



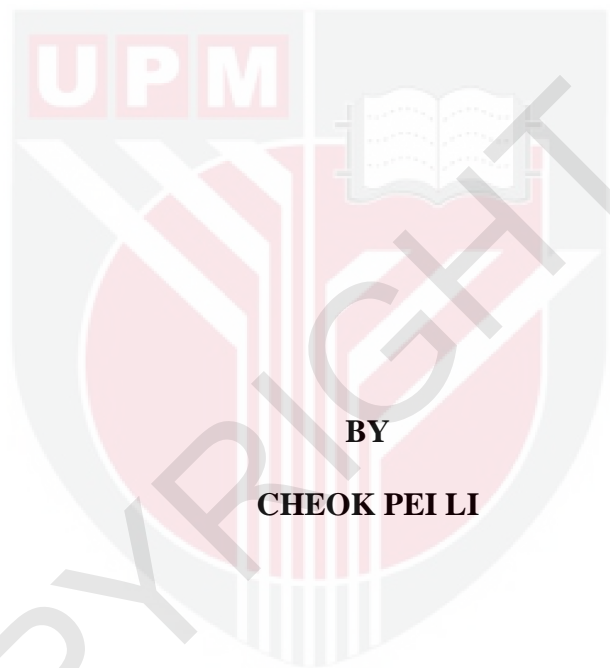
UNIVERSITI PUTRA MALAYSIA

***INVESTIGATING THE USE OF FACEBOOK BY MINISTRY OF
HEALTH FOR HEALTH COMMUNICATION DURING COVID-19
PANDEMIC***

CHEOK PEI LI

**lp
FPSK4 2022 25**

**INVESTIGATING THE USE OF FACEBOOK BY MINISTRY OF HEALTH
FOR HEALTH COMMUNICATION DURING COVID-19 PANDEMIC**



**BY
CHEOK PEI LI**

**This thesis submitted in fulfilment of the requirement for the degree of Bachelor of
Science in Environmental and Occupational Health with Honours from the
Faculty of Medicine and Health Sciences, Universiti Putra Malaysia**

ACKNOWLEDGEMENT

First and foremost, I would like to express my deepest gratitude to my supervisor, Dr. Viven How, for her relentless guidance from the very beginning to the end. Her constructive comments and informative input have helped me improve the study and complete this work within the allocated time.

Besides, I would like to thank Facepuger for providing a free and open-access platform for retrieving publicly available data from Facebook via application programming interfaces (APIs) and web scraping. These data have aided in the completion of data analysis in order to meet the study's objective.

Lastly, many other people have helped with contributions large and small. My sincere appreciation to my lecturers in the Department of Environmental and Occupational Health, families, friends, and everyone for making my dissertation successful.

ABSTRACT

INVESTIGATING THE USE OF FACEBOOK BY MINISTRY OF HEALTH FOR HEALTH COMMUNICATION DURING COVID-19 PANDEMIC

CHEOK PEI LI

Introduction: The World Health Organization (WHO) characterised COVID-19 as a pandemic in March 2020. During the pandemic, health communication is important as it can influence public to make informed healthier decisions. Effective health communication can enhance awareness and ensure compliance with the SOP to break the chain of transmission of COVID-19. **Objectives:** This study aimed to understand the utilisation of Facebook by Ministry of Health, Malaysia and public engagement during different phases of the Movement Control Order (MCO) during the COVID-19 pandemic from March 2020 to May 2021. **Methodology:** Data extraction was conducted using the Facepager version 4.3.10. The MOH Facebook profile ID was entered into the software, and the pre-set keys were used to retrieve the post. The information extracted included the content of the message, created time, permalink URL and media type. The parameters “since” and “until” were used to filter the post by date. The engagement metrics such as the users’ reactions, comments, and shares were also extracted. All retrieved data were exported into Microsoft Excel and analysed using SPSS version 26. **Results and Discussion:** Photos were the most frequent type of post during all phases of MCO (n= 1842, 68%), followed by video (n= 590, 22%), link (n=180, 6%) and text (n= 108, 4%). MCO by state recorded the highest photo posts (MPPD=6.71), video posts (MPPD=1.70) and link posts (MPPD=0.83) compared to other phases of MCO. The highest number of post was from the afternoon (n=1227, 45%), followed by evening (n= 1169, 43%), morning (n= 272, 10%) and early morning (n=52, 2%). Most of the posts were uploaded on weekdays (n= 2022, 74%) compared to weekend (n=298, 26%). There was no significant correlation between COVID-19 posts and COVID-19 cases during MCO and CMCO. However, there was a significant correlation between the COVID-19 posts and COVID-19 cases during RMCO and MCO by state. The Kruskal Wallis test showed there was a significant difference between the different MCO phases with positive emotion ($X^2= 23.772$, $p<0.001$), negative emotion ($X^2= 10.426$, $p=0.015$), comment ($X^2= 70.353$, $p<0.001$) and share ($X^2=69.149$, $p<0.001$). **Conclusion:** This study provided valuable insight into online engagement through social media networking during different phases of MCO to better understand the users' emotional sentiments. It is hoped that the result will aid in future planning for health communication in the event that another outbreak occurs in our country.

Keywords: Facebook, health communication, COVID-19, pandemic

ABSTRAK

PENGGUNAAN FACEBOOK OLEH KEMENTERIAN KESIHATAN UNTUK KOMUNIKASI KESIHATAN SEMASA PANDEMIK COVID-19

CHEOK PEI LI

Pengenalan: WHO telah mengumumkan COVID-19 sebagai pandemik pada Mac 2020. Sepanjang tempoh pandemic, komunikasi kesihatan adalah penting kerana ia boleh mempengaruhi orang ramai untuk membuat keputusan yang lebih sihat. Komunikasi kesihatan yang berkesan boleh meningkatkan kesedaran dan memastikan pematuhan SOP untuk memutuskan rantaian penularan COVID-19. **Objektif:** Kajian ini bertujuan untuk mengkaji penggunaan Facebook oleh Kementerian Kesihatan Malaysia untuk komunikasi kesihatan dan mengetahui penglibatan orang ramai semasa fasa PKP yang berbeza dari Mac 2020 hingga Mei 2021. **Methodologi:** Pengekstrakan data telah dijalankan menggunakan perisian Facepager versi 4.3.10. Id profil Facebook Kementerian Kesihatan Malaysia telah dimasukkan ke dalam perisian tersebut. Kekunci pra-tetap telah digunakan untuk mendapat maklumat, termasuklah kandungan mesej, masa siaran, url pautan kekal dan jenis media. Metrik seperti reaksi pengguna, komen, dan perkongsian telah diekstrak juga. Semua data tersebut dieksport ke dalam Microsoft Excel dan dianalisis menggunakan SPSS versi 26. **Keputusan dan Perbincangan:** Foto ialah jenis siaran yang paling kerap digunakan semasa semua fasa PKP (n=1842, 68%), diikuti siaran video (n=590, 22%), siaran pautan (n=180, 6%) dan siaran teks (n=108, 4%). Fasa PKP mengikut negeri merekodkan catatan siaran foto tertinggi (min siaran setiap hari= 6.71), siaran video tertinggi (min siaran setiap hari=1.70) dan siaran pautan tertinggi (min siaran setiap hari=0.83) berbanding fasa PKP lain. Tengah hari mencatatkan bilangan siaran tertinggi (n=1227, 45%) diikuti petang (n=1169, 43%), pagi (n=272, 10%) dan awal pagi (n=52, 2%). Hari minggu mencatatkan lebih bilangan siaran (n=2022, 74%) berbanding hujung minggu (n=298, 26%). Tiada korelasi signifikan antara kes COVID-19 dan siaran COVID-19 semasa PKPP dan PKPB, Walaubagaimanapun, terdapat korelasi signifikan antara kes COVID-19 dan siaran COVID-19 semasa PKPP dan PKP mengikut negeri. Ujian Kruskal Wallis menunjukkan terdapat perbezaan signifikan antara pelbagai fasa MCO dengan emosi positif ($X^2= 23.772$, $p<0.001$), emosi negatif ($X^2= 10.426$, $p=0.015$), komen ($X^2= 70.353$, $p<0.001$) and kongsi ($X^2=69.149$, $p<0.001$). **Kesimpulan:** Dapatan kajian ini memberikan pandangan berharga tentang penglibatan dalam talian melalui rangkaian media sosial semasa fasa PKP yang berbeza untuk lebih memahami sentimen emosi pengguna. Hasilnya diharapkan dapat membantu dalam perancangan masa depan untuk komunikasi kesihatan sekiranya berlaku lagi wabak di negara kita.

Kata kunci: Facebook, komunikasi kesihatan, COVID-19, wabak

TABLE OF CONTENTS

	Page
DECLARATION	ii
SIGNATURE OF SUPERVISOR/ INTERNAL EXAMINER	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
ABSTRAK	vi
CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
CHAPTER 1: INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	3
1.3 Study Justification	5
1.4 Research Question	7
1.5 Research Objective	7
1.5.1 General Objective	7
1.5.2 Specific Objective	7
1.6 Study Hypothesis	8
1.7 Variables	8
1.8 Definition of Terms	8
1.8.1 Conceptual Definition	8
1.8.2 Operational Definition	12
1.9 Conceptual Framework	17
CHAPTER 2: LITERATURE REVIEW	18
2.1 COVID-19 Outbreak in Malaysia	18
2.2 Social Media for Health Communication	19
2.3 Overview of Facebook	20
2.4 Engagement in Social Media	22
2.5 MOH's Website and Official Social Media	23
2.6 Data Extraction	24
CHAPTER 3: METHODOLOGY	26
3.1 Study Design	26
3.2 Method	26
3.3 Data Extraction	29
3.4 Data Analysis	29
3.5 Inclusion Criteria	31
3.6 Exclusion Criteria	32
3.7 Quality Control	32
3.8 Ethical Consideration	32
3.9 Research Flowchart	33
CHAPTER 4: RESULTS	34
4.1 Characteristics of the posts	34
4.1.1 Type of Post During Different Phases of MCO	34

4.1.2	Time Posted During Different Phases of MCO	36
4.1.3	Day Posted During Different Phases of MCO	38
4.2	Frequency of COVID-19 Post During Different Phases of MCO	39
4.3	Correlation Between COVID-19 Posts and COVID-19 Cases During Different Phases of MCO	42
4.4	Engagement of the Users During Different Phases of MCO	43
4.4.1	Comparison for the Positive Emotion	43
4.4.2	Comparison for the Negative Emotion	44
4.4.3	Comparison for the Number of Comments	44
4.4.4	Comparison for the Number of Shares	45
CHAPTER 5: DISCUSSION		47
5.1	Characteristics of the Posts	47
5.1.1	Type of Post During Different Phases of MCO	47
5.1.2	Time Posted During Different Phases of MCO	49
5.1.3	Day Posted During Different Phases of MCO	50
5.2	Frequency of COVID-19 Post During Different Phases of MCO	50
5.3	Correlation Between COVID-19 Posts and COVID-19 Cases During Different Phases of MCO	51
5.4	Engagement of the Users During Different Phases of MCO	52
5.4.1	Comparison for the Positive Emotion	52
5.4.2	Comparison for the Negative Emotion	53
5.4.3	Comparison for the Number of Comments	54
5.4.4	Comparison for the Number of Shares	55
CHAPTER 6: CONCLUSION, RECOMMENDATION AND LIMITATION		56
6.1	Conclusion and Recommendation	56
6.2	Study Limitation	57
REFERENCES		59

LIST OF TABLES

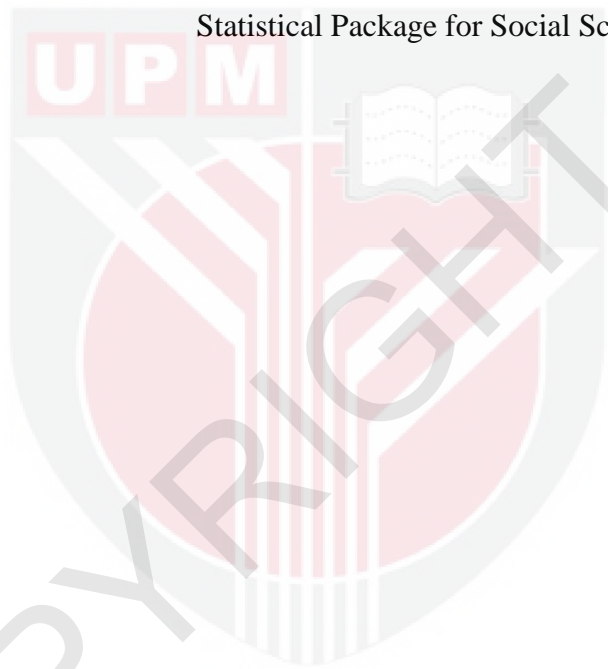
		Page
Table 4.1	Correlation between weekly COVID-19 post and weekly COVID-19 cases during different phases of MCO	42
Table 4.2	Comparison for the positive emotions during different phases of MCO	43
Table 4.3	Comparison for the negative emotions during different phases of MCO	44
Table 4.4	Comparison for the number of comments during different phases of MCO	45
Table 4.5	Comparison for the number of shares during different phases of MCO	46

LIST OF FIGURES

	Page
Figure 1.1 Conceptual Framework	17
Figure 3.1 A sample of COVID-19 Facebook post by Kementerian Kesihatan Malaysia	28
Figure 3.2 Research Flowchart	33
Figure 4.1 Percentage of different types of posts during the entire course of different phases of MCO	35
Figure 4.2 Mean post per day for different types of posts during different phases of MCO	36
Figure 4.3 Percentage of posts according to time posted during the entire course of different phases of MCO	37
Figure 4.4 Mean post per day according to time posted during different phases of MCO	38
Figure 4.5 Percentage of posts according to day posted during the entire course of different phases of MCO	38
Figure 4.6 Mean post per day according to day posted during different phases of MCO	39
Figure 4.7 Percentage of posts according to different phases of MCO	40
Figure 4.8 Weekly frequency of posts during different phases of MCO	41

LIST OF ABBREVIATIONS

APIs	Application Programming Interfaces
CMCO	Conditional Movement Control Order
MCO	Movement Control Order
MOH	Ministry of Health
MPPD	Mean Post Per Day
RMCO	Recovery Movement Control Order
SPSS	Statistical Package for Social Sciences



CHAPTER 1

INTRODUCTION

1.1 Background

Coronavirus disease 2019 (COVID-19) caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first discovered in Wuhan, China, in late 2019. The World Health Organization (WHO) Director-General declared this novel coronavirus outbreak a Public Health Emergency of International Concern on 30 January 2020. Later, on 11 March 2020, WHO classified COVID-19 as a pandemic after recognising that “COVID-19 was not just a public health crisis, but one that would affect every sector” (WHO, 2020a).

As of May 2021, the total number of confirmed cases worldwide has surpassed 160 million, with 3.39 million deaths (WHO, 2021a). This pandemic has affected many countries. At the time of writing, the top ten (10) countries with the most reported COVID-19 cases are the United States, India, Brazil, France, Turkey, Russia, United Kingdom, Italy, Argentina, and Germany (Worldometer, 2021). Following the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002 and the Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012, SARS-CoV-2 is now known to be the third highly pathogenic coronavirus introduced into the human population in the twenty-first century (Guo et al., 2020). Besides that, COVID-19 is the second infectious disease declared a pandemic by WHO this century, following the H1N1

swine flu outbreak in 2009 (CDC, 2009). In response to the emergence of this pandemic, the Malaysian government announced Movement Control Order (MCO). It implemented a set of national quarantine and cordon sanitaire measures, which was set to begin on 18 March 2020. The orders have been referred to as "lockdowns" in local and international media. MCO measures included restrictions on movement, assembly, and international travel, as well as the closure of business, industry, government, and educational institutions. The MCO was extended and relaxed to different phases in 2020 and 2021, including the Conditional Movement Control Order and Recovery Movement Control Order.

During this pandemic, social media was critical in disseminating COVID-19 related information as a means of disaster risk communication tools. Social media, also known as social media networking sites, is based on the Web 2.0 standard that allows users to create content, exchange information, and interact with one another (Kaplan & Haenlein, 2010; Thackeray et al., 2012). In contrast to the previous top-down communication method (Web 1.0), in which users could only search for information provided by the website with no interaction, Web 2.0 focuses on properties such as user participation and collaboration to generate content (Choudhury, 2014). In addition, a study by Nabity-Grover et al. (2020) suggested that as a result of the implementation of social distancing and lockdown orders, an increasing number of people are likely to turn to social media for support, entertainment, and connection to others.

Social media platforms include Facebook, Instagram, Twitter, YouTube, WeChat, WhatsApp, and Telegram. According to Molla (2020), the mentions of COVID-19 related terms in a single day on 11 March 2020 was as high as 19 million

across social media, news sites, and television. During the pandemic, Twitter alone broke the record for having COVID-19 related tweets every 45 milliseconds (Josephson & Lambe, 2020). Social media, national portals, and mobile apps were commonly used to disseminate information to the public as a risk communication tool during the COVID-19 pandemic (United Nations, 2020).

1.2 Problem Statement

The battle against COVID-19 is still ongoing with the emergence of mutant strains of the virus, high infection rates, severe morbidity and limited treatment options. Therefore, effective risk and health communication is critical in dealing with this pandemic.

Social media is a practical and low-cost way to reach audiences with public health messages (Gough et al., 2017). In fact, the definite benefits of using social media for health risk communication have been widely acknowledged and utilised in terms of urgency, physical distance and the need to rapidly disseminate knowledge and information (Wong et al. 2020).

In view of this, Ministry of Health, Malaysia (MOH) strives for transparency by providing timely information to the public via different platforms, including (i) the Ministry of Health's official portal, (ii) the Facebook account "Crisis Preparedness and Response Centre", (iii) the Facebook account "Kementerian Kesihatan Malaysia" and (iv) Crisis Preparedness and Response Centre KKM Telegram. Apart from using Facebook, MOH also actively updated COVID-19 related information on its Twitter and Instagram accounts. Despite the various social platform used by the government,

the Facebook page of MOH is considered as one of the most influential pages in terms of the total number of fans, according to statistics from Socialbraker (2021), an artificial intelligence social media analysis platform.

Before the year 2010, social media was not widely been used. Therefore, information disseminated for major recorded infectious diseases, such as the Nipah virus outbreak in 1998 and pandemic influenza A (H1N1) in 2009, was not widely shared (Lo & Rota, 2008; Sam & Abu Bakar, 2009). MOH joined Facebook in March 2010 and Twitter in March 2012. In January 2013, MOH launched an Instagram account. As a result, the COVID-19 pandemic is the first to be fully documented using social media platforms, from the beginning to the end.

In other countries, the health organisation's use of social media platforms (WHO, CDC, Doctors without Borders) and the engagements have been sufficiently studied to understand their use and value, particularly during an outbreak (Guidry et al., 2017). Past study has also shown that Facebook can be used tactically for health communication during a Zika outbreak (Lwin et al., 2018). However, while social media can be a valuable tool for the healthcare organisation, it has been suggested that social networking sites are underutilised for health promotion and behaviour change activities (Loss and von Uslar, 2020). Nevertheless, it is unclear how public health organisations used social media for crisis communication during an infectious disease outbreak and how it influenced the public's reaction towards the outbreak (Guidry et al., 2017).

Hence, this study investigates how the Ministry of Health, Malaysia used the Facebook platform to communicate with the public and the trend of public engagement during different phases of MCO from March 2020 to May 2021. The findings of this study can be used to understand better the MOH's role in this pandemic and the trend of public engagement. It is hoped that the findings will help health authorities better use social media for outbreak control and management in the future.

1.3 Study Justification

Research related to communication during the COVID-19 pandemic in the health arena is limited, especially in Malaysia when compared to other countries. However, several studies have been conducted to investigate the use of social media platforms such as Facebook, Twitter and Instagram during the critical period of infectious disease outbreaks such as Zika, Ebola as well as COVID-19 in other countries (Guidry et al., 2017; Lwin et al., 2018; Raamkumar et al., 2020; Pang et al., 2021). A study carried out to determine the role of E-government and social media in Malaysia found out that as high as 81.9% of respondents get the COVID-19 related information from social media, followed by 47.5% who get it from traditional media, 43.6% of public acquires information from the website of Ministry of Health, 38.6% of respondents obtain information from family or friends, 21% respondents obtain information from WHO website (Mat Dawi et al., 2021). Furthermore, the recent ICT Use and Access by Individuals and Household Survey Report Malaysia revealed that Internet use increased from 81.2% in 2018 to 84.2% in 2019 and 89.6% in 2020 (Department of Statistics, 2021). This demonstrates social media's enormous potential, and it is an area worth exploring.

Past study has suggested that effective risk communication can alleviate public panic and promote the adoption of preventive measures (Yusof et al., 2020). Other studies have also shown that social media can be a quick and reliable route for disseminating critical information (Chan et al., 2020). In addition, Patel & Jermacane (2015) reported that social media is likely to grow and is widely used by healthcare professionals and organisations. As a result, it is critical to understand users' engagement regularly to determine whether the public trusts MOH as a reliable source of information as the pandemic progresses.

Facebook was chosen in this study because it is expected to reach 25.95 million users in Malaysia by 2021 (Statista, 2021b). It also shows that Facebook users have increased from 20.65 million users in 2017 to 23 million users in 2019. Although Facebook is one of the tools frequently used by governments, the number of studies conducted on this platform is very limited. Besides that, Facebook allows users to give up to seven reactions, including "like", "love", "laugh", "wow", "sad" and "angry" as well as "care", which was introduced in April 2021 to allow people to send support to others who are far away during the COVID-19 crisis. Compared to other platforms, such as Twitter and Instagram, which only have the "like" feature, this range of reactions enables studying different types of engagements.

To date, no study has been conducted to investigate the use of social media by Malaysian governments during the COVID-19 pandemic and the engagement trend during different phases of MCO. Thus, this work is critical. It is a preliminary study to understand better how the MOH uses the Facebook page to provide up-to-date information and learn the public's engagement metrics throughout the MCO phases.

1.4 Research Question

- I. What are the characteristics of COVID-19 posts during COVID-19 pandemic from March 2020 to May 2021?
- II. What is the frequency of COVID-19 posts on the Facebook page during different phases of MCO from March 2020 to May 2021?
- III. Are there any correlation between COVID-19 posts and COVID-19 reported cases during different phases of MCO from March 2020 to May 2021?
- IV. How is the public's engagement on COVID-19 post during different phases of MCO from March 2020 to May 2021?

1.5 Research Objective

1.5.1 General Objective

To understand the utilisation of Facebook by the government health authority, Ministry of Health for health communication and public engagement during the COVID-19 pandemic.

1.5.2 Specific Objective

- I. To determine the characteristics of COVID-19 posts during COVID-19 pandemic from March 2020 to May 2021
- II. To determine the frequency of COVID-19 posts on the Facebook page during different phases of MCO from March 2020 to May 2021

- III. To determine the correlation between COVID-19 posts and COVID-19 reported cases during different phases of MCO from March 2020 to May 2021
- IV. To compare the engagement metrics of the public on COVID-19 posts during different phases of MCO from March 2020 to May 2021

1.6 Study Hypothesis

- I. There is a significant correlation between COVID-19 posts and COVID-19 reported cases during different phases of MCO from March 2020 to May 2021
- II. There is a significant difference of engagement of the public on COVID-19 posts during different phases of MCO from March 2020 to May 2021

1.7 Variables

Independent variables in this study are COVID-19 posts during different phases of MCO from March 2020 to May 2021. The dependent variable is the engagement from the public, which includes a range of indicative features provided by Facebook. The indicative features used to measure engagement include the number of positive emotions, negative emotions, comments, and shares.

1.8 Definition of Terms

1.8.1 Conceptual Definition

COVID- 19

Coronavirus disease or COVID-19 is the disease caused by SARS-CoV-2, which was first identified in Wuhan, China, in December 2019.” CO” stands for corona, “VI” stands for virus and “D” for disease. Formerly, it is called 2019 novel coronavirus or 2019-nCoV (UNICEF et al., 2020). It causes cough, tiredness, fever, nasal congestion, runny nose, sore throat and diarrhoea. It is transmitted from person to person through respiratory droplets or touching the contaminated surface.

Ministry of Health

Ministry of Health (MOH), also known as Kementerian Kesihatan Malaysia (KKM), is responsible for the entire health system under the Malaysian government. Its objective is to “assist individual in achieving, sustaining and maintaining certain level of health status to further facilitate them in leading a productive lifestyle-economically and socially” (KKM, 2021).

COVID-19 post

Any post regarding the COVID-19 issue.

Non-COVID-19 Post

Any posts regarding issues other than COVID-19.

Post

Any messages published online via websites or social media (Cambridge Dictionary, 2021).

Social media engagement

Engagement refers to the interaction between and among an organisation and digital communities (Alonso-cañadas et al., 2020). For example, the engagement statistic can measure the efficiency of posting and how much the Facebook page connects with the fans (Klipfolio, n.d.).

Positive emotion

Positive emotion is an emotion to indicate a positive effect (American Psychological Association, n.d.-a).

Negative emotion

Negative emotion is any unpleasant emotion to indicate negative affect, for instance, anger, envy, sadness and fear (American Psychological Association, n.d.-b).

Comment

A comment is a message provided in response to the blog post or social media message (Carly Stec, 2020).

Share

The act of sharing the post with others.

Movement Control Order

Malaysia implemented MCO as a preventive measure to contain the coronavirus. The first phase of MCO started from 18 March until 31 March 2020 (Prime Minister's Office of Malaysia, 2020). It was then extended several times and ended on 4 May 2020.

Conditional Movement Control Order

CMCO started from 4 May 2020 until 9 June 2020 to reopen the national economy as the MCO implemented earlier had shown positive results (Malaysiakini, 2020). It was introduced following the decline of cases. During this stage, most economic sectors were allowed to reopen back but subjected to the compliance of SOP implemented by the government.

Recovery Movement Control Order

Malaysia entered into the RMCO phase between 10 June until 31 August. After that, it was extended until 31 December 2020 (The Star, 2020). However, since the cases number is still high, RMCO has been extended until 31 March 2021 (CNA, 2021).

MCO by state

On 11 January 2021, Prime Minister Muhyiddin Yassin announced that MCO would be reintroduced from 13 until 26 January 2021 for Malacca, Selangor, Penang, Johor, Kuala Lumpur, Putrajaya and Labuan. Later on 15 February, Prime Minister announced that MCO would be reimposed for Kelantan and Sibu from 16 until 29 January 2021 due to the increase in COVID-19 cases (Malay Mail, 2021). On 16 January 2021, the prime minister once again announced that MCO in Selangor, Johor, Penang and Kuala Lumpur would be extended until 4 March 2021 (CNA, 2021). At the same time, the other states including Kedah, Perak, Negeri Sembilan, Terengganu, Kelantan, Malacca, Pahang, Sabah as well as Putrajaya and Labuan would be reinstated back with CMCO. On 5 March 2021, MCO was lifted in Selangor, Johor, Penang and Kuala Lumpur. These states entered the CMCO phase as the National COVID-19 Immunisation Programme started one week before lowering the daily cases (The Straits Times, 2021). The different states entered different phases of MCO, CMCO, RMCO and EMCO based on the local COVID-19 situation in the respective states from 11 January 2021 to 31 May 2021

1.8.2 Operational Definition

COVID-19

All COVID-19 related posts on the Facebook official page of MOH during different phases of MCO from March 2020 to May 2021 were extracted to be analysed.

Ministry of Health

The Facebook page of the Ministry of Health (KEMENTERIAN KESIHATAN MALAYSIA) is one of the main channels of communication with the public. Therefore, the posts from the official Facebook page of MOH were extracted and examined.

COVID-19 post

COVID-19 posts will be recognized by conditional formatting feature in Microsoft Excel and through manual scanning the content of the posts. A glossary of COVID-19 words and phrases have been identified to aid in the screening process: COVID-19, SARS-CoV2, coronavirus, cluster, kluster, pandemic, pandemik, SOP, petugas, kematian, vaksin, ICU, We Serve With Love, COVID, Lock down, Bantu Sistem Kesihatan Negara, Stay At Home, Jaga Diri Jaga Keluarga, self-lock down, Kita Jaga Kita, social distancing, pecahan kes baharu, situasi semasa, pelitup muka, pusat kuarantin, self-isolate, self-quarantine, sukarelawan, Nilai R Naught, kontak rapat, taburan kes, kes positif, zon hijau, zon merah, zon kuning, face mask, face shield, frontliner, rangkaian jangkitan, katil ICU, kadar kebolehtangkitan, MAEPS, kontena, sanitizer, varian, transmisi, status risiko, ujian saringan, asymptomatic, case fatality rate, clinical trial, community spread, confirmed positive case, contactless, containment area, epidemic, essential business, essential services, flattening the curve, thermometer, herd immunity, incubation period, index case, national emergency, PPE, pre-symptomatic, symptom, symptomatic, communicable, contagion PUI, remdesivir, respirator, social distancing, super-spreader, ventilator, work from home, droplet

transmission, self-monitoring, drive-thru testing, shelter-in-place order, anti-viral medicine, pneumonia, immunocompromised, intubation, ban, contact tracing, distancing, lockdown, masks, N95, outbreak, epidemic, outbreak, pandemic, recovery, sanitizer, transmission, underlying conditions, fomite, contagious, virus, comorbidity, antigen, contact, variant, cough, disinfectant, PCR, R value, recovery plan, restricted movement, swab, mutation, hand hygiene, reinfection, clinical trial, variant, rapid antigen test, cordon sanitaire, zoonotic (Everyday Health, 2020; Merriam-Webster, 2020; Texas Medical Center, 2020; Yale Medicine, 2020; Community Development & Health Network, 2020; NPS MedicineWise, 2020; TIME, 2020; KKM, 2020).

In addition, any posts with the following hashtags were considered as COVID-19 related posts: #coronavirus, #Covid19, #StaySafeStayHome, #Lockdown, #WFH, #Workingfromhome, #flattenthecurve, #KitaJagaKita, #StayAtHome, #dudukrumah, #jomkita, #2019nCoV, #WuhanCoronavirus, #newnormal, #wahyourhands, #selfquarantine, #socialisolation, #stayhome, #quarantinelifelife, #staysafe, #telecommuting, #flatteningthe curve, #healthcareworkers, #healthcareheroes (best hashtags, 2021; media update, 2020; New Straits Times, 2020; THE SHELF, 2020; The Star, 2020).

Non-COVID-19 post

Post on other issues such as dengue, hypertension or the posts on greeting on any celebration, recruitment offers is considered non-COVID-19 posts.

Post

All posts released on the Facebook page of MOH between March 2020 and May 2021 were retrieved using the extraction tool, Facepager.

Social media engagement

Engagements of the public were measured by using the four metrics: positive emotions, negative emotions, number of comments and number of shares (Pang et al., 2021).

Positive emotion

The reactions "like", "love", "laugh", and "care" emotions were categorized as positive emotion.

Negative emotion

The reactions "sad" and "angry" were categorised as negative emotion.

Comment

The total comments for each post were extracted using the extraction tool, Facepager.

It includes all comments to the post but does not include replies to comments.

Share

The total number of shares for each post was extracted using the extraction tool Facepager.

Movement Control Order

Posts shared between 18 March 2020 to 3 May 2020 were considered MCO posts.

Conditional Movement Control Order

Posts shared between 4 May 2020 to 9 June 2020 were considered CMCO posts.

Recovery Movement Control Order

Posts shared between 10 June 2020 to 11 January 2021 were considered RMCO posts.

MCO by state

Posts shared between 11 January 2021 to 31 May 2021, were considered MCO by state posts.

1.9 Conceptual Framework

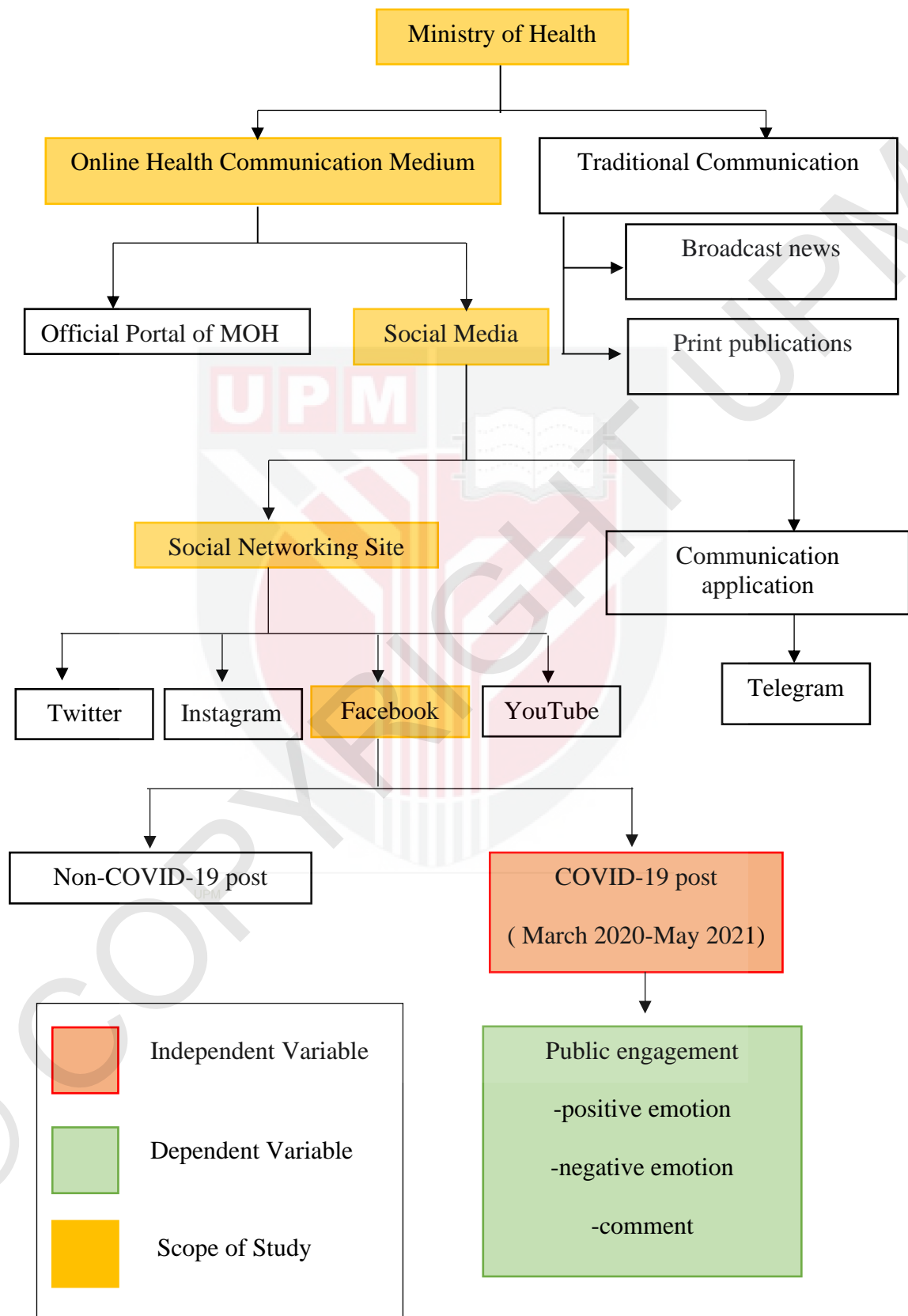


Figure 1.1: Conceptual Framework

CHAPTER 2

LITERATURE REVIEW

2.1 COVID-19 Outbreak in Malaysia

The first case of COVID-19 was reported in Malaysia on 25 January 2020. According to Rampal and Seng (2021), the first COVID-19 wave occurred between 25 January and 16 February 2020. During the first wave, the total number of cases was considered low, with 22 confirmed cases and no fatalities (MOH, 2020). Malaysia then implemented MCO as a preventive measure to contain the coronavirus. The first phase of MCO started from 18 March until 31 March 2020 (Prime Minister's Office of Malaysia, 2020). It was then extended several times and ended on 4 May 2020.

The second wave of infections began on 27 February and ended on 30 June 2020. It involved cases ranging from 23 to 197. The largest cluster was due to the religious gathering at a mosque in Sri Petaling, Kuala Lumpur. After two weeks of the gathering, the number of cases reached three digits, and MCO was announced to contain the virus (Ng et al., 2020). Later on, the third wave of infection began on 8 September 2020, with the most prominent contributor groups from Benteng Lahad Datu cluster in Sabah and Kedah's Tembok cluster (Rampal & Seng, 2021). Following MCO, CMCO was announced to begin from 4 May 2020 to 9 June 2020 to reopen the national economy as the MCO implemented earlier had shown some positive results

(Malaysiakini, 2020). During this stage, most economic sectors were allowed to reopen but subjected to the compliance of SOP implemented by the government. Malaysia entered the RMCO phase between 10 June and 31 August (New Straits Time, 2020). After that, it was extended until 31 December 2020 (The Star, 2020). However, since the cases number is still high, RMCO has been extended until 31 March 2021 (CNA, 2021).

From 3 January 2021 onwards until 6 June 2021, there were 610574 confirmed cases with 3291 deaths (WHO, 2021b). The number of COVID-19 cases on 29 May 2021 reached another high level as the cases reached 9020. Following the rapid increase of confirmed cases and the health care system on the verge of collapsing, the government announced a two-week total lockdown on 28 May 2021 to contain the COVID-19 pandemic.

2.2 Social Media for Health Communication

Kaplan and Haenlein (2010) viewed social media as a collection of web-based applications that allow users to generate content built on the ideological and technological foundations of web 2.0. The distinct feature that distinguishes social media from traditional media is that it enables users to comment, share, and contribute to the existing content (Norman, 2012). Al-Dmour et al. (2020) found that social media can promote healthy behavioural changes and public protection against COVID-19. Centers for Disease Control and Prevention (CDC, 2019) suggests that social media platform is an influential channel to reach target audiences. All government agencies and health authorities worldwide are trying to adopt and utilise social media for health

communication, especially during a crisis. For instance, the Indonesian government used Twitter to deliver the early warning of Tsunami and with the active "retweet" from the participants, the warning reached more than 4 million users (Chatfield et al., 2013).

The Community Guide (2019) defines health communication as utilising various communication tactics to encourage and educate individuals to make healthier decisions. Effective health communication can bring benefits such as increasing people knowledge, attitude and behaviours. Other than that, health communication can "increase the risk perception, reinforce positive behaviour, influence social norms, increase the availability of support and needed services as well as empower individuals to improve their health conditions" (Rural Health Information Hub, 2018).

2.3 Overview of Facebook

Mark Zuckerberg, a Harvard computer science student, invented and launched Facebook in February 2004. Facebook has grown to be one of the most valuable and influential companies in the early twenty-first century (Onion et al., 2021).

According to Statista (2021), Facebook is the most popular social network worldwide with 2740 million users as of January 2021 compared to 2291 million users on YouTube and 2000 million users on WhatsApp. Furthermore, a study conducted to identify the adoption of social media across US hospitals found out that out of 3371 hospitals, as high as 3351 hospitals (95%) own Facebook page compared to only 50.82% with a Twitter account (Griffis et al., 2014).

Khan et al. (2021) reveal that among health professionals, personal use of Facebook is the highest with 47% of regular users compared to 25% of health professionals usually using Twitter; however, for the professional use of social media, only 19% of health professionals use Facebook compared to 25% utilise YouTube and 21% use LinkedIn.

In Malaysia, Facebook is the most widely used site (91.7%) in 2020, compared to YouTube (80.6%), Instagram (63.1%) and Twitter (37.1%) (Malaysian Communications and Multimedia Commission, 2021).

A huge number of Facebook users, which are 27220,000 as of April 2021, accounted for 81.3% of the entire population in Malaysia (NapoleonCat, 2021). This figure shows that Facebook is a great platform to be studied due to its high number of users. In addition, most users are in the age range of 25 to 34 years, and around 53.4% of users are men.

Facebook provides a range of reactions for users to express their feelings towards the post. This includes "like", "love", "laugh (haha)", "surprise (wow)", "sad", and "angry". In April 2020, Facebook introduced the new reaction "care" with a smiley face-hugging a heart to allow people to send a virtual hug to one another as a way to show support during the COVID-19 crisis (Search Engine Journal, 2020). The wide range of reactions enables the users to express their emotional feelings towards the particular posts.

2.4 Engagement in Social Media

One of the tremendous benefits of social media compared to traditional media is that it provides a chance to interact, which is essential for effective communication. The engagement from the users, including access, like/dislike, share and comment, showed that engagement could be used as a measure of online advertisement effectiveness (Tucker, 2011, as cited in Alhabash & McAlister, 2015). It is vital to encourage engagement from the public to understand the public concern and priorities. Government should promote engagement from people to assist individuals in coping with the crisis and improving government actions (United Nations, 2020).

In a study conducted to examine the viral behavioural intention from Facebook and Twitter users, it was found that data for liking, sharing and commenting were significantly different, confirming that they are more likely to "like" than to "share" or "comment" with the assumption that sharing or commenting is more cognitively demanding than liking.

For some previous studies on Facebook, the researchers only collected the engagement data regarding the total number of reactions, number of shares, and number of messages left. Therefore, the different responses were not studied in detail. However, in the study conducted in Macao to understand different types of engagement levels in government social media, the authors have categorised the engagement into four metrics, which were positive emotions equal to the sum of likes, love, laugh and care emotions; negative emotions were the sum of angry and sad emotions, number of comments and number of shares (Pang et al., 2021).

A previous study to understand the health information engagement factors among users on the Facebook page of MOH has found that health education posts, risk communication posts, posts in the afternoon or evening and video format were significantly associated with a good engagement rate (Rahim et al., 2019). In addition, Card et al. (2018) reported that higher engagement could be observed to be associated with photos, video and links. This finding was in line with another study which revealed that video posting garnered 25% more likes than photo posts, whereas texts and link posts received 31% and 37% fewer likes (Kite et al., 2016).

2.5 MOH's Website and Official Social Media

MOH plays an active role in disseminating COVID-19 related information to Malaysians. There are various ways to access information. The portal Kementerian Kesihatan Malaysia: COVID-19 MALAYSIA can be accessed via the link: <http://COVID-19.moh.gov.my/>, official portal KEMENTERIAN KESIHATAN MALAYSIA can be accessed via <https://www.moh.gov.my/>, and the official portal of MyHEALTH Kementerian Kesihatan Malaysia can be accessed via <http://www.myhealth.gov.my/en/>.

Other than the official portal, MOH is active in most of the popular social media platforms in Malaysia, including Facebook (@kementeriankesihatanmalaysia), Twitter (@KKMPutrajaya) and Instagram (@kementeriankesihatanmalaysia). Social media for government authorities became popular, and MOH joined Facebook in March 2010 and Twitter in March 2012. In January 2013, MOH launched an Instagram account. Among these three social media platforms, it has the highest number of

followers on Facebook with 4907329 followers and 3861177 people like this page at the point of writing. While on Twitter, the official account of MOH, KKM Malaysia, has around 1.3 million followers and 1.2 million followers on Instagram.

The number of fans on the Facebook page of MOH is increasing fast, increasing by 5454 people per day, 41707 per week and 152072 per month (Socialbakers, 2021). Although KKM has many other Facebook pages such as Kementerian Kesihatan Malaysia-Portal Myhealth (myhealthkkm) owned by the health education division and CPRC Kebangsaan- Kementerian Kesihatan Malaysia (@CPRCKebangsaanKKM), they are not verified profile with no verified badge display next to that particular page. In addition, MOH also owns an official account on YouTube with 35 thousand subscribers.

Besides, the Ministry of Foreign Affairs (2021) reported that MOH has two official telegram account. The first one is Crisis Preparedness and Response Center (CPRC) at <https://t.me/cprckkm> with 893.7 k subscribers, and another one is Sihat Milikku at <https://t.me/sihatmilikbersama> with 71732 subscribers.

2.6 Data Extraction

Facepager is a tool to retrieve publicly available social media data, such as YouTube, Facebook and Twitter. It works with the principle of Application Program Interface (API) and web scraping (Jünger, J., & Keyling, 2019). The platform operator, such as Facebook or Twitter, will provide the API. API can help one application fetch data of interest from one another; for instance, instead of showing a general number of

"like" on the Facebook page, the API will return an exact number of reactions (Snurb, 2013). Furthermore, this application has a pre-set number that makes the data extraction easy and simple (Jünger, 2021). The pre-set button can be found in the menu bar, where the users only need to select the parameters required.

Facepager gets the data by assembling URLs from the node data. Then the information is requested from the web using these URLs before the data is exported (Jünger, 2020).

This tool has been used in many studies. For example, in a research conducted to understand the outreach effort of public health authorities and public health response during the COVID-19 outbreak, the researchers used this tool to extract data from three Facebook pages, precisely Facebook page of MOH in Singapore, Centers for Disease Control and Prevention (CDC) in the United States of America and United Kingdom (Raamkumar et al., 2020). In addition, Goldgruber et al. (2018) also use this tool to extract Facebook posts to understand social media use for crisis communication, specifically during the environmental disaster.

CHAPTER 3

METHODOLOGY

3.1 Study Design

This was a cross-sectional study in which all posts from the official MOH's Facebook page in Malaysia during different phases of MCO from March 2020 to May 2021 were extracted.

3.2 Method

All posts uploaded by the MOH to the Facebook account KEMENTERIAN KESIHATAN MALAYSIA during all phases of MCO from March 2020 to May 2021 were extracted using the Facepager application.

The Facebook “post” characteristics were classified into type, time, and day of posts. There were four types of posts, which were text (status), photo, video and link, whereas the time of posts was classified into early morning post (0000H-0759H), morning post (0800H-1159H), afternoon post (1200H-1759H) and evening post (1800H-2359H). The day of posts was categorised into weekday posts and weekend posts. The classification is based on previous studies (Card et al., 2018; Rahim et al.,

2019). The statistic on the number of reported COVID-19 cases will be obtained from Statista (2021a).

Most studies evaluated the reactions of the public with the total metric reactions. However, the total reactions cannot indicate the emotional changes during different pandemic stages. Thus, in this study, the engagements were based on the research by Pang et al. (2021), where they were categorised into four types, namely:

- Positive emotion, which is the total count of like, love, laugh and care emotions
- Negative emotion, which is the total count of angry and sad emotions
- Number of comments
- Number of shares

According to Pang et al. (2021), the classification of positive and negative emotions can help understand users' sentiment, and the "surprise" emotion was excluded as it did not mean positive or negative feelings.

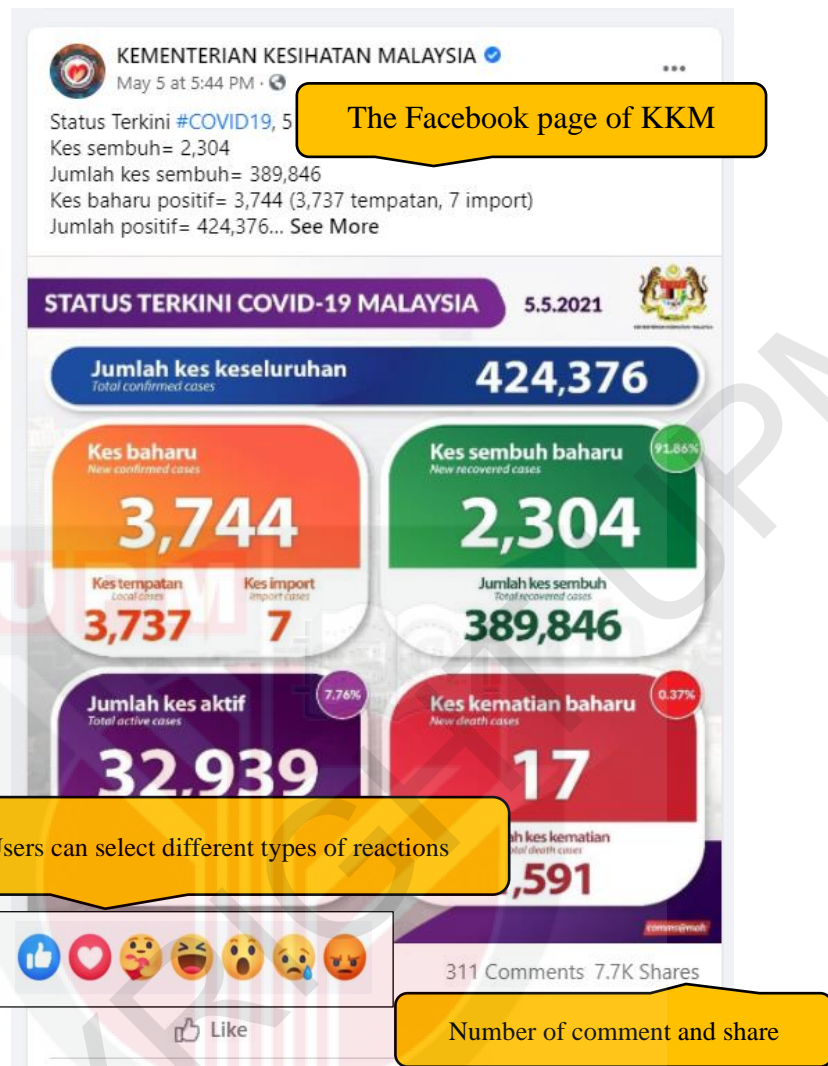


Figure 3.1: A sample of COVID-19 Facebook post by Kementerian Kesihatan Malaysia

The average value of the engagement metrics was aggregated by the phase of MCO, allowing the trends to be observed and evaluated at different times during the pandemic. The timeframe chosen was from March 2020 to May 2021 because it covered various phases of MCO, including MCO, CMCO, RMCO and MCO by state. It follows the pandemic's progression from the single-digit number of confirmed COVID-19 cases in Malaysia to a four-digit number of confirmed COVID-19 cases. Most of the social media research on COVID-19 was conducted between December 2019 and April 2020. Still, as our country has entered another pandemic phase and

keeps hitting a new high as in May 2021, this study can help us understand how the government uses social media to disseminate information during different pandemic phases and tell us the trend of public engagement.

3.3 Data Extraction

Data extraction was carried out using the extraction tool, Facepager version 4.2.10. All relevant data such as post messages, posts' time, and reactions, including the total number of like, love, care, laugh (haha), sad and angry, number of comments, and shares were extracted. The data was then exported to Microsoft Excel for analysis. The extraction process used the pre-set key with the following parameter: id, message, created time, permalink URL, media type, comments total count, total shares count, reactions total count, like total count, love total count, laugh total count, sad total count, angry total count. One thing worth noting is that the "like" reaction count extracted includes both like and care reactions (Facebook, 2021). Due to a large amount of data, the data was extracted on a monthly basis using the parameters "since" and "until".

3.4 Data Analysis

The data were analysed with SPSS version 26.0. Normality test was conducted for all continuous data by Shapiro Wilks test before proceeding with any parametric or non-parametric test. For the first objective, descriptive statistics were used to present the data. The characteristics of COVID-19 posts during different phases of MCO from March 2020 to May 2021 were categorical data. Thus, they were presented in frequency, percentage and mean post per day (MPPD). For the second objective, the

frequency of COVID-19 posts shared by MOH on the Facebook page during different phases of MCO from March 2020 to May 2021 were categorical data. Thus they were presented in terms of frequency and percentage.

For the third objective, the correlation between COVID-19 post and COVID-19 reported cases during different phases of MCO from March 2020 to May 2021 was determined by Pearson correlation test or Spearman correlation test depending on the normality of data.

The fourth objective was to determine the users' engagement regarding COVID-19 posts on Facebook during different phases of MCO from March 2020 to May 2021. The engagements were measured using four metrics: positive emotions, negative emotions, comments, and shares. Since they are all numerical data, so they were presented as mean (SD) or median depending on their normality distribution. Kruskal Wallis test was used to determine if there were any significant differences for different types of engagement during different phases of MCO from March 2020 to May 2021.

The objectives of this study were presented with the following method:

1. To determine the characteristic of COVID-19 posts during different phases of MCO from March 2020 to May 2021

Categorical data: Frequency and percentage

2. To determine the frequency of COVID-19 related posts during different phases of MCO from March 2020 to May 2021

Categorical data: Frequency and percentage

3. To determine if there are any correlation between COVID-19 posts and COVID-19 reported cases during different phases of MCO from March 2020 to May 2021

Normally distributed data: Pearson correlation

Non-normally distributed data: Spearman correlation

4. To determine if there are any significant differences in users' engagement regarding COVID-19 posts during different phases of MCO from March 2020 to May 2021

Normally distributed data: One Way Anova

Non-normally distributed data: Kruskal Wallis

3.5 Inclusion Criteria

All COVID-19 posts from the MOH's official Facebook account during different phases of MCO from March 2020 to May 2021, including text, photo, video, and the link shared, were included. In addition, all posts written in Bahasa Melayu and English language were also included.

3.6 Exclusion Criteria

Any app posts, events, polls, and events unrelated to COVID-19 were screened manually to exclude from this study.

3.7 Quality Control

The data extracted from the Facepager were cross-checked on a scrolling basis on the Facebook page on MOH to ensure the information was correct. Since posts that were too long ago were difficult to access using scrolling basic, the permanent links of the posts were extracted using Facepager to access the posts. The fetching status and status log during the extraction process were examined to ensure no missing data. Any error codes were directed to the Facebook Developer Page to help identify the issue.

3.8 Ethical Consideration

The ethical application was exempted as the data was extracted from the publicly accessible account.

3.9 Research Flowchart

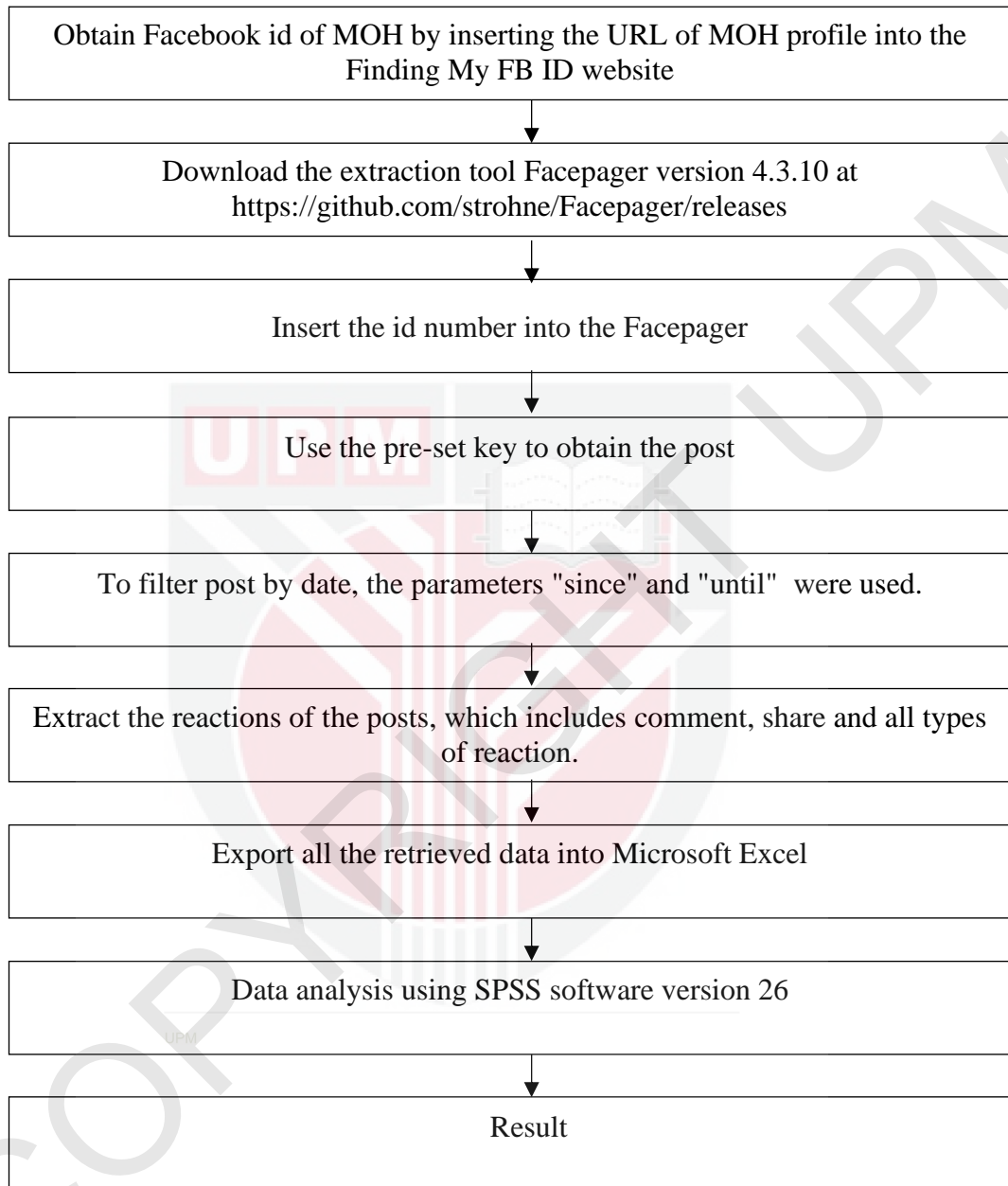


Figure 3.2: Research Flowchart

CHAPTER 4

RESULTS

4.1 Characteristics of the Posts

4.1.1 Type of Post During Different Phases of MCO

A total number of 2720 COVID-19 posts was identified from the MOH's official Facebook page from March 2020 to May 2021.

Figure 4.1 shows the distribution of different post types during all phases of MCO. During all phases of MCO, the most common type of post was photo (n= 1842, 68%), followed by video post (n= 590, 22%), link post (n=180, 6%) and text post (n= 108, 4%).

Percentage of different types of posts

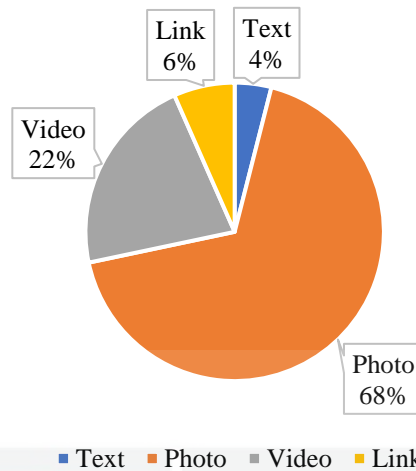


Figure 4.1: Percentage of different types of posts during the entire course of different phases of MCO

Figure 4.2 presents the mean post per day (MPPD) for different types of posts during different phases of MCO. CMCO had the highest MPPD for text posts, which is 0.51 text posts per day, compared to 0.30 text posts during MCO by state, 0.19 text posts during RMCO and 0.16 text posts per day during MCO. MCO by state ranked the highest for the photo post as the MPPD is 6.71, followed by MCO with 3.43 MPPD, CMCO with 3.34 MPPD and RMCO with 3.06 MPPD. The video post arranged in ascending order are as follow: RMCO (MPPD=1.14), CMCO (MPPD=1.23), MCO (MPPD=1.49) and MCO by state (MPPD=1.70). MCO had the lowest link post (MPPD=0.18), compared to RMCO (MPPD=0.22), CMCO (MPPD=0.34) and MCO by state (MPPD=0.83).

Mean post per day according to different types of post

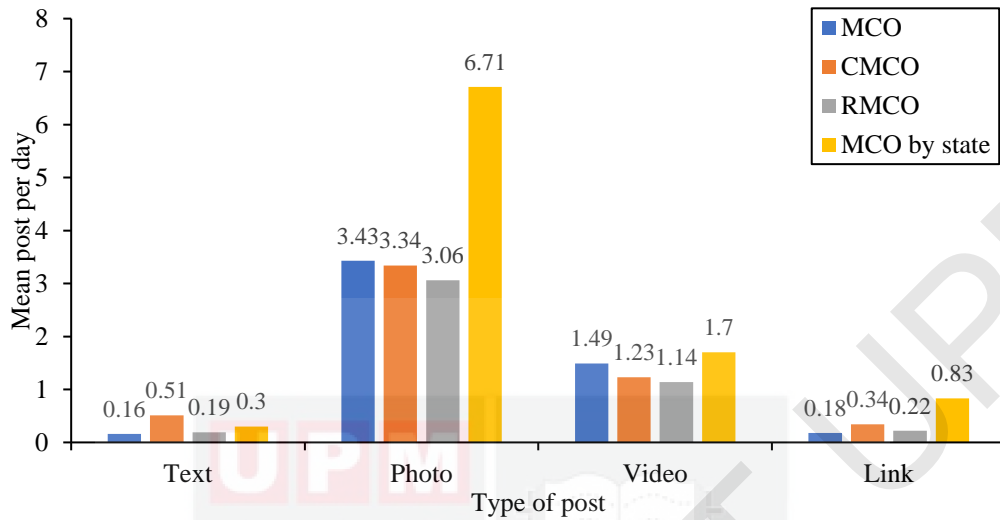


Figure 4.2: Mean post per day for different types of posts during different phases of MCO

4.1.2 Time Posted During Different Phases of MCO

Figure 4.3 illustrates the percentage of posts based on the time posted during all phases of MCO. The afternoon had the most posts (n=1227, 45%), followed by the evening (n= 1169, 43%), and the morning (n= 272, 10%). Early morning posts had the lowest percentage of posts (n=52, 2%).

Percentage of post according to time posted

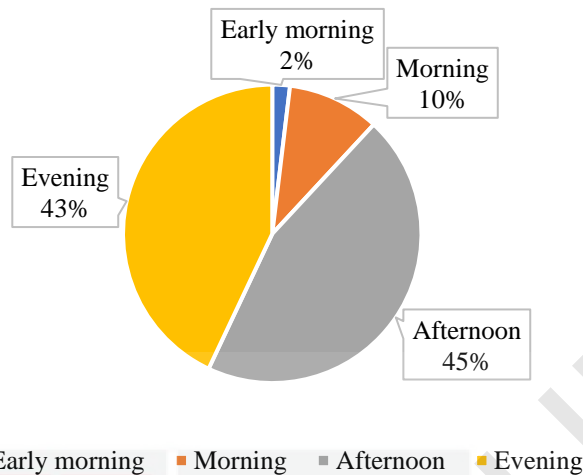


Figure 4.3: Percentage of posts according to time posted during the entire course of different phases of MCO

Figure 4.4 shows the MPPD based on the time posted during different phases of MCO. MCO had the highest MPPD in the early morning (0.22), whereas RMCO had the lowest MPPD in the early morning (0.05). MCO by state recorded the highest (MPPD=1.16) for the morning post, followed by MCO (MPPD=0.80), RMCO (MPPD=0.34) and CMCO (MPPD=0.17). MCO by state had the highest morning and evening post with MPPD= 1.16 and MPPD= 4.98, respectively. CMCO recorded the highest afternoon post (MPPD= 4,20)

Mean post per day according to time posted

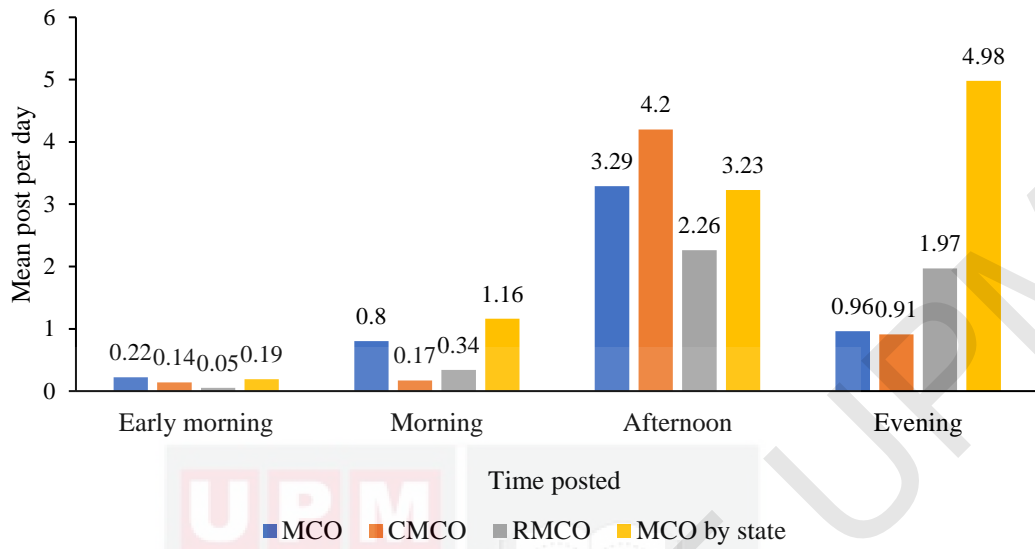


Figure 4.4: Mean post per day according to time posted during different phases of MCO

4.1.3 Day Posted During Different Phases of MCO

Figure 4.5 shows the percentage of days posted during the MCO period. The weekday had more posts (n= 2022, 74%) than the weekend (n=298, 26%).

Percentage of post according to day posted

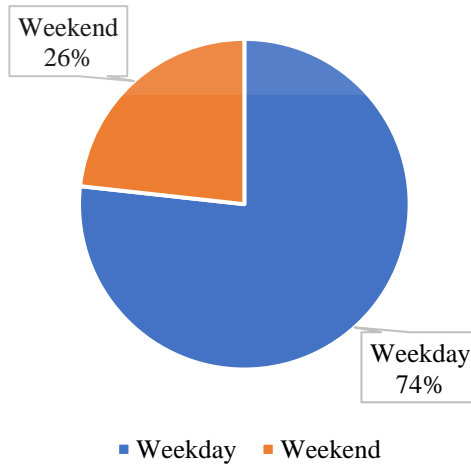


Figure 4.5: Percentage of posts according to day posted during the entire course of different phases of MCO period

Figure 4.6 shows that MCO by state had the highest weekday and weekend post with the 7.08 MPPD and 2.47 MPPD, respectively.

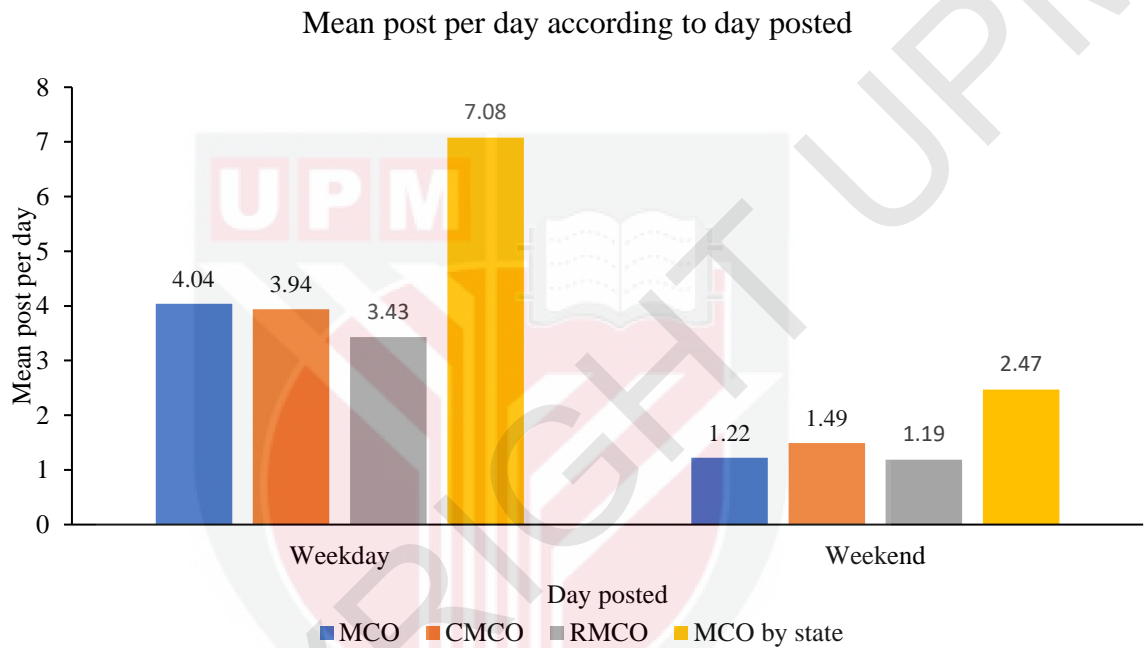


Figure 4.6: Mean post per day according to day posted during different phases of MCO

4.2 Frequency of COVID-19 Post During Different Phases of MCO

Figure 4.7 presents the percentage of COVID-19 posts during different phases of MCO. Generally, MCO by state recorded the highest number of posts (n=1270,47%), followed by RMCO (n=1002, 37%), MCO (n=258, 9%), and CMCO (190, 7%).

Percentage of post according to different phases of MCO

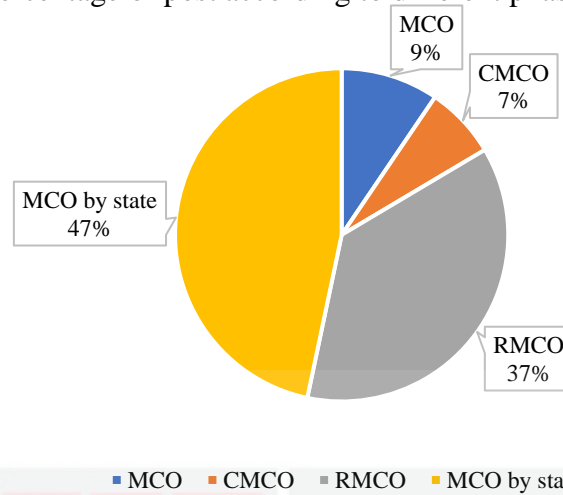


Figure 4.7: Percentage of post according to different phases of MCO

The distribution of weekly frequency of posts in Figure 4.8 shows that the distribution during the first three phases of MCO was relatively equal compared to the MCO by state.

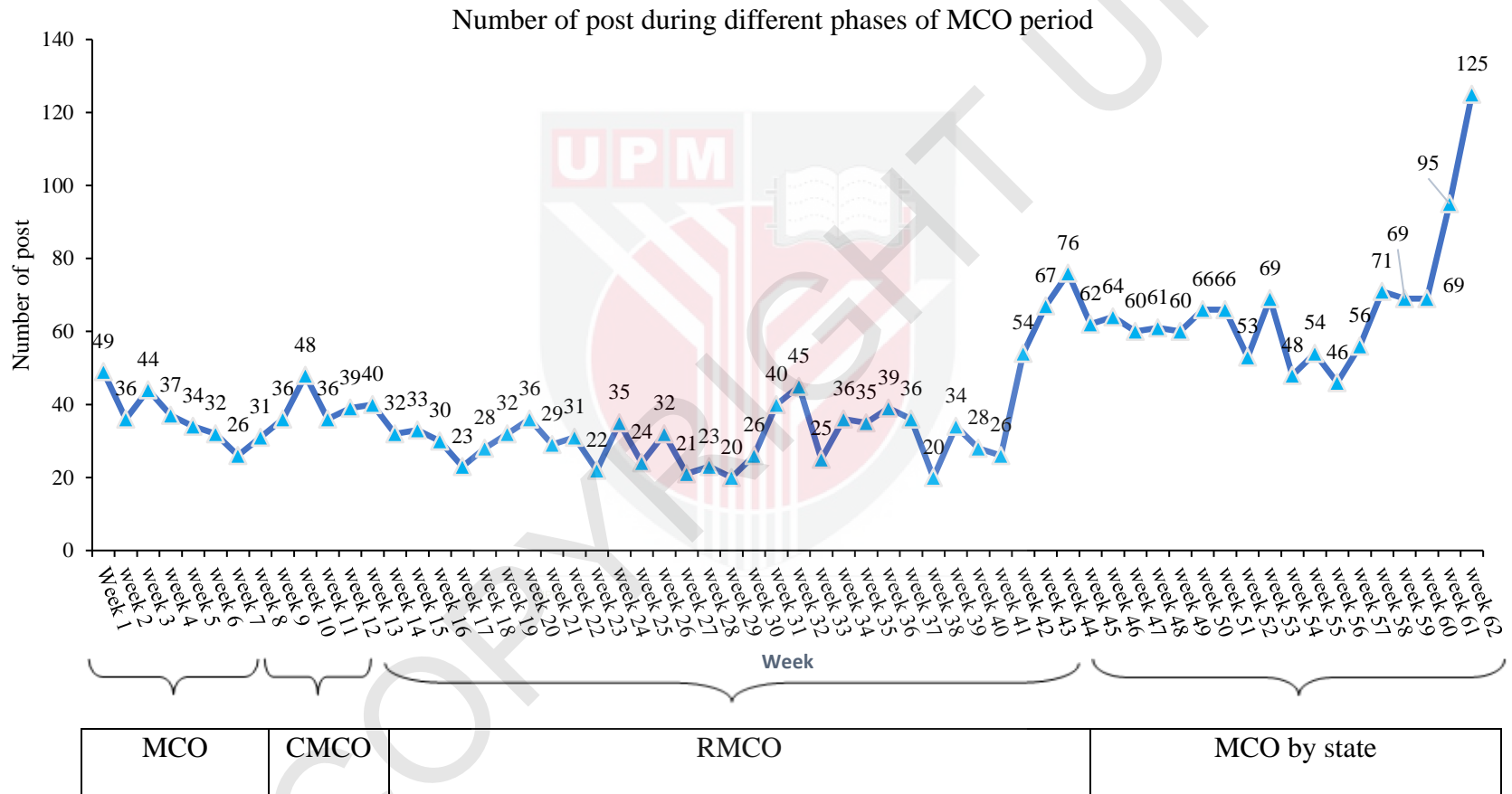


Figure 4.8: Weekly frequency of posts during different phases of MCO

4.3 Correlation Between COVID-19 Posts and COVID-19 Cases During Different Phases of MCO

Spearman's correlation test was used to determine the correlation between the number of COVID-19 posts and the number of COVID-19 cases because it involved two continuous data sets. The normality test revealed that the data was not normally distributed.

Table 4.1 presents Spearman's correlation statistics. There was no significant correlation between the COVID-19 posts and COVID-19 cases during MCO and CMCO, $p > 0.05$. However, there was a significant correlation between the COVID-19 posts and COVID-19 cases during RMCO and MCO by state at $p < 0.05$. The bivariate correlation between the COVID-19 posts and COVID-19 cases during RMCO is positive and poor, $r = 0.153$. In addition, there was a positive and fair correlation between the COVID-19 posts and COVID-19 cases during MCO by state, $r = 1.416$. This indicates that when there were more COVID-19 cases, there were more COVID-19 posts or vice versa during RMCO and MCO by state.

Table 4.1: Correlation between weekly COVID-19 post and weekly COVID-19 cases during different phases of MCO period

COVID-19 post	COVID-19 case**	
	Spearman's correlation, r	P value
MCO	0.216	0.135
CMCO	-0.038	0.830
RMCO	0.153	0.024*

MCO by state	0.416	<0.001*
--------------	-------	---------

NOTE:

* Statistically significant at $p < 0.05$

** COVID-19 case according to different phases of MCO

4.4 Engagement of the Users During Different Phases of MCO

4.4.1 Comparison for the Positive Emotion

The highest median of positive emotions was recorded during CMCO (median=10022), followed by RMCO (median=7217) and MCO (median=6096). MCO by state had the lowest median value (median=5628). The Kruskal Wallis test showed a significant difference between the different MCO phases with positive emotion ($X^2 = 23.772$, $p < 0.001$). Table 4.2 presents the significant pair. The test showed a significant difference between positive emotion during MCO and CMCO, $p = 0.038$, CMCO and MCO by state, $p = 0.002$, RMCO and MCO by state, $p = 0.003$.

Table 4.2: Comparison for the positive emotion during different phases of MCO

MCO phase	Median (IQR)	X^2	P value
MCO	6096 (9421) ^a	23.772	<0.001*
CMCO	10022 (16053) ^b		
RMCO	7217 (12386) ^c		
MCO by state	5628 (17243)		

NOTE:

^a Significant as compared to CMCO, $p = 0.038$

^b Significant as compared to MCO by state, $p = 0.002$

^c Significant as compared to MCO by state, $p=0.003$

* Statistically significant at $p<0.05$

4.4.2 Comparison for the Negative Emotion

The median for negative emotions during MCO was 132, and it dropped to 60 during CMCO before rising back to 131 during RMCO. It further declined to 97 during MCO by state. The Kruskal Wallis test showed a significant difference between the different MCO phases with negative emotion ($X^2= 10.426$, $p< 0.05$), as illustrated in Table 4.3. The significant pairs identified were negative emotion between MCO and CMCO at $p=0.01$, CMCO and RMCO at $p<0.001$, CMCO and MCO by state, $p<0.001$.

Table 4.3: Comparison for the negative emotion during different phases of MCO

	Median (IQR)	X^2	P value
MCO phase			
MCO	132 (788) ^a	10.426	0.015*
CMCO	60 (233) ^b		
RMCO	131 (586)		
MCO by state	97 (719)		

NOTE:

^a Significant as compared to CMCO, $p=0.01$

^b Significant as compared to RMCO and MCO by state, $p<0.001$

* Statistically significant at $p<0.05$

4.4.3 Comparison for the Number of Comments

Table 4.4 shows the median and the result of the Kruskal Wallis. The number of comments during MCO by state was the lowest (median=154), followed by CMCO (median=203), MCO (median=282) and RMCO (median=296). The Kruskal Wallis test showed a significant difference between the different MCO phases with the number of comments ($X^2= 70.353$, $p<0.001$). The significant pair identified were comments between MCO and MCO by state at $p<0.001$, CMCO and MCO by state at $p=0.002$, RMCO and MCO by state at $p<0.001$.

Table 4.4: Comparison for the number of comments during different phases of MCO

	Median (IQR)	X^2	P value
MCO phase			
MCO	282 (630) ^a	70.353	<0.001*
CMCO	203 (1080) ^b		
RMCO	296 (1061) ^c		
MCO by state	154 (855)		

NOTE:

^a Significant as compared to MCO by state, $p<0.001$

^b Significant as compared to MCO by state, $p=0.002$

^c Significant as compared to MCO by state, $p<0.001$

4.4.4 Comparison for the Number of Shares

The median for the number of shares decreases in the following order: MCO (median=1290), CMCO (median=988), RMCO (median=682) and MCO by state (471). The Kruskal Wallis test showed a significant difference between the different MCO phases with the number of shares ($X^2=69.149$, $p<0.001$). The significant pair

identified were number of shares between MCO and CMCO at $p=0.012$, MCO and RMCO at $p<0.001$, MCO and MCO by state at $p<0.001$, CMCO and MCO by state at $p<0.001$ as well as RMCO and MCO by state at $p<0.001$.

Table 4.5: Comparison for the number of shares during different phases of MCO

	Median (IQR)	X^2	P value
MCO phase			
MCO	1290 (1862) ^a	69.149	<0.001*
CMCO	988 (1252) ^b		
RMCO	682 (3312) ^c		
MCO by state	471 (2379)		

NOTE:

^a Significant as compared to CMCO at $p=0.012$, RMCO and MCO by state at $p<0.001$

^b Significant as compared to MCO by state, $p<0.001$

^c Significant as compared to MCO by state, $p<0.001$

CHAPTER 5

DISCUSSION

5.1. Characteristics of the Posts

5.1.1 Type of Post During Different Phases of MCO

Given the widespread adoption of social media by health organisations for health promotion, public health communication conveyance, and organisational promotion activities, the primary challenges in creating an interactive and engaging social media environment are the need to understand the dynamics of the Facebook algorithm in order to create an appropriate type of post, to recognise audience behaviours in order to disseminate health messages at times that are most likely to achieve high engagement rates and to overcome the inherent limitations of social media (Heldman et al., 2013). During all phases of MCO, the most common type of post was photo, followed by video, link, and text. This finding was consistent with the previous study by Rahim et al. (2019) conducted before the COVID-19 pandemic to examine the usage of Facebook engagement in health information sharing. The study also found that the richness of interactive video posts presented by the MOH via live streaming of daily COVID-19 situational has somehow stimulated interactive behaviours (Veale et al., 2015) that are likely to be generated by the factors of

“authority” and “source of evidence” (Fritch & Cromwell, 2001) appeals which influence the way people perceive health information.

On average, there were 6.71 photo posts per day during MCO by state, which was the highest compared to all other MCO phases. MCO by state also recorded the highest video post (MPPD=1.70) and link post (MPPD=0.83). This indicates that there were more health information updates during this phase which coincides with the resurgence of COVID-19 cases. One of the methods used by MOH to improve engagement was providing risk-related information that could change public perception and stimulate a positive response (Huurne & Gutteling, 2008). In order to engage with internet users on Facebook effectively and strategically, MOH has seen to provide relevant and updated educational content for its audience, such as infographic posters on steps to undergo home surveillance, action to be taken if detected positive for COVID-19, ways to handle stress during the quarantine period, explanation on the vaccine, update on the mutated strain of virus, etc. In addition, the study also found that MOH published videos to update the situation in the hospital and interviews with the patients to share their stories. This is according to media richness theory and past study (Cisco System, 2022), which suggested that video traffic will account for more than 80% of all internet consumption globally in the next three years.

CMCO had the highest average daily text post rate, at 0.51 per day, compared to 0.30 per day during MCO by state, 0.19 per day during RMCO, and 0.16 per day during MCO. This is because CMCO was implemented after the cases began to decline. Since some industries were allowed to reopen gradually, the authority posted regularly in text form to raise users’ awareness of the continuity in compliance to SOP. One

of the most commonly utilised on FB pages was text status updates than high media-rich posts during the CMCO period. This could be explained by the fact that health organisations prefer internet users to consult the health information on their health portal (www.moh.gov.my). Therefore, FB acts as a funnel to direct internet users to the websites.

5.1.2 Time Posted During Different Phases of MCO

The highest number of posts were posted in the afternoon (n=1227, 45%), followed by evening (n= 1169, 43%), and morning (n= 272, 10%). Early morning had the lowest percentage of posts (n=52, 2%). This is because MOH made daily updates on new COVID-19 cases, cluster breakdown, and fatality rate mostly in the afternoon or evening. This finding contradicts the previous study (Rahim et al., 2019), which reported that most posts were uploaded in the early morning before office hours. This situation could be explained by the fact that daily update on the current state of COVID-19 occurs at approximately 5 pm.

Nevertheless, the time of post posted should be strategically planned and scheduled to maximise public engagement. Posts can be shared when most internet users are online to help disseminate health messages effectively. For instance, previous research discovered that posts shared during working hours or after working hours reach fewer people than those shared in the morning (Card et al., 2018). On the other hand, another study demonstrated that posts made in the afternoon and evening gained significant positive engagement (Rahim et al., 2019). The contradictory findings in this study could be explained by the fact that the majority of internet users have access

to the internet at all times due to the work from home (WFH) policy implemented since MCO; consequently, afternoon and evening hours are the best times for them to surf the internet and keep up with COVID-19 daily updates.

5.1.3 Day Posted During Different Phases of MCO

Most posts were published during weekdays (n=2022, 74%) compared to the weekend (n=698, 26%). MCO by state has the highest post for both weekdays and weekends, with 7.08 MPPD and 2.47 MPPD, respectively. This is consistent with the trend shown by a past study (Rahim et al., 2019) where most FB posts were posted during weekdays than the weekend.

5.2 Frequency of COVID-19 Post During Different Phases of MCO

Among all phases of MCO, MCO by state had the most number of posts, accounting for nearly half of the posts. The weekly COVID-19 post on the Facebook page was distributed evenly during the MCO and CMCO. It can be seen that when approaching the end of RMCO, where the COVID-19 cases began to increase again, more posts were uploaded. The total number of posts during MCO by state was relatively higher than those during other phases. The number of posts peaked on week 62 during MCO by state as the reported COVID-19 case set a new high record. This situation could be explained by the fact that the authority used the platform more frequently to communicate various health information, such as the updates on the vaccine, appreciation of the effort of frontliners, resources available, and reminders to the public to follow SOP. The greatest number of COVID-19 posts was uploaded on

MCO by state in the hope of increasing public awareness. This finding contrasts with previous studies, where the most COVID-19 cases were published in March 2020, more than a month after Taiwan's first confirmed case (Chu et al., 2020). MCO, which was started in March 2020, was the critical period for the health authority to increase public awareness of the pandemic. It is vital to provide clear and accurate information to avoid fear (Fegert et al., 2020). Therefore, the health authority should be more prepared by spreading more messages to reassure the public during the early stages of the pandemic by establishing an effective strategy to engage with internet users during particular events or occasions.

It has been demonstrated that a social media account or profile that actively shares content engages more people and attracts more engagement from users. For example, Veale et al. (2015) found that making a regular posting (median of 46 posts per month) on Facebook was one of the strategies used by the top ten ranked Facebook profiles to engage more users. In view of this, a past study has also shown that increasing an educational post improves a population's health literacy, fosters social support, reduces stigmas and myths, and improves personal health management long-term (Bounsanga et al., 2016).

5.3 Correlation Between COVID-19 Posts and COVID-19 Cases During Different Phases of MCO

The Spearman correlation test showed a significant correlation between COVID-19 posts and COVID-19 cases during RMCO and MCO by state since the p-value is <0.05 . This is similar to the study by Chu et al. (2020), where the cumulative

COVID-19 posts per week from the medical centres in Taiwan was correlated with the confirmed COVID-19 cases per week (Pearson correlation coefficient=0.56, p=0.01).

The significant correlation between COVID-19 post and COVID-19 cases during RMCO and MCO by state could indicate that as the pandemic progresses, the government is more prepared to utilise the social media to remind internet users to follow SOP. It also suggests that the authority emphasised the outbreak during the late phase of the pandemic.

In contrast, there was no significant correlation between the COVID-19 cases and COVID-19 posts during MCO and CMCO. This could imply that the authority did not fully utilise the platform to disseminate information to users during the early stage of pandemic. MCO was the crucial phase taken by the government to break the chain of infection. As a result, health authority should actively address the health issue from the beginning of the disease outbreak. When the virus first appeared and hit our country, the general public was terrified. They are seeking information from various perspectives in order to better understand the diseases (Llewellyn, 2020). Thus, MOH plays an important role in communicating health advice to the public as a reliable and trustworthy source.

5.4 Engagement of the Users During Different Phases of MCO

5.4.1 Comparison for the Positive Emotion

The median positive emotion was the highest (median= 10022) during CMCO compared to other phases. This situation could be explained as the number of COVID-19 cases started to drop back to 2 figures compared to 3 figures during CMCO. CMCO, as a preparation phase for Malaysian to return to normal, made the public felt a sense of relief as the government started to relax some measures of MCO. As a result, most economic activities were allowed to resume their normal operations. In contrast, MCO by state recorded the lowest median positive emotions as this was when the reported COVID-19 cases rose again, and the SOP started to be tightened. The decreasing trend of the positive emotions from CMCO onwards suggests that the prolonged pandemic and the lockdown period have caused the public to lose confidence in the government's ability to handle the crisis. This explains why there were significant differences in positive emotions between MCO and CMCO phase at $p=0.038$, CMCO and MCO by state at $p=0.02$ and RMCO and MCO by state.

An educational or risk communication post appealing to emotions such as curiosity, fear, and anxiety can change public perception and encourage behavioural actions (Rahim et al., 2019). The interaction between MOH and the general public could indicate that the health information is successfully disseminated and received. It has been demonstrated that two-way participation and engagement between the general public and the health organisation increases the likelihood of behaviour change (Strecher et al., 2008).

5.4.2 Comparison for the Negative Emotion

The negative emotion was the lowest (median=60) during CMCO. In comparison, MCO had the most negative emotions (median=132). Relatedly, the expression of negative emotions (i.e. more intimate information) is perceived as less acceptable in interactions with acquaintances on the situation (Chaikin & Derlega, 1974). Various measures taken to contain the virus, such as social isolation, increased family stress, and lack of support resources, contribute to mental health issues during the pandemic (Fegert et al., 2020). Wang et al. (2020) also suggested that more than half of the respondents in their study reported moderate to severe psychological impact during the initial phase of the COVID-19 pandemic. The same study also pointed out that specific preventive measures and current health information were linked to lower stress, anxiety, and sadness levels.

5.4.3 Comparison for the Number of Comments

The number of comments during MCO by state was the lowest (median= 154) compared to all other phases. Commenting on Facebook is a type of engagement through deliberate messaging among internet users and Facebook account admin, at the same time, convey user attitudes and opinions towards the particular message. However, the comment section was disabled in some of the Facebook posts during the MCO by state period by MOH with the claim to reduce unnecessary chaos and miscommunication. This action caused dissatisfaction among internet users, and some accused MOH of being unprofessional (Buletin TTKM, 2021). Chen et al. (2020) suggested that health authorities should react to the users' queries to enhance public interaction and boost involvement. It is important to remain open and friendly to increase public engagements (Men & Tsai, 2015).

5.4.4 Comparison for the Number of Shares

The number of shares showed a downward trend from MCO (median=1290), CMCO (median=988), RMCO (median=682) to MCO by state (471). The feature of “share” indicates the topic's relevancy to the internet users. It shows the intention of users to disseminate the information to their social networks (Cho et al., 2014), which would influence other audiences' evaluations of the quality and credibility of the original message (Gearhart & Kang, 2014). The reduced trend of “share” features among users throughout MCO phases might be explained by users' exhaustion towards the prolonged pandemic and mental anguish as COVID-19 lockdown continues over the year.

CHAPTER 6

CONCLUSION, RECOMMENDATION AND LIMITATION

6.1 Conclusion and Recommendation

In conclusion, this study demonstrated the use of Facebook by MOH and the engagement trend. MOH uses different posts types to provide educational content to its audience. In addition, it updates the information regularly in the afternoon and evening, which has been shown to increase engagements. The significant correlation between COVID-19 posts and COVID-19 cases during RMCO and MCO by state showed that MOH emphasised the use of Facebook during the late phase of the pandemic. Since the initial stage of the pandemic provides the best opportunity for the public to be prepared, MOH could make good use of Facebook to disseminate health information to alleviate public fear and panic when the case was first detected in Malaysia. The significant difference between positive emotion, negative emotion, comment, and share across MCO phases suggests that users react and engage differently as the pandemic progresses through the stages. The basic principle in managing outbreaks is to create and maintain trust, therefore MOH should proactively address public concerns via two-way risk communications by making good use of social media.

This study implies that social media can be used strategically to disseminate information in Malaysia as a means of health communication. Furthermore, it provides valuable insight on online engagement through social media networking in different phases of MCO to better understand the users' emotional sentiments. Finally, it is hoped that the findings will aid in future health communication planning in the event that another outbreak occurs in our country.

Future research could focus on examining the post's content to better understand what would elicit more interaction and engagement from the users. In addition, the data on the demographic background of the users should be collected to enable health organisations to plan for the strategies according to the characteristics of the population. Besides, MOH uses various social media platforms, including Twitter and Instagram but this study only analyses the Facebook profile of MOH in view that it is the most influential profile with the highest number of followers. Future analysis on different social media platforms of MOH may help determine the effectiveness of various social media platforms. Thematic analysis can be conducted in future work to better understand types of themes that can gain more interaction from the users.

6.2 Study Limitation

This study has several limitations. First, there might be an issue of inconsistencies in interpreting the users' reactions because some users might misunderstand the meaning of the emotions (Chu et al., 2020). The classification of reactions in this study was based on the meaning of each reaction by Facebook. Thus, any discrepancies were solely due to the misunderstanding of users, which is out of

the author's control. Next, the engagement indicators might have changed and might be different compared to the time the posts were assessed. However, it is believed that the changes in the indicators are minor because there is a gap of three months from the last date of the post shared by the MOH to the date of assessed to the post.



REFERENCES

- Al-Dmour, H., Masa'deh, R., Salman, A., Abuhashesh, M., & Al-Dmour, R. (2020). Influence of social media platforms on public health protection against the COVID-19 pandemic via the mediating effects of public health awareness and behavioral changes: Integrated model. *Journal of Medical Internet Research*, 22(8), 1–15. <https://doi.org/10.2196/19996>
- Alhabash, S., & McAlister, A. R. (2015). Redefining virality in less broad strokes: Predicting viral behavioral intentions from motivations and uses of Facebook and Twitter. *New Media and Society*, 17(8), 1317–1339. <https://doi.org/10.1177/1461444814523726>
- Alonso-cañadas, J., Galán-valdivieso, F., Saraite-sariene, L., & Caba-pérez, C. (2020). Committed to health: Key factors to improve users' online engagement through facebook. *International Journal of Environmental Research and Public Health*, 17(6). <https://doi.org/10.3390/ijerph17061814>
- American Psychological Association. (n.d.-a). *negative emotion* – *APA Dictionary of Psychology*. Retrieved June 6, 2021, from <https://dictionary.apa.org/negative-emotion>
- American Psychological Association. (n.d.-b). *positive emotion* – *APA Dictionary of Psychology*. Retrieved June 6, 2021, from <https://dictionary.apa.org/positive-emotion>
- best hashtags. (2021). *Hashtags for #healthcare on Instagram, Twitter, Facebook, Tumblr | best-hashtags.com*. <http://best-hashtags.com/hashtag/healthcare/>
- Bounsanga, J., Voss, M. W., Crum, A. B., & Hung, M. (2016). The Association Between Perceived Health Status and Health Information Communication Channels. *Journal of Health Communication*, 21(11), 1148–1152. <https://doi.org/10.1080/10810730.2016.1231726>
- Buletin TTKM. (2021). *Laman FB KKM tutup ruang komen | Buletin TTKM*. <https://ttkm.com.my/2021/04/25/laman-fb-kkm-tutup-ruang-komen/>
- Cambridge Dictionary. (2021). *POST | meaning in the Cambridge English Dictionary*. Cambridge Dictionary. <https://dictionary.cambridge.org/dictionary/english/post>
- Card, K. G., Lachowsky, N., Hawkins, B. W., Jollimore, J., Baharuddin, F., & Hogg, R. S. (2018). Predictors of facebook user engagement with health-related content for gay, bisexual, and other men who have sex with men: Content analysis. *Journal of Medical Internet Research*, 20(4). <https://doi.org/10.2196/publichealth.8145>
- Carly Stec. (2020). *Social Media Definitions: The Ultimate Glossary of Terms You Should Know*. Hubspot. <https://blog.hubspot.com/marketing/social-media-terms>

- CDC. (2009). *2009 H1N1 Pandemic Timeline | Pandemic Influenza (Flu) | CDC*.
<https://www.cdc.gov/flu/pandemic-resources/2009-pandemic-timeline.html>
- CDC. (2019). *CDC Social Media Tools, Guidelines & Best Practices*.
<https://www.cdc.gov/socialmedia/tools/guidelines/index.html>
- Chaikin, A. L., & Derlega, V. J. (1974). Variables affecting the appropriateness of self-disclosure. *Journal of Consulting and Clinical Psychology*, 42(4), 588–593.
<https://doi.org/10.1037/H0036614>
- Chan, A. K. M., Nickson, C. P., Rudolph, J. W., Lee, A., & Joynt, G. M. (2020). Social media for rapid knowledge dissemination: early experience from the COVID-19 pandemic. *Anaesthesia*, 75(12), 1579–1582. <https://doi.org/10.1111/anae.15057>
- Chatfield, A. T., Scholl, H. J. J., & Brajawidagda, U. (2013). Tsunami early warnings via Twitter in government: Net-savvy citizens' co-production of time-critical public information services. *Government Information Quarterly*, 30(4), 377–386.
<https://doi.org/10.1016/j.giq.2013.05.021>
- Cheong-Iao Pang, P., Cai, Q., Jiang, W., & Sun Chan, K. (2021). Engagement of Government Social Media on Facebook during the COVID-19 Pandemic in Macao. *Public Health*, 18, 3508. <https://doi.org/10.3390/ijerph18073508>
- Cho, M., Schweickart, T., & Haase, A. (2014). Public engagement with nonprofit organizations on Facebook. *Public Relations Review*, 40(3), 565–567.
<https://doi.org/10.1016/j.pubrev.2014.01.008>
- Choudhury, N. (2014). World Wide Web and Its Journey from Web 1.0 to Web 4.0. *International Journal of Computer Science and Information Technologies (IJCSIT)*, 5(6), 8096–8100.
- Chu, W. M., Shieh, G. J., Wu, S. L., & Sheu, W. H. H. (2020). Use of facebook by academic medical centers in Taiwan during the COVID-19 pandemic: Observational study. *Journal of Medical Internet Research*, 22(11), 1–11.
<https://doi.org/10.2196/21501>
- CNA. (2021). *COVID-19: Malaysia's recovery movement control order extended again to Mar 31 -CNA*.
<https://web.archive.org/web/20210101102729/https://www.channelnewsasia.com/news/asia/malaysia-covid-19-rmco-extended-mar-31-restrictions-13877484>
- Community Development & Health Network. (2020). *COVID-19 A to Z | Community Development and Health Network*. <https://www.cdhn.org/covid-19-z>
- Department of Statistics. (2021, April 12). *Department of Statistics Malaysia Official Portal*.
https://www.dosm.gov.my/v1/index.php?r=column/cthemByCat&cat=395&bullet_id=OWUvVnV5SHI2WFU2VFhnQ2ZjTm1Bdz09&menu_id=amVoWU54UTl0a21NWmdhMjFMMWcyZz09

- Everyday Health. (2020). *Glossary of Common Coronavirus Words | Everyday Health*. <https://www.everydayhealth.com/coronavirus/coronavirus-glossary-key-terms-about-the-pandemic-explained/>
- Facebook. (2021). *Page/insights - Graph API*. <https://developers.facebook.com/docs/graph-api/reference/insights/#page-post-engagement>
- Fegert, J. M., Vitiello, B., Plener, P. L., & Clemens, V. (2020). Challenges and burden of the Coronavirus 2019 (COVID-19) pandemic for child and adolescent mental health: A narrative review to highlight clinical and research needs in the acute phase and the long return to normality. *Child and Adolescent Psychiatry and Mental Health, 14*(1), 1–11. <https://doi.org/10.1186/s13034-020-00329-3>
- Fritch, J. W., & Cromwell, R. L. (2001). Evaluating internet resources: Identity, affiliation, and cognitive authority in a networked world. *Journal of the American Society for Information Science and Technology, 52*(6), 499–507. <https://doi.org/10.1002/asi.1081>
- Gearhart, S., & Kang, S. (2014). Social Media in Television News. *Electronic News, 8*(4), 243–259. <https://doi.org/10.1177/1931243114567565>
- Goldgruber, E., Sackl-Sharif, S., Ausserhofer, J., & Gutounig, R. (2018). ‘When the Levee Breaks’: Recommendations for Social Media Use During Environmental Disasters. *Social Media Use in Crisis and Risk Communication, 229–253*. <https://doi.org/10.1108/978-1-78756-269-120181015>
- Gough, A., Hunter, R. F., Ajao, O., Jurek, A., McKeown, G., Hong, J., Barrett, E., Ferguson, M., McElwee, G., McCarthy, M., & Kee, F. (2017). Tweet for behavior change: Using social media for the dissemination of public health messages. *JMIR Public Health and Surveillance, 3*(1), 1–17. <https://doi.org/10.2196/publichealth.6313>
- Griffis, H. M., Kilaru, A. S., Werner, R. M., Asch, D. A., Hershey, J. C., Hill, S., Ha, Y. P., Sellers, A., Mahoney, K., & Merchant, R. M. (2014). Use of social media across US hospitals: Descriptive analysis of adoption and utilization. *Journal of Medical Internet Research, 16*(11), e3758. <https://doi.org/10.2196/jmir.3758>
- Guidry, J. P. D., Jin, Y., Orr, C. A., Messner, M., & Meganck, S. (2017). Ebola on Instagram and Twitter: How health organizations address the health crisis in their social media engagement. *Public Relations Review, 43*(3), 477–486. <https://doi.org/10.1016/j.pubrev.2017.04.009>
- Guo, Y. R., Cao, Q. D., Hong, Z. S., Tan, Y. Y., Chen, S. D., Jin, H. J., Tan, K. Sen, Wang, D. Y., & Yan, Y. (2020). The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak- A n update on the status. In *Military Medical Research* (Vol. 7, Issue 1, p. 11). BioMed Central Ltd. <https://doi.org/10.1186/s40779-020-00240-0>
- Heldman, A. B., Schindelar MPH, J., & Weaver III, PhD, MPH, J. B. (2013). Social

Media Engagement and Public Health Communication: Implications for Public Health Organizations Being Truly “Social.” *Public Health Reviews*, 35(1), 1–18. <https://search.proquest.com/docview/1464737561?accountid=17242>

Huurne, E. Ter, & Gutteling, J. (2008). Information needs and risk perception as predictors of risk information seeking. *Journal of Risk Research*, 11(7), 847–862. <https://doi.org/10.1080/13669870701875750>

Josephson, A., & Lambe, E. (2020). *Brand communications in time of crisis*. Twitter Blog. https://blog.twitter.com/en_us/topics/company/2020/Brand-communications-in-time-of-crisis.html

Jünger, J., & Keyling, T. (2019). *GitHub - strohne/Facepager: Facepager was made for fetching public available data from YouTube, Twitter and other websites on the basis of APIs and webscraping*. <https://github.com/strohne/Facepager>

Jünger, J. (2020). *Basic Concepts · strohne/Facepager Wiki · GitHub*. <https://github.com/strohne/Facepager/wiki/Basic-Concepts>

Jünger, J. (2021). *Presets · strohne/Facepager Wiki · GitHub*. <https://github.com/strohne/Facepager/wiki/Presets>

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59–68. <https://doi.org/10.1016/j.bushor.2009.09.003>

Khan, M. I., Saleh, M. A., & Quazi, A. (2021). Social Media Adoption by Health Professionals: A TAM-Based Study. *Informatics*, 8(1), 6. <https://doi.org/10.3390/informatics8010006>

Kite, J., Foley, B. C., Grunseit, A. C., & Freeman, B. (2016). Please like me: Facebook and public health communication. *PLoS ONE*, 11(9), 1–16. <https://doi.org/10.1371/journal.pone.0162765>

KKM. (2021). *Official Portal of Ministry of Health Malaysia*. <https://www.moh.gov.my/index.php/pages/view/137?mid=14>

Klipfolio. (n.d.). *Facebook Engagement Metrics | Social Media KPI Examples - Klipfolio*. Retrieved June 7, 2021, from <https://www.klipfolio.com/resources/kpi-examples/social-media/facebook-engagement-metrics>

Llewellyn, S. (2020). *MEDICINE AND THE MEDIA Covid-19: how to be careful with trust and expertise on social media*. <https://doi.org/10.1136/bmj.m1160>

Lo, M. K., & Rota, P. A. (2008). The emergence of Nipah virus, a highly pathogenic paramyxovirus. *Journal of Clinical Virology*, 43(4), 396–400. <https://doi.org/10.1016/j.jcv.2008.08.007>

Loss, J., & Von Uslar, C. (2020). *How German health insurance providers use social online networks to promote healthy lifestyles: a content analysis of Facebook* ®

accounts. <https://doi.org/10.1186/s12911-021-01433-w>

Lwin, M. O., Lu, J., Sheldenkar, A., & Schulz, P. J. (2018). Strategic uses of facebook in zika outbreak communication: Implications for the crisis and emergency risk communication model. *International Journal of Environmental Research and Public Health*, 15(9). <https://doi.org/10.3390/ijerph15091974>

Malay Mail. (2021). *Kelantan, Sibul placed under MCO after surge in Covid-19 cases / Malaysia / Malay Mail*. <https://www.malaymail.com/news/malaysia/2021/01/15/kelantan-sibu-placed-under-mco-after-surge-in-covid-19-cases/1940812>

malaysiakini. (2020). *PM: Conditional MCO extended until June 9*. <https://www.malaysiakini.com/news/524969>

Malaysian Communications and Multimedia Commission. (2021). Internet Users Survey 2016. *WHO*, 76. <https://doi.org/ISSN 1823-2523>

Mat Dawi, N., Namazi, H., Hwang, H. J., Ismail, S., Maresova, P., & Krejcar, O. (2021). Attitude toward protective behavior engagement during COVID-19 pandemic in Malaysia: the role of e-government and social media. *Frontiers in public health*, 9, 113.

media update. (2020). *Seven trending hashtags about COVID-19 on social media*. <https://www.mediaupdate.co.za/social/148423/seven-trending-hashtags-about-covid-19-on-social-media>

Men, L. R., & Tsai, W. H. S. (2015). Infusing social media with humanity: Corporate character, public engagement, and relational outcomes. *Public Relations Review*, 41(3), 395–403. <https://doi.org/10.1016/j.pubrev.2015.02.005>

Merriam-Webster. (2020). *A Guide to Coronavirus-Related Words | Merriam-Webster*. <https://www.merriam-webster.com/words-at-play/coronavirus-words-guide/covid-19>

Ministry of Foreign Affairs. (2021). *Information on COVID-19 in Malaysia - News From Mission - Portal*. https://www.kln.gov.my/web/chl_santiago/news-from-mission/-/blogs/information-on-covid-19-in-malaysia-link

MOH. (2020). *UPDATES ON THE COVID-19 SITUATION IN MALAYSIA* (Vol. 21, Issue 1). <http://covid-19.moh.gov.my/terkini/032020/situasi-terkini-13-mac-2020/52 KPK - 13032020 - EN.PDF>

Molla, R. (2020). *Coronavirus dominates Facebook, Twitter, and Google searches - Vox*. <https://www.vox.com/recode/2020/3/12/21175570/coronavirus-covid-19-social-media-twitter-facebook-google>

Nabity-Grover, T., Cheung, C. M. K., & Thatcher, J. B. (2020). Inside out and outside in: How the COVID-19 pandemic affects self-disclosure on social media.

International Journal of Information Management, 55(June), 102188.
<https://doi.org/10.1016/j.ijinfomgt.2020.102188>

NapoleonCat.com. (2021). *Facebook users in Malaysia - March 2020 | NapoleonCat*.
<https://napoleoncat.com/stats/facebook-users-in-malaysia/2021/04>

New Straits Time. (2020). *CMCO to end, replaced with RMCO until Aug 31 [NSTTV]*.
<https://www.nst.com.my/news/nation/2020/06/598700/cmco-end-replaced-rmco-until-aug-31>

New Straits Times. (2020). *#TECH: Top Twitter hashtags in Malaysia for 2020*.
<https://www.nst.com.my/lifestyle/bots/2020/12/653539/tech-top-twitter-hashtags-malaysia-2020>

Ng, C. F. S., Seposo, X. T., Moi, M. L., Tajudin, M. A. B. A., Madaniyazi, L., & Sahani, M. (2020). Characteristics of the COVID-19 epidemic and control measures to curb transmission in Malaysia. *International Journal of Infectious Diseases*, 101, 409–411. <https://doi.org/10.1016/j.ijid.2020.10.027>

Norman, C. D. (2012). Social media and health promotion. *Global Health Promotion*, 19(4), 3–6. <https://doi.org/10.1177/1757975912464593>

NPS MedicineWise. (2020). *COVID-19 useful words and phrases - NPS MedicineWise*. <https://www.nps.org.au/glossary>

Onion, A., Sullivan, M., & Mullen, M. (2021). *Facebook launches - HISTORY*. A&E Television Networks. <https://www.history.com/this-day-in-history/facebook-launches-mark-zuckerberg>

Patel, D., & Jermacane, D. (2015). Social media in travel medicine: A review. *Travel Medicine and Infectious Disease*, 13(2), 135–142. <https://doi.org/10.1016/j.tmaid.2015.03.006>

Prime Minister's Office of Malaysia. (2020). *The Prime Minister's Special Message on COVID-19 - 16 March 2020 - Prime Minister's Office of Malaysia*. <https://www.pmo.gov.my/2020/03/perutusan-khas-yab-perdana-menteri-mengenai-covid-19-16-mac-2020/>

Raamkumar, A. S., Tan, S. G., & Wee, H. L. (2020). Measuring the Outreach Efforts of Public Health Authorities and the Public Response on Facebook during the COVID-19 Pandemic in Early 2020: Cross-Country Comparison. *Journal of Medical Internet Research*, 22(5). <https://doi.org/10.2196/19334>

Rahim, A. I. A., Ibrahim, M. I., Salim, F. N. A., & Ariffin, M. A. I. (2019). Health information engagement factors in Malaysia: A content analysis of facebook use by the ministry of health in 2016 and 2017. *International Journal of Environmental Research and Public Health*, 16(4). <https://doi.org/10.3390/ijerph16040591>

Rampal, L., & Seng, L. B. (2021). Malaysia's third COVID-19 wave – a paradigm

- shift required. *Medical Journal of Malaysia*, 76(1), 1–4.
- Rural Health Information Hub. (2018). *Health Communication Strategies - Rural Health Promotion and Disease Prevention Toolkit*. <https://www.ruralhealthinfo.org/toolkits/health-promotion/2/strategies/health-communication>
- Sam, J. I. C., & Abu Bakar, S. (2009). Pandemic influenza A (H1N1) 2009 in Malaysia - The next phase. *Medical Journal of Malaysia*, 64(2), 105–107.
- Search Engine Journal. (2020). *Facebook Coronavirus Emojis*. <https://www.searchenginejournal.com/facebook-coronavirus-emojis/365040/#close>
- Snurb. (2013). *Facepager: A Tool for Gathering Facebook Data*. <https://snurb.info/node/1861>
- Socialbakers. (2021). *KEMENTERIAN KESIHATAN MALAYSIA | Detailed statistics of Facebook page | Socialbakers*. https://www.socialbakers.com/statistics/facebook/pages/detail/373560576236?url_key=kementerian-kesihatan-malaysia
- Statista. (2021a). • *Malaysia: COVID-19 daily cases 2021 | Statista*. <https://www.statista.com/statistics/1110785/malaysia-covid-19-daily-cases/#statisticContainer>
- Statista. (2021b). • *Malaysia: Facebook users 2017-2025 | Statista*. <https://www.statista.com/statistics/490484/number-of-malaysia-facebook-users/>
- Strecher, V. J., McClure, J., Alexander, G., Chakraborty, B., Nair, V., Konkel, J., Greene, S., Couper, M., Carlier, C., Wiese, C., Little, R., Pomerleau, C., & Pomerleau, O. (2008). The role of engagement in a tailored web-based smoking cessation program: Randomized controlled trial. *Journal of Medical Internet Research*, 10(5), 1–10. <https://doi.org/10.2196/jmir.1002>
- Texas Medical Center. (2020). *COVID-19 crisis catalog: A glossary of terms - TMC News*. <https://www.tmc.edu/news/2020/05/covid-19-crisis-catalog-a-glossary-of-terms/>
- The Community Guide. (2019). *Health Communication, Social Marketing | The Community Guide*. <https://www.thecommunityguide.org/topic/health-communication-and-health-information-technology>
- THE SHELF. (2020). *49 Trending Hashtags for More Mindful Posting — The Shelf Full-Funnel Influencer Marketing*. <https://www.theshelf.com/the-blog/covid19-trending-hashtags>
- The Star. (2020). *Covid-19: Two Malaysia hashtags, including #StayAtHome, trending in the country | The Star*. <https://www.thestar.com.my/news/regional/2020/03/19/covid-19-two-malaysia->

hashtags-including-stayathome-trending-in-the-country

The Straits Times. (2021). *Malaysia lifts MCO as cases taper down, vaccination drive kicks in*, *SE Asia News & Top Stories - The Straits Times*. <https://www.straitstimes.com/asia/se-asia/malaysia-lifts-mco-for-kl-selangor-johor-and-penang>

TheStar. (2020). *PM: Recovery MCO extended till Dec 31 (updated)* | *The Star*. <https://www.thestar.com.my/news/nation/2020/08/28/pm-recovery-mco-extended-till-dec-31>

TIME. (2020). *Understanding the Coronavirus: A Glossary of Terms to Know* | *Time*. <https://time.com/5798684/coronavirus-glossary-definitions/>

Unicef, WHO, & IFRC. (2020). Key Messages and Actions for Prevention and Control in Schools. *Key Messages and Actions for COVID-19 Prevention and Control in Schools, March*, 13. https://www.who.int/docs/default-source/coronaviruse/key-messages-and-actions-for-covid-19-prevention-and-control-in-schools-march-2020.pdf?sfvrsn=ba81d52_4#:~:text=COVID-19 is a,2019-nCoV.

United Nations. (2020). *COVID-19: Embracing digital government during the pandemic and beyond* | *Department of Economic and Social Affairs*. Department of Economic and Social Affairs. <https://www.un.org/development/desa/dpad/publication/un-desa-policy-brief-61-covid-19-embracing-digital-government-during-the-pandemic-and-beyond/>

Veale, H. J., Sacks-Davis, R., Weaver, E. R., Pedrana, A. E., Stoové, M. A., & Hellard, M. E. (2015). *The use of social networking platforms for sexual health promotion: identifying key strategies for successful user engagement*. <https://doi.org/10.1186/s12889-015-1396-z>

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *Int. J. Environ. Res. Public Health*, 17, 1729. <https://doi.org/10.3390/ijerph17051729>

WHO. (2020a). *Archived: WHO Timeline - COVID-19*. <https://www.who.int/news/item/27-04-2020-who-timeline---covid-19>

WHO. (2020b). *Listings of WHO's response to COVID-19*. <https://www.who.int/news/item/29-06-2020-covidtimeline>

WHO. (2021a). *Malaysia: WHO Coronavirus Disease (COVID-19) Dashboard With Vaccination Data* | *WHO Coronavirus (COVID-19) Dashboard With Vaccination Data*. <https://covid19.who.int/region/wpro/country/my>

WHO. (2021b). *Coronavirus disease - Answers*. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/coronavirus-disease->

answers?query=What+is+COVID19%3F&referrerPageUrl=https%3A%2F%2Fwww.who.int%2Femergencies%2Fdiseases%2Fnovel-coronavirus-2019%2Fcoronavirus-disease-answers

Wong, A., Ho, S., Olusanya, O., Antonini, M. V., & Lyness, D. (2020). The use of social media and online communications in times of pandemic COVID-19. *Journal of the Intensive Care Society*, 0(0), 1–6. <https://doi.org/10.1177/1751143720966280>

Worldometer. (2021). *COVID Live Update: 172,003,917 Cases and 3,577,592 Deaths from the Coronavirus* - Worldometer. <https://www.worldometers.info/coronavirus/>

Yale Medicine. (2020). *Our New COVID-19 Vocabulary—What Does It All Mean?* > News > Yale Medicine. <https://www.yalemedicine.org/news/covid-19-glossary>

Yusof, A. N. M., Muuti, M. Z., Ariffin, L. A., & Tan, M. K. M. (2020). Sharing Information on COVID-19: the ethical challenges in the Malaysian setting. *Asian Bioethics Review*, 12(3), 349–361. <https://doi.org/10.1007/s41649-020-00132-4>