Malaysia. As stated earlier, the west coast has a high variability and variation in the definition of new cases. During RMO1, it can be seen that the west coast and the northern region have similar patterns, where they have abruptly recorded a series of new cases, while the east coast and East Malaysia (Sarawak) start to show sudden changes in the following week (RMO2). It was particularly obvious that the first two weeks were crucial for Malaysia to determine the fate of the next week. Then, positive changes ~~can~~ could suddenly be seen starting in RMO3, where the graph is flattening towards the end of RMO4.

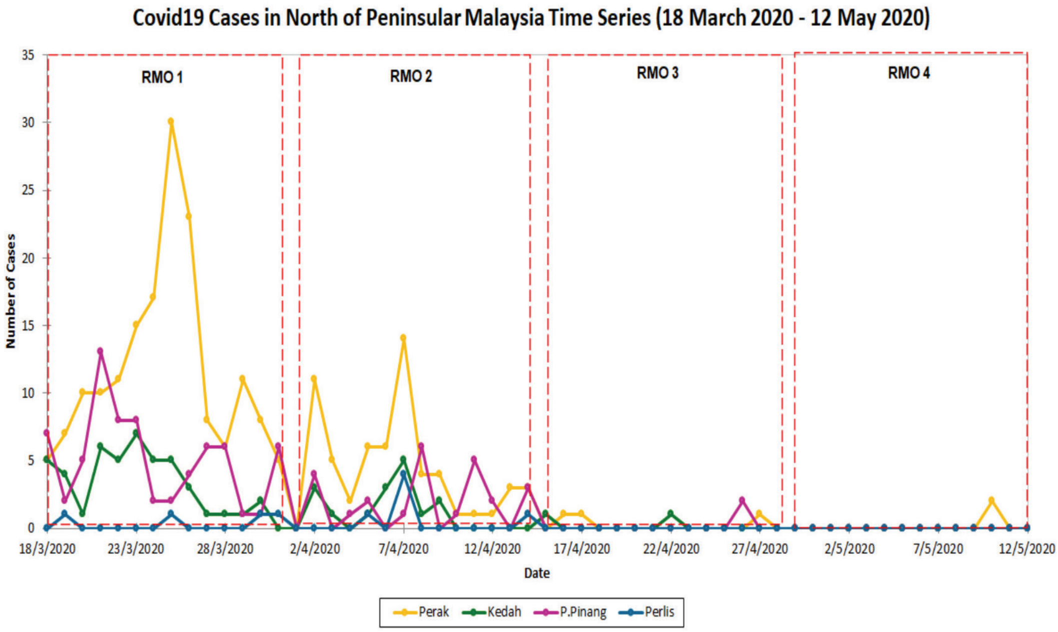
8A)


Covid19 Cases in Westcoast of Peninsular Malaysia Time Series (18 March 2020 - 12 May 2020)
RMO 1
RMO 2
RMO 3
RMO 4
Number of Cases
Date
18/3/2020
23/3/2020
28/3/2020
2/4/2020
7/4/2020
12/4/2020
17/4/2020
22/4/2020
27/4/2020
2/5/2020
7/5/2020
12/5/2020
KL
Putrajaya
Selangor
N. Sembilan
Melaka
Johor

8B)


Covid19 Cases in Eastcoast of Peninsular Malaysia Time Series(18 March 2020 - 12 May 2020)
RMO 1
RMO 2
RMO 3
RMO 4
Number of Cases
Date
18/3/2020
23/3/2020
28/3/2020
2/4/2020
7/4/2020
12/4/2020
17/4/2020
22/4/2020
27/4/2020
2/5/2020
7/5/2020
12/5/2020
Pahang
Terengganu
Kelantan

8C)



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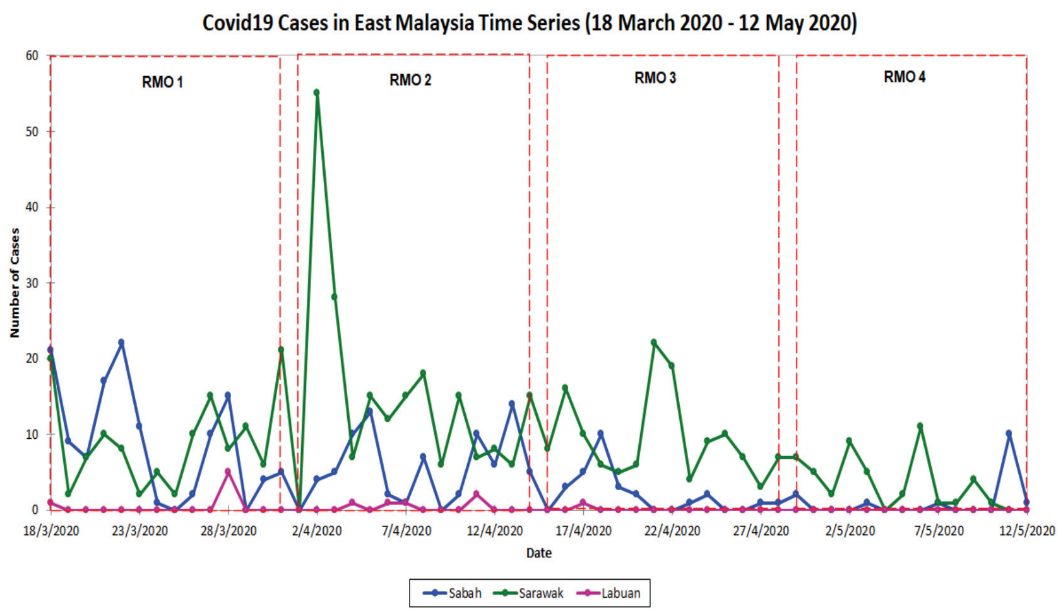

Figure 8: Comparison of COVID-19 Cases in Malaysia during RMO. A: West Coast of Peninsular Malaysia, B: East Coast of Peninsular Malaysia, C: North of Peninsular Malaysia, D: East Malaysia

Table 4: Summary of Mann Kendall Test Result for New Cases by State in Malaysia During RMO

Series\Test	Kendall's tau	p-value	Sen's slope	Trend
KL	-0.2589	**0.0053**	-0.3534	↓
Putrajaya	-0.3918	**0.0001**	-0.0333	↓
Selangor	-0.4092	**< 0.0001**	-0.6818	↓
N. Sembilan	-0.1019	0.2809	-0.0769	NT
Melaka	-0.1931	**0.0499**	-0.0204	↓
Johor	-0.6221	**< 0.0001**	-0.4329	↓
Pahang	-0.2933	**0.0022**	-0.0822	↓
Terengganu	-0.5010	**< 0.0001**	-0.0294	↓
Kelantan	-0.6886	**< 0.0001**	-0.0909	↓
Perak	-0.6759	**< 0.0001**	-0.1667	↓
Kedah	-0.6262	**< 0.0001**	-0.0303	↓
P.Pinang	-0.6110	**< 0.0001**	-0.0476	↓
Perlis	-0.2523	**0.0228**	0.0000	↓
Sabah	-0.4347	**< 0.0001**	-0.1373	↓
Sarawak	-0.2989	**0.0015**	-0.1620	↓
Labuan	-0.1977	0.0731	0.0000	NT

Conclusion

Currently, the confirmed cases reported daily show a declining and plateauing trend. With the increasing number of COVID-19 cases recovering, this has led to a decrease in active cases during the RMO's Phase 4. This has contributed to curve flattening, and the nation is now entering recovery. This statement supported the outcome of this study of Mann-Kendall test, which showed downward trends for all cases and new cases in states.

For example, the total number of active cases for RMO Phase 4 was 1,410, compared to the highest number of active cases of 2,596 on April 5, 2020. This achievement is the result of the government's proactive and aggressive actions to reduce the transmission of COVID-19 infection during the period before and during RMO and the public who follow the advice during RMO. These have ensured that healthcare facilities in Malaysia's Ministry of Health are able to accommodate the number of COVID-19 patients in Malaysia, including ICU capacity and ventilator use in hospitals.

The RMO also helped reduce the interactions in the community and reduce the risk of COVID-19 infection. Besides active case detection activities, the Ministry of Health and various agencies adopted a targeted approach to high-risk groups and population. These include detection, screening, testing and isolation activities, as well as treatment of individuals in Enhanced RMO (ERMO) localities, contact tracking of attendees of the Seri Petaling gathering and other mass gatherings, including in the religious schools (MOH, 2020).

Malaysia's Prime Minister announced that the implementation of the Control Restriction Movement Order (CRMO) was extended from May 12 to June 9. Several economic sectors also began to open. Individuals stranded in their hometowns or elsewhere, including students, started returning home. It was generally found that business owners, employers, and the public played an active role in meeting the Standard Operating Procedures (SOPs). Cooperation at all levels in the fight against COVID-19 was amazing. The public showed social responsibility and self-regulation. The public was advised to continue practising the new norms in daily life such as complying with the Conditional Restriction Movement Order (CRMO), avoiding leaving the house except for important matters, practising safe social distance of at least 1 meter from others and maintaining optimal levels of hygiene at all times, such as frequent hand washing with water and soap to ensure that the COVID-19 chain can be disconnected immediately.

This study succeeds in determining the pattern for each of the variables involved, including time series analysis. As a result, it has clearly shown how effective the Malaysian government is in its strategy to combat the COVID-19. Unfortunately, the successful story of Malaysia's struggle against COVID-19 will be history, if the new normal practice is not ~~be~~ fully understood and practised by the Malaysians themselves.

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