In 2020 a significant threat to public health emerged. The novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) epidemic outbreak emerged in December 2019 from Wuhan City, Hubei Province, China and spread to the rest of the world. This disease was named COVID-19 by World Health Organization. To date (17th April 2020) a total of 2,230,439 cases of COVID-19; 150,810 cases of deaths and 564,210 recovered cases have been reported worldwide. In this review the SARS-CoV-2 morphology, pathogenic mechanism, similarities and differences between SARS-CoV and Middle East Respiratory Syndrome and severe acute respiratory syndrome, transmission mode, diagnosis, treatment, and preventive measures were investigated. The outbreak of COVID-19 from a Malaysian perspective was explored and mental health care during the COVID-19 outbreak was explored. To date, there is no vaccine or no specific treatment for COVID-19. Therefore, preventive measures are very important to prevent and control the rapid spread of the SARS-CoV-2 virus. Preparedness should be a priority for future pandemic outbreaks.

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Introduction

A continuous occurrence of an unknown acute respiratory tract infection was reported in Wuhan City, Hubei Province, China, since 12th December 2019, originating from the Hunan South China Seafood Market [1]. On the 7th January 2020, Chinese scientists isolated the unknown viral sample from an infected person and sequenced its genome using the next gene sequencing tool. They reported that the virus had 96.3% genetic similarity with a Yunnan bat coronavirus RaTG13 and 70% homology with severe acute respiratory syndrome coronavirus (SARS-CoV) [2]. On the 12th January 2020, the World Health Organization (WHO) announced the cause of this epidemic outbreak was a novel coronavirus discovered in 2019 (2019-nCoV) or SARS-CoV-2 and named the disease coronavirus disease 2019 (COVID-19) [3]. However, the answer to the origin of SARS-CoV-2 remains to be determined.

The SARS-CoV-2 spread rapidly to other countries including South Korea, Taiwan, Thailand, Singapore, Japan, Italy, Iran, Spain, USA, UK and was classified by the WHO as a pandemic on 12th March 2020 [3]. As of the 17th April 2020, there are a total of 2,230,439 cases of COVID-19; 150,810 cases of deaths and 564,210 recovered cases have been reported throughout the world [4]. The USA has had the highest number of cases of COVID-19 (686,431) and number of deaths (35,578) [4]. There have been 58,179 USA patients who have recovered from COVID-19 [4]. On the 17th April 2020, a total of 8,861 new cases and 961 new deaths were reported in USA [4]. The number of cases has increased exponentially in USA, Italy, Spain, UK, Turkey, and Russia. This article describes COVID-19 and its outbreak in Malaysia.
1. SARS-CoV-2

1.1. Morphology and pathogenic mechanism
The SARS-CoV-2 is a beta coronavirus, which is a large, spherical, enveloped, non-segmented positive-sense, single-stranded RNA virus genome of about 30 kb [5]. It consists of 4 main structural proteins which are spike glycoprotein (S), membrane (M), envelope (E) and nucleocapsid (N) proteins [6]. SARS-CoV-2 uses its spike to inhibit the activity of neutralizing antibodies. Neutralizing antibodies are mainly involved in preventing viral particles from interacting with the host cell to infect cells. S protein contains S1 and S2 domains and the interaction between the S1 domain of SARS-CoV-2 with a specific host cell receptor called Angiotensin Converting Enzyme 2 (ACE-2) promotes a conformational change in the S protein. The virus mediates membrane fusion with the host cell membrane via the S2 domain and enters the host cell (specifically alveolar epithelial cells) [7,8].

1.2. Similarities and differences between SARS-CoV, MERS-SARS and SARS-CoV-2
SARS-CoV-2 is different from SARS-CoV and MERS-SARS (Table 1) [3,9-13].

1.3. Transmission
SARS-CoV-2 spreads rapidly from person to person but it was initially hypothesized that, SARS-CoV-2 was propagated by animal to human via direct contact with an intermediary host. Consumption of infected, raw or semi-cooked meat may also lead to the transmission of the virus. COVID-19 is a zoonotic disease where an animal virus undergoes mutations that permit it to infect and replicate inside the human body where it spreads rapidly through the human population. The virus is transmitted by asymptomatic infected individuals and symptomatic individuals via oral fluid droplets, mainly airborne via coughing or sneezing [2,14,15].

1.4. Symptoms
COVID-19 symptoms are manifest usually as fevers, a dry cough and tiredness. Some infected individuals may have mild symptoms like headaches, muscle pains, runny nose, sore throat or diarrhea. Some COVID-19 patients may suffer from severe pneumonia, organ failure (e.g. kidney), acute respiratory tract infection and septic shock, which can lead to death [16]. However, there are some infected individuals who do not develop any symptoms and do not feel unwell. These people are called asymptomatic carriers. The people who are highly vulnerable to COVID-19 are the elderly, young children, pregnant ladies, and people with chronic diseases such as hypertension, diabetes, heart problems, kidney and liver diseases, in addition to immuno-compromised people including patients with cancer, HIV, auto-immune disorders, and smokers.

1.5. Treatment
To date, there is no vaccine or specific antiviral therapy confirmed by the WHO to be effective against COVID-19. However, there are a number of medicines which could potentially be repurposed to treat COVID-19 (Table 2) [14,17-20].

1.6. Preventive measures
Since there is no safe and effective medicine against COVID-19, the WHO has developed a strict guideline to adhere to during the pandemic. Standard precautions are very important to set out and adhere to in an effort to curb the spread of SARS-CoV-2 worldwide. Preventive measures such as regular hand washing with soap or sanitizer, avoiding handshaking, wearing masks and gloves, social distancing of 1-2 m apart, coughing into disposable tissues or into a flexed elbow and self-isolating if symptomatic, avoidance of gatherings and unnecessary travel to affected areas can suppress the spread of viral infection.

2. COVID-19 in Malaysia
As of the 17th April 2020, there were 5,251 COVID-19 cases including 86 deaths and 2,967 cases of recovery reported by the Ministry of Health (MOH) in Malaysia [21]. Selangor, in Malaysia had recorded the highest number of confirmed COVID-19 cases (1,338) to date (17th April 2020). The government announced 27 districts as red zones including Lembah Pantai (592), Hulu Langat (446), Petaling Jaya (366), Seremban (288), Kuching (255), and Kluang (221), because of the large cumulative number of positive cases detected in those areas [21].

On the 25th January 2020, the first case of COVID-19 was detected in Malaysia and traced back to 3 Chinese nationals who previously had close contact with an infected person in Singapore [22,23]. They had travelled into Malaysia via Singapore on the 24th January 2020. They were treated at Sungai Buloh Hospital, Selangor, Malaysia [22,23]. The MOH quickly devised standard guidelines for the management of COVID-19 and 34 hospitals and screening centers were specifically designated in each state of Malaysia [including Kuala Lumpur Hospital (Kuala Lumpur), Sungai Buloh Hospital (Selangor), Tuanku Jaafar Hospital (Negeri Sembilan), Sultanah Aminah Hospital (Johor Bahrul), Miri Hospital (Sarawak), Tawau Hospital (Sabah) [21]].

The first Malaysian was confirmed with COVID-19 on the 4th February 2020. The 41-year old man had recently returned from Singapore when he started to develop a fever and a
Table 1. The similarities and differences between the severe acute respiratory syndrome coronavirus (SARS-CoV), the Middle East respiratory syndrome coronavirus (MERS-CoV) and the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

|                             | SARS-CoV                  | MERS-SARS                | SARS-CoV-2                  |
|-----------------------------|---------------------------|--------------------------|-----------------------------|
| **Coronavirinae**           |                           |                          |                             |
| **Genera**                  | b-coronavirus, lineage B  | b-coronavirus, lineage C | b-coronavirus, lineage B    |
| **Virus type**              | RNA virus                 | RNA virus                | RNA virus                   |
| **Total length of DNA**     | 29,751                    | 30,111                   | 29,903                      |
| **sequence**                |                           |                          |                             |
| **Discovery (y)**           | 2003                      | 2012                     | 2019                        |
| **Origin**                  | Guangdong province, China | Arabian Peninsula        | Hubei province, China       |
| **Total No. of cases**      | > 8,000                   | 2,494                    | 2,230,439 (Till 17th April 2020) |
| **worldwide (WHO report)** |                           |                          |                             |
| **Total No. of affected**   | 26                        | 27                       | 210                         |
| **countries**               |                           |                          |                             |
| **(WHO report)**            |                           |                          |                             |
| **Total number of death**   | 916                       | 858                      | 150,837 (As of 17th April 2020) |
| **cases**                   |                           |                          |                             |
| **(WHO report)**            |                           |                          |                             |
| **Mortality**               | >10%                      | 34.4%                    | 2.10%                       |
| **Transmission mode**       | -Droplets (coughing and sneezing) -Close contact with an infected person | -Droplets (coughing and sneezing) -Close contact with an infected person | -Droplets (coughing and sneezing) -Close contact with an infected person or even asymptomatic ones |
| **Transmission medium**     | Animal to human           | Animal to human          | Animal to human              |
| **Transmission region**     | Globally                  | Regionally               | Globally                     |
| **Cellular receptor**       | Angiotensin-Converting Enzyme 2 (ACE 2) | Dipeptidyl peptidase 4 (DDP4) | Angiotensin-Converting Enzyme 2 (ACE2) |
| **Reservoir**               | Palm Civets and Bats      | Bats and Camels          | Bats                         |
| **Receptor binding domain** | C-domain                  | C-domain                 | C-domain                     |
| **(RBD)**                   |                           |                          |                             |
| **IFN-γ inhibitor**         | Yes                       | Yes                      | Unknown                      |
| **Viral replication**       | High                      | Higher                   | Higher                       |
| **efficiency**              |                           |                          |                             |
| **Pathogenicity**           | Higher                    | High                     | High                         |
| **Clinical symptoms**       | Fever, malaise, myalgia, headache, diarrhea, and shivering (rigors) | Fever, cough, and shortness of breath | Fever, tiredness, and dry cough |
| **(WHO report)**            |                           |                          |                             |
| **Prevention**              | -Hand wash                | -Hand wash               | -Hand wash                   |
|                            | -Wear mask and gloves     | -Wear mask and glove     | -Wear mask and gloves       |
|                            | -Physical distancing      | -Physical distancing     | -Physical distancing        |
| **Treatment**               | Glucocorticoid and interferon | No vaccine or specific treatment | No specific antiviral treatment |

MERS-CoV = Middle East respiratory syndrome coronavirus; SARS-CoV = severe acute respiratory syndrome coronavirus; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2; WHO = World Health Organization.
A 40-year old female Malaysian was reported positive for COVID-19 on the 6th February 2020. She had no travel history to infected areas, however, she was the younger sister of the 41-year old man confirmed as positive with the virus on the 4th February 2020. She was the first COVID-19 patient in Malaysia who contracted the virus via local transmission. She developed a fever and a sore throat on 1st February 2020 and developed a cough the following day. She was isolated at Sultanah Bahiyah Hospital, Alor Setar, on the 3rd February 2020 [26]. On 12th March 2020, Malaysia reported its first sporadic case of COVID-19 where the infected person neither travelled to an affected area nor had contact with an infected person [21].

In March 2020, the number of reported COVID-19 cases grew relatively slowly until a religious event took place at Sri Petaling, Kuala Lumpur, which led to an exponential rise in cases [27]. A few weeks after the event, Malaysia recorded the highest number of positive cases of COVID-19 in South East Asia. The religious mass gathering was a 4-day event with 16,000 people participating, including 1,500 from outside Malaysia [27]. The spread of COVID-19 to other states of Malaysia and neighboring countries such as Brunei, Cambodia, Indonesia, Thailand, Singapore, Philippines and Vietnam was propagated [28-31]. Sporadic cases of transmission within the local community were reported. A 53-year-old man who attended the religious event was confirmed as positive after returning Brunei. He was the first positive case of COVID-19 that was detected in Tutong, Brunei on 9th March 2020. His symptoms began to develop on 7th March 2020, and he was isolated at the National Isolation Centre in Tutong for treatment [32].

The number of positive cases increased beyond 553 cases.
on the 16th March 2020, and the Prime Minister of Malaysia announced a Movement Control Order (MCO). Social distancing was to be in place for 14 days (18th March to 31st March 2020) to reduce the rapid spread of COVID-19 [33-35]. Since the 18th March 2020, the government restricted people from travelling to other states or COVID-19 affected areas. Only 1 person from 1 family could leave the home and go out to buy essential goods.

On the 17th March 2020, Malaysia confirmed 2 COVID-19 related deaths, a 60-year-old man from Kuching, Sarawak, who had a history of chronic disease, and a 34-year-old man from Johor Bahru, Johor, who participated at the religious gathering in Sri Petaling, Kuala Lumpur [36]. As the number of positive cases remained relatively high, on the 25th March 2020, the MCO was extended a further from 14 days to the 14th April 2020 [37].

Two more cluster groups were detected on 6th April 2020, originating from a religious gathering at Kuching, Sarawak, which led to 83 COVID-19 confirmed cases, and a wedding at Bandar Baru Bangi, Selangor, which resulted in 88 positive cases [38,39]. A new subcluster of COVID-19 cases was identified in Rembau, by the MOH on 8th April 2020. This subcluster was linked to the religious gathering at Sri Petaling, Kuala Lumpur. There were 27 people infected with SARS-CoV-2 virus [40].

As of the 10th April 2020, there were a total of 4,346 COVID-19 cases reported by the MOH Malaysia, including 70 deaths and 1,830 recovered cases [21]. Furthermore, the WHO estimated that the number of COVID-19 cases in Malaysia would grow exponentially and peak in mid-April and so the government extended the MCO a further 14 days until 28th April 2020 [41,42].

The government implemented an “Enhanced Movement Controlled Order (EMCO)” for specific areas in Kuala Lumpur including Kluang, Hulu Langat, Menara City One, Selangor Mansion, and Malayan Mansion effective until 28th April 2020 [43]. Residents who were under the EMCO were not permitted to leave their houses (the government provided food to the affected residents), receive visitors, or enter COVID-19 affected areas. All the residents had to be screened for COVID-19 by health officials. The MOH identified a new cluster of COVID-19 cases in Sendayan, Negeri Sembilan, on the 14th April 2020 where 39 people were identified as COVID-19 positive [44].

The MOH to date has reported 29 virus clusters throughout Malaysia. There were 69 COVID-19 positive cases reported by the MOH on 17th April 2020 [21] and this was the first time that the number of cases was less than 100 since the 14th March 2020.

2.1. Treatment of COVID-19 in Malaysia

A person was “suspected” of having COVID-19 based on the criteria below [21].

1) Has acute respiratory infection (either with difficulty in breathing, sore throat, or dry cough) with or without fever
2) Had a history of travel to or resided in a foreign country within 14 days before onset of disease OR
3) Had close contact with an infected person in the last 14 days before the onset of symptoms
4) Attended a gathering or event linked to a COVID-19 outbreak

A person was “confirmed” COVID-19 positive after performing laboratory tests.

COVID-19 patients can be diagnosed using diagnostic testing kits for the presence of the virus. Imaging techniques such as chest X-ray and pulmonary CT scans can be used to diagnose pneumonia in COVID-19 patients. There are 5 clinical stages of COVID-19 [21].

Stage 1. asymptomatic,
Stage 2. symptomatic and no pneumonia,
Stage 3. symptomatic and pneumonia,
Stage 4. symptomatic, pneumonia and supplemental oxygen required,
Stage 5. critically ill with multiorgan failure

Currently, there is no vaccine or specific treatment for COVID-19 that has been approved for use in humans.

In Malaysia, hydroxychloroquine has been proposed as a drug to treat patients with COVID-19. Hydroxychloroquine inhibits endocytic pathways by elevating the pH of the endosomes to block the pH-dependent entry of the virus into the host cell [45]. The suggested treatment regime using hydroxychloroquine is

Stage 1. No treatment required
Stage 2. Hydroxychloroquine only
Stage 3/4. Hydroxychloroquine combined treatment with Lopinavir/Ritonavir
Stage 5. Hydroxychloroquine combined treatment with Lopinavir/Ritonavir, Ribavarin or Interferon Beta [21].

As of the 17th April 2020, the government reported that out of the 5,251 COVID-19 positive cases in Malaysia, 56.5% recovered [21].

2.2. Preventive measures in Malaysia

- Wash hands frequently with soap and water or an alcohol-based hand sanitizer
- Wear face mask and gloves
- Maintain physical distancing of 1 metre
- Mass gatherings have been stopped
- Cover mouth and nose with a disposable tissue or flexed elbow when coughing or sneezing
Avoid touching eyes, mouth, or nose
Avoid handshaking
Stay at home if immunocompromised or has comorbidities
Avoid traveling to COVID-19 affected areas or countries
Self-isolate at home for 14 days upon return from overseas if symptomatic
Screen for COVID-19 after a person returns from a foreign country
Avoid spreading false information regarding COVID-19

2.3. Movement Control Order (MCO) in Malaysia
In Malaysia, the Movement Control Order (MCO) was implemented on the 18th March and was in place until the 28th April to control the spread of COVID-19 nationwide. The government imposed 6 restrictions [46].
- People were prohibited from attending mass gatherings such as religious, sports, social, and cultural events. All places of worship and businesses were closed temporarily. However, people could buy essential goods at markets, supermarkets, grocery shops and convenience stores.
- People were required to undergo health screening for the detection of COVID-19 and self-isolate after returning from overseas.
- Foreign tourists and visitors were forbidden entry to Malaysia.
- Kindergartens, government, and private schools including daily schools, boarding schools, international schools, tahfiz centers, other primary, secondary and pre-university institutions were all closed.
- Public and higher education institutions and skill training institutes nationwide were closed.
- Government and private premises were closed except for essential services (water, electricity, energy, telecommunications, postal, transportation, irrigation, oil, gas, fuel, lubricants, broadcasting, finance, banking, health, pharmacy, fire, prison, port, airport, safety, defense, cleaning, retail and food supply).

2.4. Psychological stress during pandemic outbreak of COVID-19 in Malaysia
Anyone can be affected emotionally during an outbreak like COVID-19. Everyone reacts differently to critical scenarios. Fear, worry, and anxiety regarding COVID-19 can cause strong emotions such as stress and depression in a person. For example, a 62-year old patient under investigation for COVID-19, committed suicide in Serdang Hospital, Selangor, apparently due to depression [47,48]. The MOH has published well-described guidelines on “Mental Health and Psychosocial Support in COVID-19 [21].” They included the mental health and psychosocial support services for individuals under COVID-19 investigation and those health care workers/response

Workers involved. A concise flow chart of mental health and psychosocial support activities for COVID-19 were described in the guideline [21]. Some mental health care tips are listed below:
- Eat healthy food
- Drink lots of water
- Do regular physical exercise indoors
- Perform deep breathing exercises
- Practice yoga/meditation
- Listen to music
- Be artistic and expressive
- Read books
- Cook and bake (new recipes)
- Spend quality time with family members
- Talk with friends

Conclusion
This COVID-19 pandemic outbreak continues to have a strong impact on the economy, trade, and tourism industries. It has also affected sports activities such as the 2020 SUKMA Games, squash’s Asian Team Championship, and the 2020 Summer Olympics was postponed until 2021. To date, there is no specific treatment for COVID-19. Worldwide, many clinical trials are being carried out to find medicines and vaccines for COVID-19. At the same time, the experience gained from the global efforts in dealing with COVID-19, should propel countries globally to be prepared for disease control for novel disease outbreaks, epidemics and pandemics of the future.

Conflicts of Interest
The author has no conflict of interest to declare.

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