



**SURVEY OF HOUSEHOLD WATER USAGE
DURING MOVEMENT CONTROL ORDER
(MCO) DUE TO COVID-19 AMONG TANJUNG
MALIM, PERAK COMMUNITY**

by

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**Survey of Household Water Usage during Movement Control Order (MCO)
due to COVID-19 among Tanjung Malim, Perak Community.**

ABSTRACT

Early this year, the death causal microorganism identified as coronavirus or called COVID 19 has been spread worldwide, and Malaysia has not been an exception. Furthermore, on 25th January was the first case of COVID-19 that has been detected in Malaysia. Due to that, the Government of Malaysia, via the Ministry of Health and National Safety Council, has imposed the Movement Control Order (MCO) on Malaysians. In that order, the Ministry of Health and National Safety Council has given best practices during the outbreaks to ensure public health precaution among Malaysians. One of the precautions that need to be taken for households and individuals is to maintain good hygiene by frequently and proper bathing and handwashing to prevent the infection of COVID-19 to the community. Furthermore, the pandemic crisis COVID-19 has made the whole family stay at home for a long time more than usual. This means water consumption in the household was believed to arise due to activities and increased household sizes. The objectives of this study are to determine the water usage before and during MCO among Tg. Malim, Perak community and to determine the percentage of increase in water consumption during MCO among Tg. Malim, Perak community. A survey technique with a set of questionnaires was used to collect the required data on 383 respondents. The information was then performed in the cross-sectional descriptive study, and percentages were utilized to determine the association level. Also, the correlation between water bill and daily activities during MCO was observed. The p-value <0.05 was selected as normal, statistically significant. The results shows that, the percentage of respondents who paid water bill between RM 35.00 to RM 55.00 during MCO reduced by 4.4%, and this percentage was going to the higher water bill, which is more than RM 55.00 per month, meaning that, people in Tanjong Malim used more water during MCO as compared to before. As a recommendation, this study can be a new basis for implementing green practices among the local community, especially regarding water conservation. It can be used by authorities as a basis to craft a new policy of water conservation during the virus pandemic outbreak.

**Tinjauan Penggunaan Air Isi Rumah semasa Perintah Kawalan Pergerakan
(PKP) kerana COVID-19 di kalangan Komuniti Tanjung Malim, Perak.**

ABSTRAK

Awal tahun ini mikroorganisma penyebab kematian yang dikenal pasti sebagai coronavirus atau disebut COVID 19 telah tersebar di seluruh dunia dan Malaysia tidak terkecuali. Tambahan pula, pada 25 Januari adalah kes pertama COVID-19 yang telah dikesan di Malaysia. Oleh kerana itu, Kerajaan Malaysia melalui Kementerian Kesihatan dan Majlis Keselamatan Negara telah mengenakan Perintah Kawalan Pergerakan (PKP) kepada rakyat Malaysia. Dengan perintah itu, Kementerian Kesihatan dan Majlis Keselamatan Negara telah memberikan amalan terbaik semasa merebaknya wabak untuk memastikan langkah berjaga-jaga kesihatan awam di kalangan rakyat Malaysia. Salah satu langkah pencegahan yang perlu diambil untuk rumah tangga dan individu adalah menjaga kebersihan yang baik dengan kerap mandi dan mencuci tangan dengan betul untuk mencegah jangkitan COVID-19 kepada masyarakat. Tambahan pula, krisis pandemik COVID-19 telah menjadikan seluruh keluarga tinggal di rumah untuk jangka masa yang lama daripada biasa. Ini bererti penggunaan air dalam rumah tangga dipercayai terjadi disebabkan oleh kegiatan dan peningkatan ukuran isi rumah. Objektif kajian ini adalah untuk menentukan penggunaan air sebelum dan semasa PKP di kalangan Tg. Masyarakat Malim, Perak dan untuk menentukan peratusan peningkatan penggunaan air semasa PKP di kalangan masyarakat Tg. Malim, Perak. Teknik tinjauan dengan satu set soal selidik digunakan untuk mengumpulkan data yang diperlukan pada 383 responden. Data kemudian dilakukan kajian deskriptif keratan rentas dan peratusan digunakan untuk menentukan tahap pergaulan. Serta, hubungan antara bil air dan aktiviti harian semasa PKP diperhatikan. Nilai $p < 0,05$ dipilih sebagai signifikan secara statistik. Keputusan kajian menunjukkan bahawa, peratusan responden yang membayar bil air antara RM 35.00 hingga RM 55.00 semasa PKP berkurang sebanyak 4.4%, dan peratusan ini menuju ke bil air yang lebih tinggi, iaitu lebih dari RM 55.00 sebulan, yang bermaksud, orang di Tanjong Malim menggunakan lebih banyak air semasa PKP berbanding sebelumnya. Sebagai saranan, kajian ini dapat menjadi dasar baru untuk pelaksanaan praktik hijau di kalangan masyarakat setempat, terutama mengenai pemuliharaan air, dan dapat digunakan oleh pihak berwenang sebagai dasar untuk membuat kebijakan baru pemuliharaan air selama wabah wabah virus berlaku .

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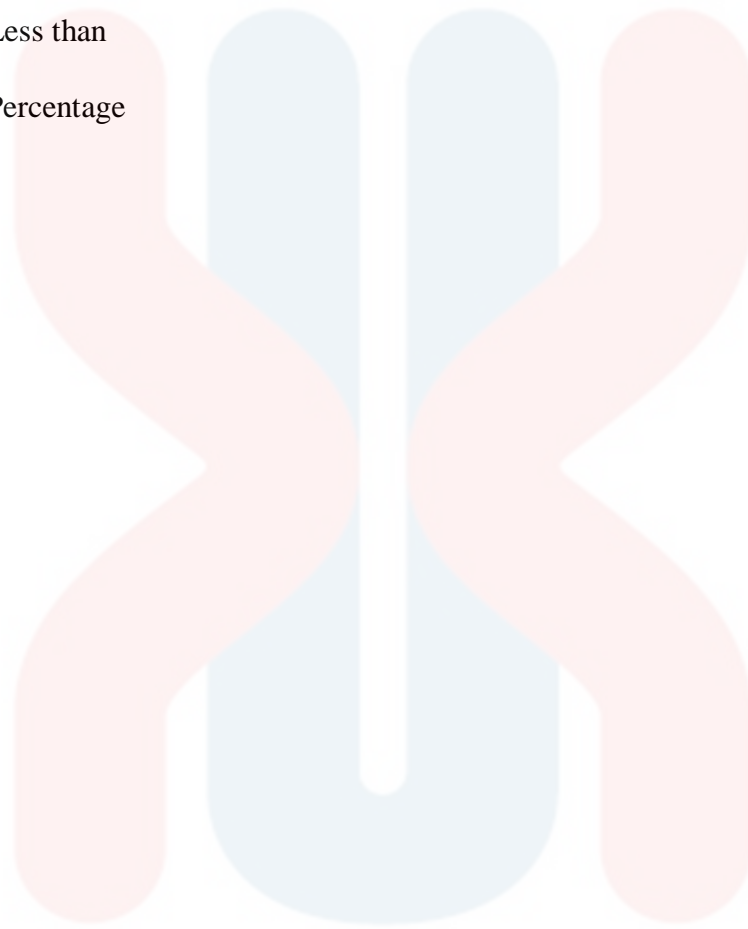
LIST OF ABBREVIATIONS

SPSS	Statistical Package for Social Science
SD	Standard Deviation
MCO	Movement Control Order
WHO	World Health Organization
COVID-19	Coronavirus Disease
Km	Kilometer
RM	Ringgit Malaysia

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<	Less than
%	Percentage



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CHAPTER 1

INTRODUCTION

1.1 Background of study

In late Dec 2019, one of the hospitals in Wuhan city has detected one unusual incident that happened to their patient and believes the illness was linked to the city's animal market. On 26th January, the causal microorganism was identified as a novel coronavirus called COVID-19 (Saadat et al., 2020). This disease has been spread around the world, and Malaysia has not been an exception. Furthermore, on 25th January was the first case of COVID-19 that has been detected in Malaysia. The presence of COVID-19 was observed from 3 tourists who come to travel to Malaysia through Johor Bharu after Wuhan declared a virus in that country.

After that, the number of Malaysia's cases slightly increased from time to time due to mass religious gatherings at the Sri Petaling area, participating for almost 16 000 people from neighboring countries such as Brunei and Indonesia. The number of cases keeps rising and has been infected to 5th generations (Bedi, 2020), which means the virus has spread widely in the community. Regarding this pandemic crisis,

Malaysia's Prime Minister has decided to enforce the Movement Control Order (MCO) on 18th May 2020. This enforcement was done to be one of the mitigation steps to reduce the spreading of the virus in the community and worsen Malaysia's healthy state (Azlan, 2020).

After that, the Ministry of Health has outlined the Malaysians to ensure public health precautions among the community. One of the steps of protection that can be taken for household and individual is maintaining good hygiene, such as frequently and proper handwashing techniques (Hanafiah et al., 2020), which is to prevent the infection of COVID-19 to the community. Also, (World Health Organization (WHO), 2020) declared that perform hand hygiene at the right time and right techniques with either soap and water or alcohol-based hand rub for about 40-60 seconds and 20 seconds if the hand visibly dirty and not visibly dirty respectively.

Moreover, handwashing recommended after coughing or sneezing or before eating or after using the toilet, meanwhile taking off the clothes and immediately washing the clothes and, take an immediate shower after coming back from public areas after entering a home will be one of the suggestions from Malaysian Prime Minister due to reducing the spreading of the virus, especially in the household area. This can be proved from a former COVID-19 patient who is also a participant in the Sri Petaling mosque, and doctors advise the patients to drink plenty of water and take a bath while in an isolation center. This can reduce symptoms as well as increase the level of hygiene, thus reducing the rate of virus transmission. Therefore, to prevent the spreading virus vigorously among the community indirectly contributes to the environmental problem. Frequent handwashing, direct shower, and not use a washing machine when clothes in bulk directly increase the water consumption among the

community. However, the Prime Minister's advice to stay at home and only out from the house if necessary can gradually increase the total household size per capita.

This is because the water used depends on the water source, maintenance, management, type of supply, and cultural habit (Keshavarzi et al., 2006). Also, hand washing, food preparation, showering, toilet use, gardening, and washing clothes categories as activities that consume water in the household. Water demand depends on household size, income, type of house, education age. Then, it does not depend on the total consumption per capita to estimate the water demand and water supply planning. Still, the total consumption activities per capita should be considered too.

1.2 Problem Statement

Movement Control Order (MCO) has been executed in Malaysia due to the pandemic crisis COVID-19, which urged everybody to stay home and has made several family members, including those stranded in that area or family with their kids, remain at home for a long time more than usual. This means water consumption in the household was believed to arise due to activities with an increment in the household sizes. This is because due to increase in population will directly increase the demand for water usage. Furthermore, the new norms practices such as frequent handwashing, instant shower after going out to public places, and washing the clothes that were wearing during out to public places, have been suggested by the Ministry of Health, hoping to prevent the spreading of the virus. All new norm culture can be one reason the total amount of bills during MCO is believed to slightly increase from the previous total amount of water bills per household. Hence, it is necessary to survey water usage

among the household to determine the best green practice suggested for water conservation, thus reducing the bills.

1.3 Expected outcomes

Hopefully, this study's findings can be a new basis for implementing green practices among the local community, especially water conservation. Therefore, as a recommendation, the community should use water wisely and be used by authorities to craft a new policy of water conservation during the virus pandemic outbreak.

1.4 Objectives

The objectives of this study are:

- i. To determine the difference in the percentage of water usage before and during MCO among Tg. Malim, Perak community.
- ii. To determine the daily activities related to water usage during MCO among Tg. Malim, Perak community.
- iii. To determine the correlation between water usage and daily activities related to water usage during MCO and handwashing practices among Tg. Malim, Perak community.

1.5 Scope of the study

Firstly, the total water bill data and daily activities data are selected from the Tg. Malim, Perak community. This because of the Tg. Malim area has many residential areas that mostly filled with a big family, also Tg. Malim area had been red zone during MCO due to having more than 50 cases (17th January 2021), including the university

student and local transmission in that area that make all communities were alert to take good hygiene.

The study's validation is that the required respondents to answer the questionnaire survey were conducted using an online form to prevent close contact between the researcher and respondents due to COVID-19. This questionnaire is required for 350 respondents from residential areas among Tg. Malim, Perak. Each respondent is represented as one household. After that, the respondents will be required to answer 26 questions divided into three sections.

The three sections are A, B, and C, which consists of Section A (Head of Household demographic), Section B (Hygiene practices during MCO), and Section C (Determinants of monthly water expenses and consumptions per capita). Section A is regarding respondent demographic. Meanwhile, in Section B, respondents were required to respond to all item statements measured using a 5-point Likert-type scale from 'strongly disagree' (1) to 'strongly agree' (5).

Lastly, before the real survey is distributed to all communities, the question is to be trialed with 30 respondents to see the question's reliability (Abbasi et al., 2020). If the question survey is not reliable, the questions in the survey will be changed. Cronbach's Alpha was used to determine the reliability of all items. The pilot survey data will be used in the overall survey.

The real data were analyzed by statistical analysis SPSS: mean, frequencies, standard deviation (SD), and percentages, while Pearson's correlation was utilized to investigate the relationship between the percentage of water consumption and daily activities that related to water usage. The bar chart was also used to compare the

percentage of total water bills before and during MCO. The p-value <0.05 was set as statistically significant.

1.6 Significant of the study

During disease outbreaks identified in this study, the total water usage can be a reference for local authorities, especially clean water providers, to set a minimum daily production to avoid water disruption.

1.7 Limitation of the Study

Due to the pandemic outbreaks, the survey is easing online. This can decrease the data reliability due to respondents not understanding the question correctly.

CHAPTER 2

LITERATURE REVIEW

2.1 The community at Tanjung Malim

Tg. Malim is a developing area that consists of development and population blooms in that area for about 63,639 population in the past three years. The community Tg. Malim consists of the family from the elder's age or local people and the migrate family that transfers at Tg. Malim due to development occurred. Also, the community of Tg. Malim consists of single-family members such as workers that move in Tg. Malim and students. Therefore, some of the community might be unaware of the sustainable lifestyle due to the population here still consisting of the elders' age community. During MCO, the people's obedience level is high, making them aware that this virus is severe.

2.2 Water Usage during a normal situation

The world is having a water crisis year by year. The water crisis is one of the environmental problems that keep rising. There are few limitations to solving the situation: climate change, population blooming, and an increase in the living standard in recent years (Bari et al., 2015). From previous studies, Gross Domestic Product (GDP) vital to determine the water consumption from one household, which is an increase in GDP will increase household water usage from 10%-30% (Bengtsson et al., 2005). Moreover, it does not depend on the total consumption per capita to estimate the water demand and water supply planning. Still, the total consumption activities per capita should be considered too. This is because the water used depends on the water source, maintenance, management, type of supply, and cultural habit (Keshavarzi et al., 2006). Also, hand washing, food preparation, showering, toilet use, gardening, and washing clothes categories as activities that consume water in the household. Water demand depends on household size, income, type of house, education age.

In 2011, Malaysian are top rank for consuming water among Southeast Asian, 226 l/p/d more than their neighbor country, Singapore, and Thailand, 154 l/p/d and 90 l/p/d respectively (Mohd. Shoed et al., 2016). Worldwide Fund for Nature doubts that to ensure Malaysia's sustainable water resource due to a high amount of water wastage incidence from domestic, industrial, and agriculture activities. Therefore, if Malaysian do not practice water-saving, it will negatively impact future generations (Khalid et al., 2019), and sustainable development is not achievable. This is because, United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) said, 2 per third of world populations will face water scarcity by 2050, 1 per sixth world population do not have enough water supply for domestic purposes.

2.3 COVID-19

Since late 2019, Malaysia has aware of this outbreak after China reported a "pneumonia unknown origin" virus from one of the hospitals in that area on 29th December 2019 (Zhu et al., 2020). According to China, the cases were linked with a large seafood market from Wuhan City that has been called novel coronavirus or current named COVID-19 (KHOR et al., 2020).

This virus only needs two months to spread globally (Aylward, Bruce (WHO); Liang, 2020), which is not only the whole of China's city but the whole world. The World of Health Organization (WHO) has declared this pandemic outbreak on March 11 as a fatal global pandemic outbreak because the number of cases is over 1 million. The total death rates were over 50 000 worldwide (Mariana, 2020) on April 4. Furthermore, COVID-19 impact and public health treated globally are more severe cases rather than the 1918 influenza outbreak (Ferguson et al., 2020).

Next, the first cases of COVID-19 that have been detected in Malaysia on 25th January 2020, from 3 tourists from China that travel to Malaysia after visited Singapore. The first wave for Malaysia was on February 15, and on February 28 was the second wave after more than 1000 people that have been infected. Also, the COVID-19 cases kept increasing when Malaysia is experienced the thrid-wave of the COVID-19 pandemic started on 9th October 2020 with a cumulative number of cases to 14,368 (Bernama, 2020). Meanwhile, on February 27, the Ministry of Health Malaysia got informed by Brunei that one of their citizens is positive COVID-19 after joined religious gatherings in Malaysia. The participants attended about 16 000 people (Moghbelli et al., 2020) from the neighboring countries, and the participants have spread the virus up to the 5th generation.

2.4 Movement Control Order (MCO)

Therefore, Malaysia's Prime Minister has done enforcement of Movement Control Order (MCO) from March 18 as a mitigation phase (Mahmud & Lim, 2020) in Malaysia. Moreover, during MCO, some states and districts have been classified as Red Zone. All Malaysians had to stop mass movement and gathering across the country, such as sports, religious gathering, and cultural activities. Next, all premises close except for the supermarket or any convenience store that sells everyday essentials: close kindergarten, school and preschool, and public and private higher education. Also, close all government and private sector except water, energy, and electricity. Next, whoever just returned from overseas must undergo a health check and quarantine for 14 days, restricting tourists and foreigners' entry. Therefore, Malaysian tend to stay at home due to MCO, and this is one of the actions that can be done to stop the spreading virus. Moreover, the household size per capita was believed to be increased due to closure for almost all sectors such as education, government, and private premises, and non-essential business.

2.5 Water Usage during MCO

Firstly, to stop the spreading virus in the house area, Malaysians must practice a new good hygiene technique and follow WHO recommendations, which are frequently and correctly handwashing. (Beiu et al., 2020). WHO recommended washing thoroughly in fingernails, interdigital web spaces, and wrist for 20 seconds by using water and soap, especially after going to public places, before eating, after sneezing or coughing, after toilet use, and when the hand feels dirt. Also, as the Ministry of Health Malaysia suggested to Malaysians, the clothes used need to be washed immediately

and take a quick shower after going out to public places due to mitigating the spreading of COVID-19 in the household area. According to a former COVID-19 patient who is also a participant in the Sri Petaling mosque, doctors advise the patients to drink plenty of water and take a bath while staying in an isolation center. This can reduce symptoms as well as increase the level of hygiene, thus reducing the rate of virus transmission.

According to Malaysia's Ministry of Health, people should take immediate clothes washing after going out to the public due to the virus's lifespan at cloth surfaces are until one day (Patients et al., 2020). Next, COVID-19 can spread by droplets from coughing and hand contact between people or surfaces such as a doorknob, kitchenware, and furniture. Therefore, disinfection should be added to the daily routine (Katzner, 2020).

COVID-19 is enveloped by the fatty layer and are susceptible to soap and detergent to deactivate the virus. The type of cleaner and disinfected depends on the frequency of contact, intent, and various surfaces. According to the manufacturer instructor, effective sanitization can decrease the virus's spread (Canada & Canada, 2014). High touch surfaces such as a doorknob, table, kitchenware, chairs, light switches, and furniture disinfection can be done once or twice daily if someone positive COVID-19 or elderly inside the house (Osach & Osach, 2009). Moreover, low touch surfaces can be disinfected once a week, and higher disinfection is not necessary if everyone in the house is in good condition.

CHAPTER 3

MATERIAL AND METHODS

3.1 Study Area

The study area that has been selected is Tg. Malim, Perak community. Tg. Malim was located at Muallim district, in Perak Darul Ridzuan, shown in Figure 3.1 below. Bernam Valley Region is irrigated by two major rivers, which are Sg. Bernam and Sg. Inki.

Also, Tg. Malim was a secondary regional growth center with a population size is 69,639 and located in the Southern part of Perak, which only takes 90km to Kuala Lumpur. After that, on 17th January 2021, Tg. Malim has experienced a Red zone due to the pandemic crisis; the total cases are 53 cases from the local transmission based on the health department of Perak State.

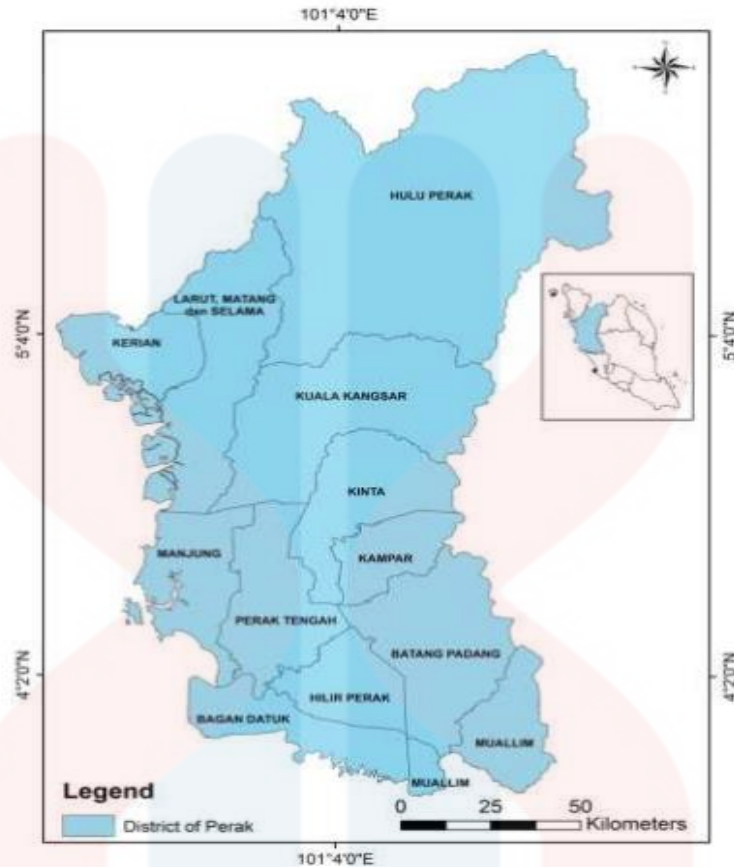


Figure 3.1 shows a map of the District in Perak State (Omar et al., 2018)

3.2 Data Collection

For this study, the developed questionnaires were randomly distributed to 30 respondents in the community as a pilot test (Nachimuthu et al., 2020) to get a better comprehension, to see the reliability of the questions provided, and to organize the question properly before the final survey distributed to the study population (Bhagavatula et al., 2020). If the reliability cannot be achieved, the question might be changed for better reliable data results. Also, the pilot survey data was included in the overall survey. The study required respondents to answer the questionnaire using an online method, namely google form, to prevent close contact between the researcher and respondents due to COVID-19 outbreaks. The respondents can click on the link

provided, and they are also asked to share with all their friends, neighbors, and community who are living in Tg. Malim. This questionnaire was distributed to 383 respondents from residential areas in Tg. Malim, Perak. One respondent representing one household. (modified from Mohd. Shoed et al., 2016)

The respondents were requested to answer 29 questions divided into three sections: Section A (Head of Household demographic), Section B (Hygiene practices during MCO), and Section C (Determinants of monthly water expenses and consumptions per capita). In Section A, ten questions are required to be answered regarding respondent demographics. There were age, gender, household size, ethnicity, current employment status, religion, household income, and education. In Section B, respondents were required to respond to all item statements measured using a 5point Likert-type scale from 'strongly disagree' (1) to 'strongly agree' (5). Section C are required respondent's ideas and opinions to improve the studies (modified from Wahid & Hooi, 2015).

3.3 Data Analysis

Lastly, for this cross-sectional descriptive study, the data were analyzed by statistical analysis (SPSS): mean, frequencies, standard deviation (SD), and percentages also, while Pearson's correlation was utilized to investigate the relationship between the percentage of water consumption and daily activities that related to water usage. The bar chart shows every level and compares the percentage increase of total bills from previous before the MCO has been applied and during MCO been applied due to COVID-19. The p-value <0.05 was set as statistically significant (Bhagavatula et al., 2020).

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Demographic profile of Head of Households

The survey results showed that 63 % of the respondents were male, and 37% were female (Figure 4.1). The majority of respondents are aged between 24 and 35 years old, which covered 33.2%, followed by 30% of respondents aged below 24-year-old, 20.9% of respondents which are aged between 36 and 45 years old, 9.7% of respondent aged between 46 and 55 years old, and 6.3% was above 55 years old (Figure 4.2). The respondents consist of Malay (77%), Chinese (12%), Indian (9.4%), and others (1.6%). Examples of other races are Kelabit, Kenyah, and Kadazandusun (Figure 4.3). Most of the respondents are degree holders (33.4%), followed by a Diploma (24.3%), a certificate (23%), secondary school (18.3%), and master level 1% (Figure 4.4). In Figure 4.5, most of the respondents are self-employed (34.2%), followed by 33.2% of respondents who are an employee of either government or

private sectors and are working from home; on the other hand, 32% of respondents lose their jobs due to a covid-19 pandemic.

Figure 4.6 showed that 15.4% of respondents had a total household income of less than RM 1,500, 51.4% of respondents had an income of RM 1,500 – RM3,000, 23.5% of respondents had an income of RM 3,001 – RM 6,000, 4.2% of respondents had an income of RM 6,001 – RM 9,000 and 5.5 % of respondents had a revenue of more than RM 9, 000. Meanwhile, 2.9% of respondents had a single or one family member, 56.7% of respondents had family members between 2 to 4 people. Thirty-five point two percent (35.2%) of respondents had family members between 5 to 7 people. Four-point two percent (4.2%) of respondents had family members between 8 to 10 people, and only 1% of respondents had family members more than ten people (Figure 4.7).

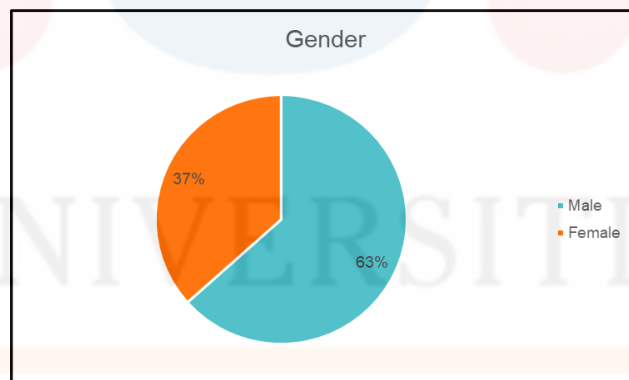


Figure 4.1: Percentage of respondents of gender

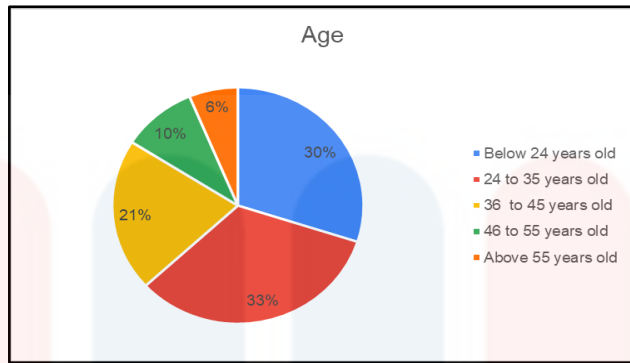


Figure 4.2: Percentage of respondents by age

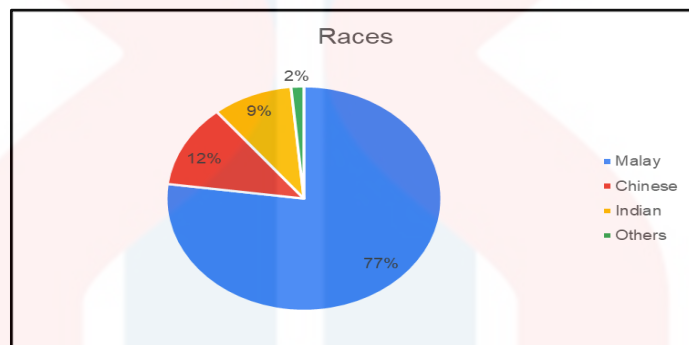


Figure 4.3: Percentage of respondents by races

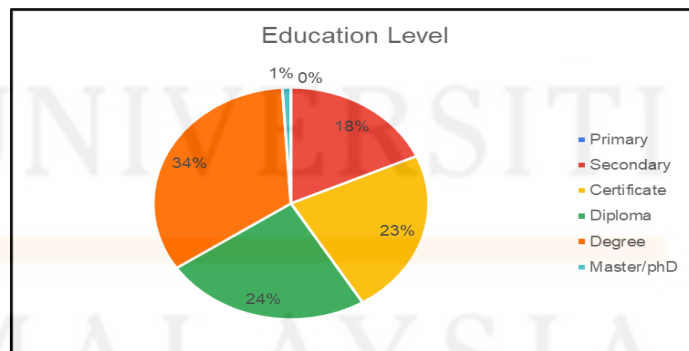


Figure 4.4: Percentage of respondents by education level

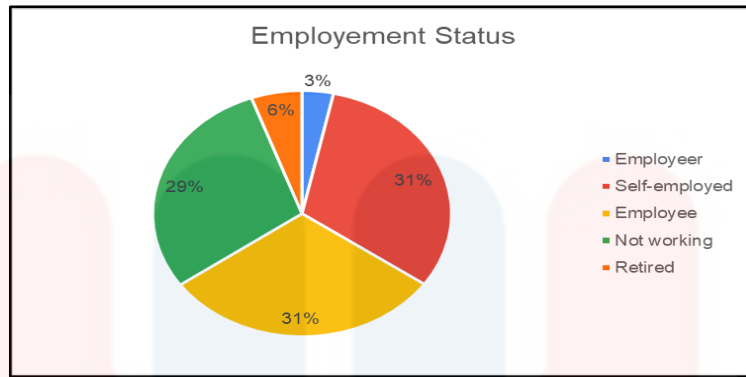


Figure 4.5: Percentage of respondents by employment status

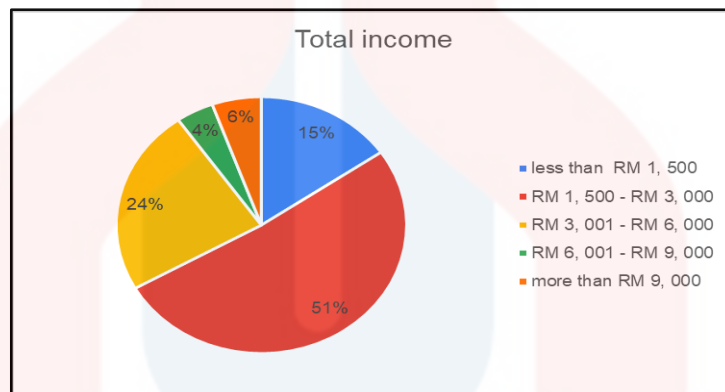


Figure 4.6: Percentage of respondents by total income

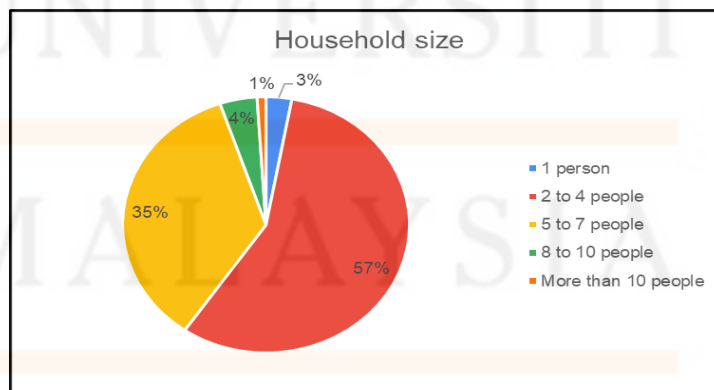


Figure 4.7: Percentage of respondents by household size

4.2 Mean Value for Hygienes Practices during MCO

Table 4.1 shows the mean analysis for each hygienes practices variable measured in this study. The mean analysis showed that Tanjong Malim community practicing a good hand washing technique suggested by the Ministry of Health Malaysia was high with a mean value of 4.36 and SD = 0.66. They are also practiced good personal hygiene by taking a quick shower after returning from public places with a mean value of 4.05 and SD = 0.82. The practicing shower for more than 15 minutes and more than three times per day was low, with a mean value of 2.44, SD = 1.32, and a mean value of 2.48, SD = 0.98, respectively.

The Tanjong Malim community also practiced immediate clothes washing after returning from public places relatively high with a mean value of 3.90, SD = 0.87. The attitude of separating the clothes during washing among the Tanjong Malim community was also relatively high, with a mean value of 3.95, SD = 0.93. The personal hygiene attitude, namely washing their hand before and after touching something inside and outside the house, was also high with a mean value of 4.55, SD = 0.7 and 4.67, SD = 0.5, respectively.

Table 4.1: Mean value for each variable in hygiene practices during MCO

	N	Mean	Std. Deviation
Practice an excellent handwashing technique suggested by the Ministry of Health Malaysia.	383	4.36	0.66

Table 4.1 (Continued)

Take a shower immediately after coming back from public places.	383	4.05	0.82
Take a shower more than 15 minutes after coming back from public places.	383	2.44	1.32
Take a shower more than three times per day.	383	2.48	0.98
Wash clothes immediately after coming back from the public.	383	3.90	0.87
Separate clothes during washing.	383	3.95	0.93
Do hand wash before touching or holding something while inside the house	383	4.55	0.70
Do hand wash after touching something from outside	383	4.67	0.582

Due to the covid-19 pandemic crisis, most of the respondents wash their hands at least twice a day, with a majority of 5 to 7 times a day (51.2%). The results were shown in Figure 4.8, below where the highest frequency recorded 5 to 7 times per day (51.2%), followed by twice to 4 times a day (21.1%) and more than ten times a day (9.9%). These results revealed that people in Tanjung Malim very consent about covid-19 very concerned about the possibility of them exposed to covid-19, which is why they take care of themselves by washing their hands every time they go out to touch something. The increase of frequencies was also believed to be due to enforcement of the Movement Control Order (MCO), where they need to stay inside the house most of the time.

MCO does increases not only the handwashing frequencies among the people in Tanjung Malim but also increases daily activities that involved the usage of water, namely taking a shower (24%), laundry (20%), cooking, and washing dishes (17%) (Figure 4.9). The increase in water consumption activities is that the Ministry of Health Malaysia suggested that the clothes used need to be washed immediately and take a quick shower after returning home. After going out to public places, covid-19 can stay at them for at least one day (Patients et al., 2020).

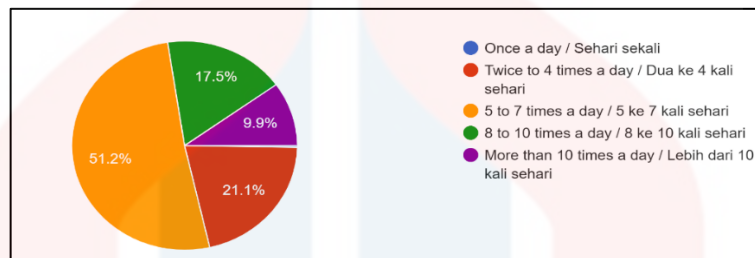


Figure 4.8: Percentage of respondents and the frequency of handwashing

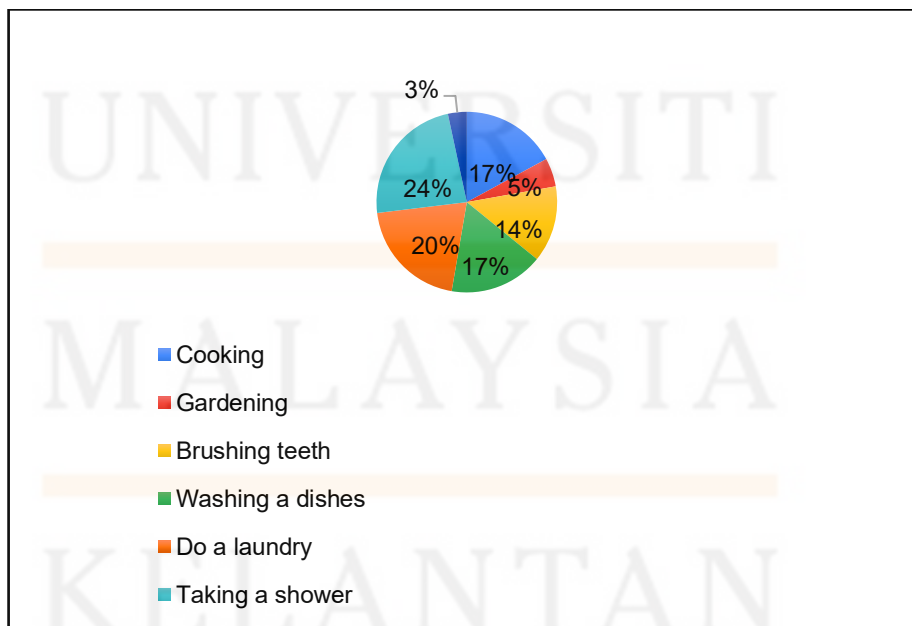


Figure 4.9: Percentage of respondents vs. water usage related to daily activities

4.3 Percentage of Water Bill

Figures 4.10 and 4.11 show the percentage of respondents who spent money on the water bill before and during MCO. Before MCO was applied, the majority of the respondents (48%) paid the water bill rate of RM35.00 to RM 55.00 per month, followed by 26.6% paid for above RM 55.00 monthly, 19.8% paid for RM 15.00 to RM 35.00, and only 5.5% paid water bill below RM 15.00. Therefore, the total monthly water bill during MCO was slightly increased due to increased water usage.

The majority of respondents, which is 43.6% paid for RM 35.00 to RM 55.00, followed by 38.9% paid water bill above RM 55.00 monthly, 14.6% of the community spent the water bill for RM 15.00 to RM 35.00, and only 2.9% paid water bill below RM 15.00 monthly currently. Based on the data, it can be seen that the percentage of respondents who paid water bill between RM 35.00 to RM 55.00 during MCO reduced by 4.4%, and this percentage was going to the higher water bill, which is more than RM 55.00 per month.

The rate of less than RM 15.00 per month also decreased from 5.5% before MCO to 2.9% during MCO. Similarly, the percentage who pay within RM 15.00 to RM 35.00 per month of a water bill decreased by 5.2% from 19.8% before MCO to 14.6% during MCO. So, in conclusion, people in Tg. Malim pays more water bill (> RM 55.00) during MCO than before MCO by 2.6% to 5.2%. Figure 4.12 shows the percentage difference in the total monthly water bill between before and after the MCO was applied.

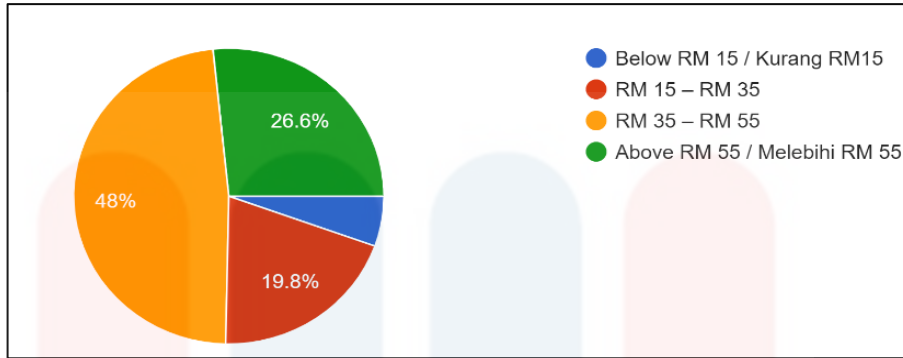


Figure 4.10: Percentage of respondents vs. monthly water bill before MCO

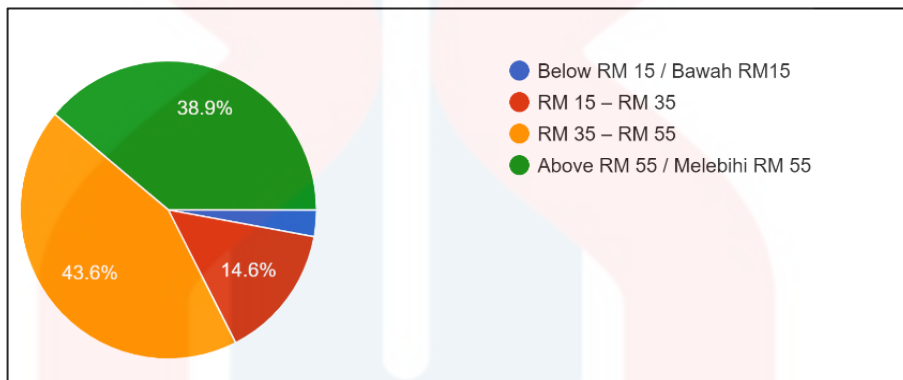


Figure 4.11: Percentage of respondents vs. monthly water bill during MCO

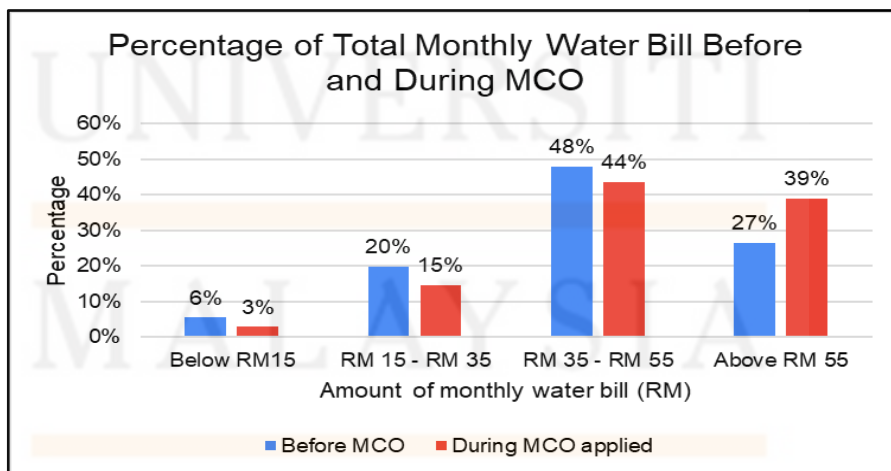


Figure 4.12: Percentage difference in the water bills

4.4 Correlation of Total Monthly Water Bill and Daily Activities

Pearson’s correlation was conducted to examine the relationship that determines the total monthly water bill pattern. Six variables (gardening, brushing teeth, washing dishes, taking a shower, do laundry, and cooking) were examined (Table 4.3). It can be seen from the correlation matrix that all out of all six variables were negatively correlated and significant in determining the total monthly water bill pattern. The weak negative correlation level and significant at $p < 0.01$ variable was washing dishes ($r = -0.196, p < 0.01$), followed by do laundry ($r = -0.191, p < 0.01$), also weak negative correlation and significant at $p < 0.05$ are cooking ($r = -0.189, p < 0.05$), brushing teeth ($r = -0.157, p < 0.05$), taking shower ($r = -0.067, p < 0.05$) and gardening ($r = -0.032, p < 0.05$). Meanwhile, Table 4.4 shows that all six variables were positively correlated and significant in determining the total monthly water bill pattern. The variable that was most strongly positive correlation and significant was taking a shower ($r = 0.85, p < 0.05$), followed by do laundry ($r = 0.345, p < 0.05$) which is weak positive and significant, cooking ($r = 0.137, p < 0.05$), washing the dishes ($r = 0.127, p < 0.05$), and gardening ($r = 0.008, p < 0.05$) are very weak positive correlation and significant. The level of correlation was determined based on Table 4.2

Table 4.2 : Range of Correlation Coefficient Values and the Levels of Correlation

Range of Correlation Coefficient Values	Level of Correlation	Range of Correlation Coefficient Values	Level of Correlation
0.80 to 1.00	Very Strong Positive	-1.00 to -0.80	Very Strong Negative
0.60 to 0.79	Strong Positive	-0.79 to -0.60	Strong Negative
0.40 to 0.59	Moderate Positive	-0.59 to -0.40	Moderate Negative
0.20 to 0.39	Weak Positive	-0.39 to -0.20	Weak Negative
0.00 to 0.19	Very Weak Positive	-0.19 to -0.01	Very Weak Negative

(Source: Meghanathan 2016)

Table 4.3: Correlation between total monthly water bill before MCO with daily activities

	Total monthly water bill before MCO	Gardening	Brushing teeth	Washing dishes	Taking shower	Do laundry	Cooking
Total monthly water bill before MCO	1						
Gardening	-.032	1					
Brushing teeth	-.157	.476**	1				
Washing dishes	-.196**	.375**	.786**	1			
Taking shower	-.067	.181**	.381**	.485**	1		
Do laundry	-.191**	.273**	.573**	.728**	.665**	1	
Cooking	-.189	.366**	.769**	.978**	.496**	.745**	1

**Correlation is significant at the 0.01 level (2-tailed).

Table 4.4 : Correlation between total monthly water bill during MCO and daily activities

	Total monthly water bill during MCO	Gardening	Brushing teeth	Washing dishes	Taking shower	Do laundry	Cooking
Total monthly water bill during MCO	1						
Gardening	0.008	1					
Brushing teeth	.112*	.476**	1				
Washing dishes	.127*	.375**	.786**	1			
Taking shower	.85	.181**	.381**	.485**	1		
Do laundry	.345	.273**	.573**	.728**	.665**	1	
Cooking	.137	.366**	.769**	.978**	.496**	.745**	1

** . Correlation is significant at the 0.01 level (2-tailed).

This association demonstrates an increase in household water consumption as such factors as an activity related to water usages such as taking a shower, doing laundry, and cooking increase. Simultaneously, there is a weak relationship between household water consumption and daily activities related to household water usage before MCO is applied. This implies that the higher the number of people living in a household, the higher the quantity of water consumed per day. Furthermore, the higher the daily activities related to water usage, the more water that is consumed. This is simply because MCO enforcement has made people stay longer at home. This may also result from different attitudes toward environmental issues, where individuals in the community possess less information about and give less attention to water conservation (Mahat et al., 2016).

4.5 Correlation between Water Bills and Frequency of Handwashing Activities

Also, Pearson's correlation was conducted to examine the relationship between the total monthly water bills and handwashing frequency. It can be seen (Table 4.5) in the correlation matrix that the total monthly water bill before MCO was weak positive correlated and significant ($r = 0.16$, $p < 0.005$). Meanwhile, the most moderate positive correlated and significant correlation variable was the total monthly water bill during MCO ($r = 0.57$, $p < 0.05$). This illustrates that personal hygiene, such as increasing wash hands frequency, will slightly increase the total monthly water bills during MCO. This is because on an early stage of pandemic outbreaks, the (World Health Organization (WHO), 2020) has declared that perform hand hygiene at the right time and proper techniques with either soap and water or alcohol-based hand rub for about 40-60 seconds and 20 seconds if the hand visibly dirty and not visibly dirty

respectively to act as mitigation step from the spreading of the virus among the community.

Table 4.5: Correlation between total monthly water bills and the frequency of handwashing activities

	Total monthly water bill before MCO	Total monthly water bill during MCO	Wash Hand
Total monthly water bill before MCO	1		
Total monthly water bill during MCO	.777**	1	
Wash Hand	0.16	0.57	1

**Correlation significant at 0.01 level (2-tailed)

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study investigated the percentage of monthly water bills (water consumption) before and during MCO and the factors that influence household water consumption in the Tanjung Malim community during MCO. The results showed that household water consumption was slightly increasing in water bill during MCO. The percentage for water billed below RM 15 was decreased by half during MCO, RM 15 – RM 35 was reduced by 5% during MCO applied. Next, the total water billed for RM 35 – RM 55 was the most amount of water billed paid for before and during MCO applied; meanwhile, above RM 55 was increase 8% in total water bill during MCO. Household water consumption in Tanjung Malim is highly influenced by daily activities related to water usage factors taking a shower, doing laundry, cooking, washing the dishes, brushing teeth, and gardening. Also, the correlation between the

water billed and daily activities that applied water usage was significant. This study concluded that MCO enforcement had restricted all people's movement, making many workers work from home and close almost all economic and institution sectors, contribute to an increase in household size and increase the daily activities towards water usage.

Due to COVID-19, most people keep excellent personal hygiene, improve taking shower, and handwash activities also one of factor is the increased water bill within MCO. This can be seen in the correlation of handwashing, and total water billed shown that the correlation during MCO was moderate positive significant.

5.2 Recommendations

This study's finding can be a reference for local authorities, especially clean water providers, to set a minimum daily production to avoid water disruption. It can also be suggested that a similar study could be conducted in the area with higher populations to get more data to conclude the total percentage of water consumption during MCO. If possible, further research should use the interview method to avoid biasedness.

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APPENDIX

Dear respondents,

I am a final year student from Bachelor of Applied Science (Sustainable Science) with Honours of Universiti Malaysia Kelantan (UMK) and currently surveying of household water usage during movement control order (MCO) due to COVID-19 among Tanjung Malim, Perak community.

The objectives of this study are:

- i. To determine the water usage before and during MCO, among Tg. Malim, Perak community.
- ii. To determine the daily activities related to water usage during MCO among Tg. Malim, Perak community.
- iii. To determine the percentage of increase in water consumption during MCO among Tg. Malim, Perak community.

I am very grateful if you can take a moment to answer the questionnaire and give some valuable information. All the information will be treated as private and confidential. Also, it will be used for academic purposes only. Your kind participation in this study is greatly appreciated. THANK YOU FOR YOUR COOPERATION.

If you have any questions or require more information about this study, please do not hesitate to contact me,

Siti Maryam bt Mohd Helmy 012-2135416.

SECTION A (Head of the Household demographic).

Question 1. Gender

- Male
- Female

Question 2. Age

- Below 24 years
- 24 – 35 years

36 – 45 years

45 – 55 years

Above 55 years

Question 3. Education

Secondary

Certificate/diploma

Degree

Master/PhD

Question 4. Household size

1 person

2 to 4 persons

5 to 7 persons

8 to 10 persons

More than 10 persons

Question 5. Please specify your ethnicity

Malay

Chinese

Indian

Others _____ (Please specify)

Question 6. Are you married?

Yes

No

Widow/widower

Question 7: What is your annual household income?

- below RM 1500
- RM 1500 – RM 3000
- RM 3000 – RM 6000
- RM 6000 – RM 9000
- above RM 9000

Question 8: What is your current employment status?

- Employee
- Self-employed
- Worker
- Not working

Question 9: How many children do you have?

- 1 child
- 2 to 4 child
- 5 to 7 child
- 8 to 10 child
- above 10 child

Q 10: Please specify your religion

- Muslim
- Buddhist
- Hindu
- Christian
- Others : _____ (please specify)

SECTION B

(Choose the item that describes your hygienes practices during MCO)

Question 1. How often you wash your hand in a day?

- Once a day
- Twice to 4 times a day
- 5 to 7 times a day
- 8 to 10 times a day
- More than 10 times

Question 2. I'm practicing a good handwashing technique suggested by the Ministry of Health

- strongly disagreed
- disagreed
- not sure
- agreed
- strongly agreed

Question 3. I took a shower immediately after coming back from public places

- strongly disagreed
- disagreed
- not sure
- agreed
- strongly agreed

Question 4. I took a shower more than 15 minutes after coming back from public places

- strongly disagreed
- disagreed
- not sure
- agreed
- strongly agreed

Question 5. I took a shower more than three times per day

- strongly disagreed
- disagreed
- not sure
- agreed
- strongly agreed

Question 6. I washed my clothes immediately after coming back from public places

- strongly disagreed
- disagreed
- not sure
- agreed
- strongly agreed

Question 7. I separated my clothes during washing

- strongly disagreed
- disagreed
- not sure
- agreed
- strongly agreed

Question 8. I wash my hand before touching or holding something (inside the house)

strongly disagreed disagreed not sure agreed strongly agreed

Question 9. I wash my hand after touching something from outside

strongly disagreed disagreed not sure agreed strongly agreed

Question 10. Choose your daily activities that apply the most water usage during MCO

Cooking Gardening Brushing teeth Washing the dishes

Taking shower Do a laundry

SECTION C

Question 1. How much is your total monthly water billed before MCO?

- Below RM 15
- RM 15 – RM 35
- RM 35 – RM 55
- Above RM 55

Question 2. How much your monthly water billed after MCO?

- Below RM 15
- RM 15 – RM 35
- RM 35 – RM 55
- Above RM 55

Question 3. Do you aware there are slight changes in your water bills during MCO?

- Yes
- No
- Not sure

Question 4. Do you expect an increase in water usage during MCO as compared to before?

- Yes
- No
- Not sure

Question 5. Do you practice any sustainable water usage during MCO?

- No
- Yes

Not sure

Question 6. If yes, please state what are the practices that you practice:

Question 7. Do you think that the large number of households is a factor that can contribute to the increasing in water bills during MCO?

Yes

No

Not sure

Question 8. Do you think other factors can contribute to increased water bills during MCO?

No

Yes

Not sure

Question 9. If yes, please specify the factors:
