



UNIVERSITI PUTRA MALAYSIA

**KNOWLEDGE, ATTITUDE AND PRACTICE ON COVID-19
PREVENTION AMONG MEDICAL STUDENTS OF FACULTY OF
MEDICINE AND HEALTH SCIENCES,
UNIVERSITI PUTRA MALAYSIA**

GROUP 14

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CHAPTER 1

INTRODUCTION

1.1 Background

Coronavirus Disease 2019 (COVID-19) is an infectious disease due to newly discovered coronavirus from the pneumonia outbreak in Wuhan, China in December 2019. COVID-19 caused by the Severe Acute Respiratory Syndrome(SARS)-CoV-2 is the first disease caused by a coronavirus to be declared pandemic by the World Health Organization(WHO) (Heet. al., 2020). The outbreak is likely to have started from a zoonotic transmission event associated with a large seafood market that also traded in live exotic animals, it soon became clear that efficient person-to-person transmission was also occurring (Li, et al., 2020). A person can become infected from respiratory droplets when an infected person coughs, sneezes, or talks. Furthermore, others can also be infected by touching a surface or object that has the virus on it, and then by touching their mouth, nose, or eyes.

54.3% of those infected with COVID-19 are male with a median age of 56 years (Wang et al., 2020) To date, most COVID-19 infected patients have developed mild symptoms such as dry cough, sore throat, and fever. The majority of cases have spontaneously resolved. However, some have developed various fatal complications including organ failure, septic shock, pulmonary oedema, severe pneumonia, and Acute Respiratory Distress Syndrome (ARDS) (Chen et al., 2020). Impacts of COVID-19 Pandemic on Mental Health in Malaysia (Shanmugam, Juhari, Nair, Ken, & Guan, 2020). Facemasks and similar barriers to prevent respiratory illness such as COVID-19 (Brainard, Jones, Lake, Hooper, & Hunter, 2020). In March 2020, Malaysia recorded the highest number of COVID-19 cases in Southeast Asia with more than 35% of new COVID-19 cases linked to the Sri Petaling gathering, a Moslem missionary movement attended by more than 19 000 people of different nationalities in Kuala Lumpur. From this cluster, 1701 samples have been tested positive out of 21 920 tests carried out (Che, Atan, Abdul, Safuan, & Sabreena, 2020). To control the spread of infection, the Malaysian government decided to implement a nationwide Movement Control Order (MCO) effective from 18 March 2020. Thus, it is really important to determine the level of knowledge,

attitude and practice on COVID-19 among Malaysian especially in the medical and healthcare field. Knowledge, attitude and practice on COVID-19 prevention among people in Malaysia were influenced by many factors, including socio-demographic factors. Recent studies found that the increased communication surrounding the spread of this disease on social communication channels has captivated the public and increased general awareness on the disease (Hanafiah & Da, 2020).

Based on the study that was conducted among the Chinese residents in Hubei, China, the author reported that most of the residents there were highly knowledgeable, had optimistic attitudes and practised strict precaution regarding the COVID-19 (Zhong BL et al., 2020). Azlan et al. (2020) reported that Malaysians had a high knowledge, positive attitude and good practice due consistent messaging from the government and/ or health authorities regarding COVID-19 that improved these variables.

However, not much study and research has been conducted to determine the level of knowledge, attitude and practice on COVID-19 prevention among the public especially university students and there is the fact that the both itself does influence the transmission of COVID-19. Therefore, this research conducted particularly in University settings which consist of medical students. Medical students are used as the sample population for this study and it does not represent the public population.

1.2 Problem Statement

Recently, statistics showed that the number of people that were affected by COVID-19 had risen from day to day. But, there is still no specific treatment that can be used in order to eradicate this virus for good. A first generation of COVID-19 vaccines is expected to gain approval as soon as the end of 2020 or early 2021 (Peiris & Leung, 2020). The scenario about this pandemic could become worse if there is no proper prevention that is being practised.

In the meantime, there is a lack of study run by the researchers as this pandemic is not fully known and understood. According to Hossain (2020), more study needs to be conducted in

rural areas, including socio economics characteristic and effect of this virus. Because of these reasons, we decided to study the knowledge, attitude and practice of COVID-19 as it can represent the level of COVID-19 prevention. Medical students chosen as they would become one of the future healthcare workers plus the awareness regarding this pandemic is highly valuable in our consideration. Next, this study is conducted at the Faculty of Medicine and Health Sciences, UPM (FMHS, UPM) because this faculty mainly focuses in the health field and becoming one of the sectors in producing highly skilled future healthcare workers such as nurses, doctors, dietician and nutrition. FMHS, UPM carry the responsibility when it comes to health sectors because they offer the health-related courses. Thus, this study aims to measure the knowledge, attitude and practice of COVID-19 prevention among the medical students in Faculty of Medicine and Health Science, Universiti Putra Malaysia and its association to the various sociodemographic factors as there is lack of study and data.

1.3 Significance of Study

It is important that we studied the level of knowledge, attitude and practice on COVID-19 prevention among medical students in the Faculty of Medicine and Health Sciences of Universiti Putra Malaysia. This is because pandemic COVID-19 has triggered lockdowns in dozens of nations and claimed more than 100,000 lives in only a few months. And the disease continues to spread. By knowing the level of knowledge, attitude and practice of COVID-19 prevention among medical students in Faculty of Medicine and Health Sciences of Universiti Putra Malaysia, we able to find a better resolution such as hygiene policies by the university authority that be made available in order to improve hygiene practice among students in Universiti Putra Malaysia and hence prevent the coronavirus infection from university. Currently, there is limited data from past studies which have attempted to research on COVID-19 literacy among medical students specifically. The findings of this research will be of great use in future studies of designing COVID-19 literacy in a way which may increase the awareness among medical students in the Faculty of Medicine and Health Sciences in preventing COVID-19.

The level of COVID-19 literacy that we obtained from this study beneficial in improving awareness regarding the importance of hygiene practice, not only to students in Faculty of

Medicine and Health Sciences but also promotes awareness among family members, community, public, employers and workplace, the government sectors and also to non-government bodies. By initiating strong awareness on hygiene practice, better support plans by workplace and hygiene policies by the governments can be made available such as regularly disinfecting the workplace in order to eradicate coronavirus from Malaysia.

1.4 Limitation of Study

The temporal sequence of exposure and effect was difficult or impossible to determine since this study is cross sectional study. A few types of bias occurred from this study such as information bias and non-response bias. Besides that, respondents might intendedly modify their answers on knowledge, attitude and practice of COVID-19 prevention to meet the current proper norms instead of expressing their real experience. Then, the result of this study cannot be generalized to other medical students in other universities in Malaysia. This is because the research only focuses on the medical students in the Faculty of Medicine and Health Sciences, UPM. .

1.5 Objective of Study

1.5.1 General Objective

To determine the association between sociodemographic factors and knowledge, attitude and practice of COVID-19 prevention among medical students of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

1.5.2 Specific Objective

1. To determine the sociodemographic factors, level of knowledge, attitude and practice towards COVID-19 prevention among the respondents;
2. To determine the association between sociodemographic factors and level of knowledge, attitude and practice towards COVID-19 prevention among the respondents;
3. To determine the association between level of knowledge and attitude towards COVID-19 prevention among the respondents;
4. To determine the association between level of knowledge and practice towards COVID-19 prevention among the respondents;
5. To determine the association between attitude and practice towards COVID-19 prevention among the respondents.

1.6 Research Questions

What are the factors associated with knowledge, attitude and practice of COVID-19 prevention among medical students of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

1.7 Research Hypothesis

1. There is a significant association between sociodemographic factors and level of knowledge, attitude and practice towards COVID-19 prevention among the respondents;
2. There is a significant association between level of knowledge and attitude towards COVID-19 prevention among the respondents;
3. There is a significant association between level of knowledge and practice towards COVID-19 prevention among the respondents;
4. There is a significant association between attitude and practice towards COVID-19 prevention among the respondents.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction about COVID-19

2.1.1 Introduction about family *Coronaviridae*

SARS-CoV-2 is a member of the family *Coronaviridae* and order *Nidovirales*. Coronaviruses usually cause respiratory and gastrointestinal tract infections and are genetically classified into four major genera: *Alphacoronavirus*, *Betacoronavirus*, *Gammacoronavirus*, and *Deltacoronavirus*. The first two genera mainly infect mammals while the later two mainly infect birds (Wu et al., 2020). The name "coronavirus" originates from the crown-like projections on their surfaces. "Corona" in Latin means "halo" or "crown." Corona viruses are enveloped single-stranded RNA viruses (Hossain, 2020).

In addition to SARS-CoV-2, other members of the *Betacoronavirus* genus caused the 2003 SARS (severe acute respiratory syndrome) outbreaks and the 2012 MERS (Middle East respiratory syndrome) outbreaks in humans (Drosten et al., 2003). SARS-CoV and MERS-CoV are of bat origin, but both coronaviruses had an intermediate host which is palm civets for SARS-CoV (Guan et al., 2003) and dromedary camels for MERS-CoV (Azhar et al., 2013). The coronavirus may cause various symptoms, including pneumonia, fever, trouble breathing, and lung infection.

Based on the medical letter of CDC & FDA, results showed that the incubation period of COVID-19 is within the range of 2-14 days with 95% confidence and had a number of mean around 5 days when approximated using the lognormal best fit distribution. The mean time from the onset of illness to hospital admission (for diagnosis and/or isolation) was calculated to be 3-4 days without truncation and 5-9 days if correctly truncated. They stated that based on the 95th percentile estimate of the incubation period, they recommended that the length of quarantine should be at least 14 days. When calculating the probability of COVID-19 case fatality, the median time interval of 13 days from disease onset to death (17 days with correct truncation) should be considered.

2.1.2 Transmission

A coronavirus (SARS-CoV) is considered as the etiological agent of SARS. Further analysis found that the first transmission of the virus to human hosts was possibly from zoonotic reservoirs in southern China in Guangdong province, including bats, Himalayan palm civets (*Paguma larvata*), and raccoon dogs (*Nyctereutes procyonoides*), the latter two of which are sold on exotic animal markets (Graham & Baric, 2010). Past studies indicated that besides humans, SARS-CoV may also have a wide host range. SARS-CoV was transmitted directly from market civets to humans and is believed to have originated in bats (Cui et al., 2019)

The zoonotic origin of SARS-CoV-2 in Wuhan, China, can be strongly associated with the wet animal market since a large number of people who got an infection in the beginning were exposed to it (Rothan & Byrareddy, 2020). There were several attempts to confirm the primary host or intermediate carriers from which the infection may have been transmitted to humans. Apart from bats, several other hosts of animals have been reported as reservoirs of viruses. Ji et al. (2020) demonstrated snakes as a possible virus reservoir for human infection while Lam et al. (2020) identified SARS-CoV-2-related coronaviruses in pangolins (*Manis javanica*).

Transmission from person to person is confirmed because there is rapid spread among humans. The virus spreads by coughing or sneezing of an infected person and leaves small droplets in the air or by stool. Thus the person who inhales such droplets or touches the infected surfaces may get infected too. Ghinai et al. (2020) found that person-to-person transmission of SARS-CoV-2 may occur as a result of prolonged and unprotected exposure to the infected person that suggests constant pathogenic pressure leading to infection and illness.

2.1.3 Risk Factor

Medical expert group of Tongji Hospital reported an age distribution of adult patients between 25 and 89 years old. Most of the patients were between the ages of 35 and 55, and fewer cases among children and infants were found. An analysis of the virus' early transmission dynamics found that the median age of patients was 59 years, ranging from 15 to 89 years, with the majority (59%) being male (Li et al.,2020). It has been proposed that the most at risk group could be people with impaired immune function, such as the elderly and those with renal and hepatic dysfunctions.

As reported by the World Health Organisation (WHO) in February 2020, there was no death from coronavirus infection in the 0–9 age group and death rates were 0.2 percent in the 10–19 age group; however, death rates are 8.0 percent and 14.8 percent respectively in the 70–79 age group and > 80 years. COVID-19 primarily affects males (58.1%), especially of Asian ethnicity; this may be due to increased expression of the hACE-2 receptor in their gene and also due to higher smoking levels, which also contributes to increased expression of the hACE-2 receptor (Cai, 2020).

Immunocompromised conditions such as hypertension and diabetes are possible risk factors for the production of extremely infectious infections, such as novel infection with coronavirus. It is necessary to be cautious for children and adolescents with poor immune function or on immune suppressant medication. Because of their immunocompromised state, preterm babies and newborn babies with a low birth weight are also at risk.

The major underlying comorbidities that complicate the course of COVID-19 by increasing the severity of illness, use of mechanical ventilation and length of ICU stay and thus increase the mortality include uncontrolled hypertension, diabetes, coronary heart disease, hepatitis B, cerebrovascular disease, chronic obstructive airway disease and others like cancer, chronic kidney disease and immunodeficiency. Hypertension (15%) was followed predominantly by diabetes (7.4%), the likely explanation for this could be due to hACE-2 receptor polymorphism in the Asian population (Guan et al., 2020)

A study was conducted in Tongji Hospital identified 269 (49.1%) of 548 COVID-19 patients as severe cases on admission. Older age, underlying hypertension, high levels of cytokine (IL-2R, IL-6, IL-10 and TNF- α), and high levels of lactate dehydrogenase on admission were significantly correlated with extreme COVID-19. The prevalence of asthma in patients with COVID-19 was 0.9%, significantly lower than that in the adult population of Wuhan. The estimated mortality in nonsevere patients was 1.1 per cent and in severe cases 32.5 per cent during the average follow-up period of 32 days (Li et al., 2020).

2.1.4 Clinical Manifestation

Initially, the symptoms of COVID-19 begin with symptoms of fatigue, low-grade intermittent fever of prolonged duration, myalgia, dry cough, and shortness of breath, which either improve with early identification and conservative management or worsen and advance to dyspnoea and productive cough. The median time onset of dyspnoea from various cohorts was found to be 6 days following exposure. The median time required for admission, ARDS development and mechanical ventilation and ICU care was 8, 8.2 and 10 days, respectively (Zhou et al., 2020).

The most common complications that develop in COVID-19 are bilateral pneumonia which may progress to ARDS, sepsis and septic shock, acute kidney injury (AKI) and others such as acute cardiac injury (arrhythmias, heart failure, MI), coagulopathy, rhabdomyolysis, hyponatremia and acidosis. Complications are more in severe disease if compared to non-severe disease (Guan et al., 2020)

2.1.5 Treatment and Management

Recently, antiviral activity against SARS-CoV-2 infection was demonstrated by two licensed nucleoside analogues which are ribavirin and favipiravir (Wang et al., 2020). Nucleoside analogs function in targeting RNA-dependent polymerase RNA and inhibiting the replication cycle in a wide variety of RNA viruses. Both medications are well absorbed in the gastrointestinal tract (98 percent bioavailability) and metabolized in the liver following oral administration, and the metabolites are excreted in urine.

Also investigated were two experimental nucleoside analogs remdesivir (GS-5734) and galidesivir (BCX4430) against infection with SARS-CoV-2. Remdesivir has recently been shown to inhibit SARS-CoV-2 by integrating it into nascent viral RNA chains leading to premature termination of viral RNA chains (Wang et al., 2020). In Malaysia, Health director-general Datuk Dr Noor Hisham announced that remdesivir has been used to treat COVID-19 patients in Malaysia.

Drugs including disulfiram, lopinavir, and ritonavir have antiviral activity against coronaviruses in humans. The drug is also reported to inhibit the papain-like MERS and SARS protease in cell line models (Agostini et al., 2018). In addition, lopinavir and ritonavir are the HIV protease inhibitors that also have efficacy against 3-chymotrypsin-like protease of MERS and SARS (Sheahan et al., 2020; Kim et al., 2016; Chan et al., 2015). Currently, vaccines that can protect against CoV infection are still in investigation and the first generation of COVID-19 vaccines is expected to gain approval as soon as the end of 2020 or early 2021 (Peiris & Leung, 2020).

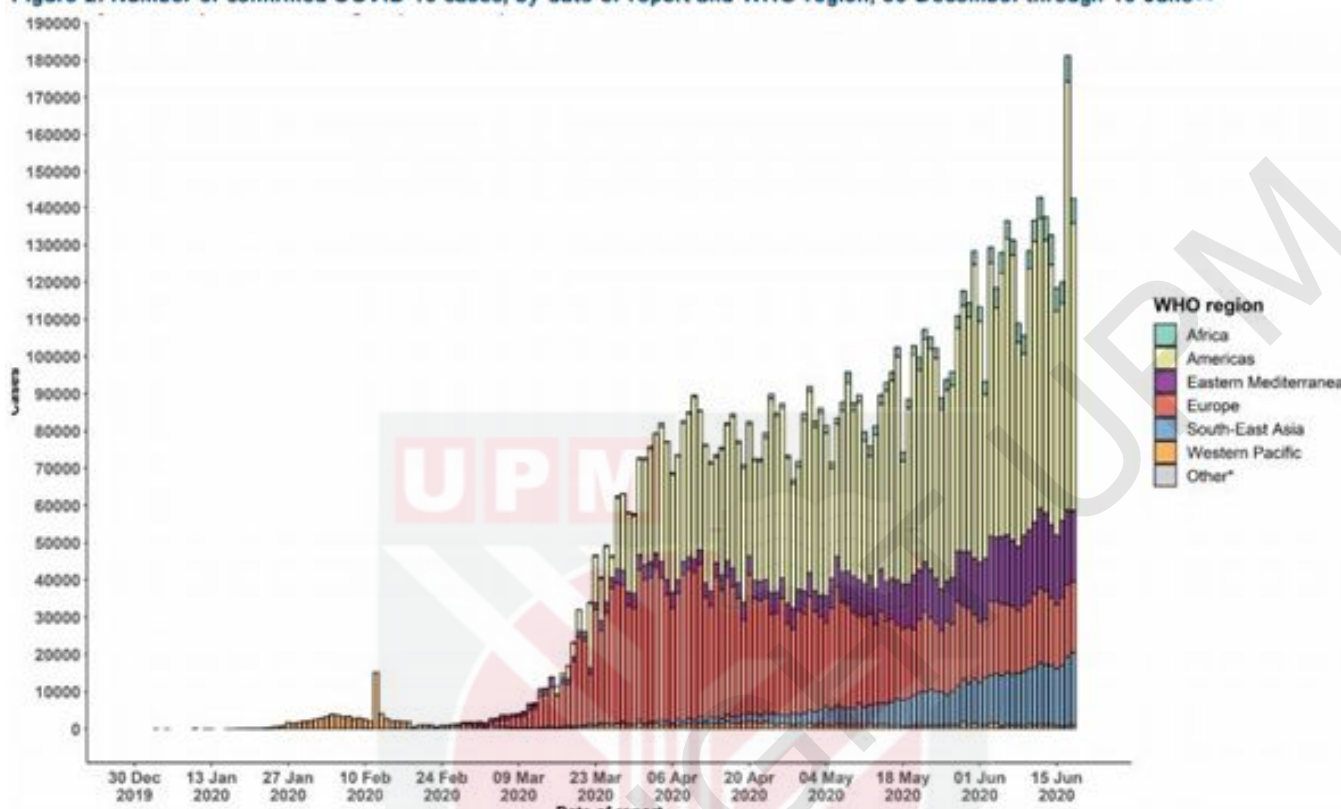
2.2 Prevalence of COVID-19

2.2.1 Worldwide Prevalence & Rate

More than eight million cases of COVID-19 had been recorded globally. On 19 June 2020, the World Health Organisation had confirmed a total of 8 385 440 cases of COVID-19 recorded, including 450 686 deaths and the incidence of cases rising from day to day (WHO, 2020). On 19 April 2020, the total cases reported was 2 241 778 cases and on 19 May 2020, the total cases of COVID-19 were 4 711 830 cases. The trend for the case increased from April to June as it doubled from April to May and rose rapidly from May to June with differences of 3 673 610 cases. But the mortality rates showed decreased as 6.80 % (April), 6.70 % (May) and kept declining to 5.37 % (June) on 19th of the respective month. There are around 204 countries that have been affected by COVID-19 since it was started in Wuhan, China in late December 2019. COVID-19 impacts the entire world, but it is important to note that for the most vulnerable communities, this is only one of the many challenges they face (WHO, 2020).

According to WHO, America is the first runner up region on the list regarding the COVID-19 cases with 4 092 526 cases, followed by Europe (2 490 815 cases) and Eastern Mediterranean (856 650 cases) on 19 June 2020. As for the mortality rates, America has the highest rates with 47.6% and followed by Europe (42.4%) which made up to 90% of total mortality cases globally for the current situation. However, reviewing the past data of COVID-19 cases for the past 2 months, it showed that European was the first region on the list of COVID-19 cases before surpassed by America the following month. Then, America also showed a rise in trend as 821 860 cases (19th April) to 2 069 661 (19th May) and doubled its numbers to current cases. The chart below is showing the trend of cases that have been reported and confirmed from December 2019 to June 2020 which generally the cases have risen especially from 9 March 2020 to 6 April 2020.

Figure 2. Number of confirmed COVID-19 cases, by date of report and WHO region, 30 December through 19 June**

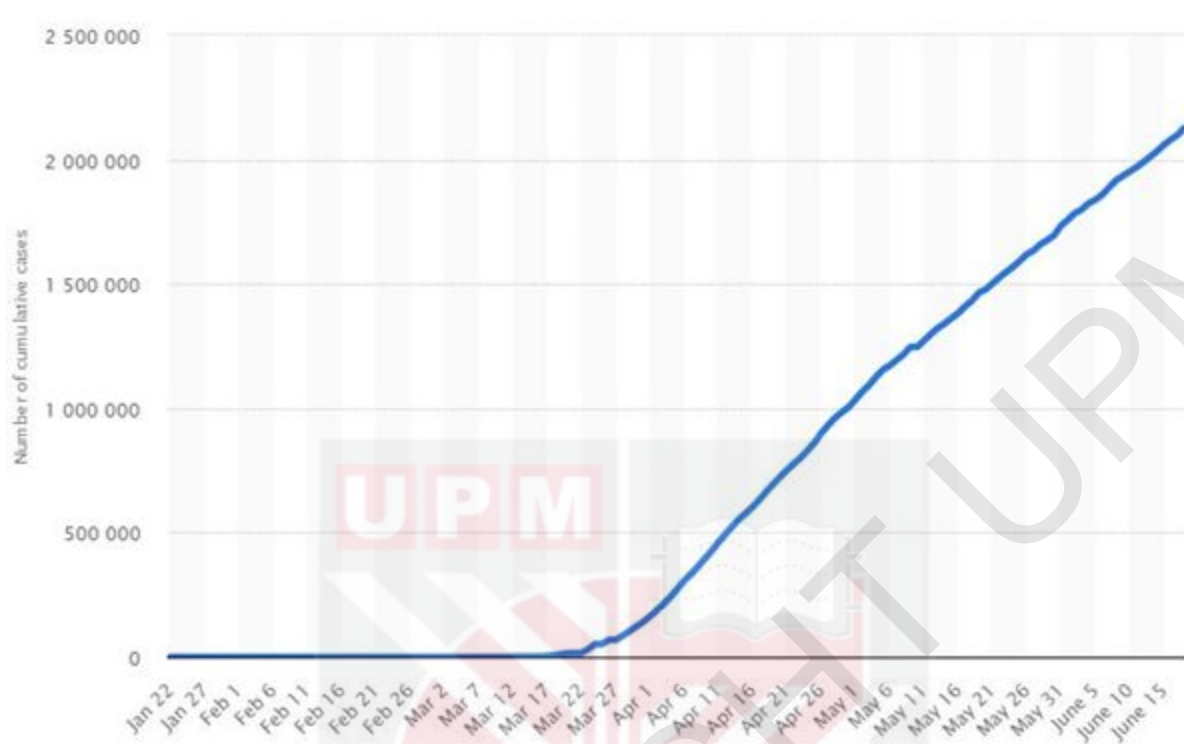


The chart showing the number of confirmed COVID-19 cases, by date of report and WHO region, 30 December through 19 June (WHO, 2020)

Recently from mid-April to mid-June-in just two months, six million cases and you can see from this how the virus speeds up and moves really fast (WHO, 2020). SARS-CoV-2 is a highly infectious virus with human-to - human transmission capability (Srivastava et al., 2020). The statement above shows that COVID-19 could easily infect a person to another because of its mode of transmission through direct contact and long duration of keeping alive. Then, because of the virus capability, WHO had recorded that the United States is the country with the highest cases of COVID-19 of 2 149 166 cases and represent 25.61% of total cases globally between April to June. Then, followed by Brazil (955 377 cases), Russia (569 063 cases) and India (380 532 cases) as top 4 countries in the list of COVID-19 cases. These countries may only have a low number of positive cases at the beginning of the outbreak but it rapidly rose with time. As

reported by WHO, coronavirus started with a few positive cases, but increased more than tenfold within 10 days due to its highly contagious nature (Srivastava et al., 2020).

Then, analysing cases in the United States should be carried out as it was the highest country of COVID-19 cases. While the average daily recorded cases and deaths are decreasing, the 7-day average daily incidence of COVID-19 cases indicates continuing population transmission (Stokes et al., 2020). COVID-19 events in the United States account for less than one-third of the worldwide estimate (Elflein, 2020). Next, the coronavirus hit the country in mid-March, and cases began to rise at an alarming rate (Elflein, 2020). The United States also has carried out more tests than any other country to help health authorities manage the continued spread of the disease (Elflein, 2020). Similar to previous studies on case monitoring of COVID-19, severe outcomes were more frequently identified among older people and those with existing health conditions in the United States (Stokes et. al., 2020). Stokes et al (2020) also stated that hospitalizations were six times higher and deaths were 12 times higher among those with underlying conditions reported compared to those with none reported in the United States. The graph below showing the increased cumulative cases of COVID-19 reported in the United States 22nd May to the 15th June.



The graph shows cumulative cases of COVID-19 in the U.S. from January 22 to June 18, 2020, by day (Elflein, 2020)

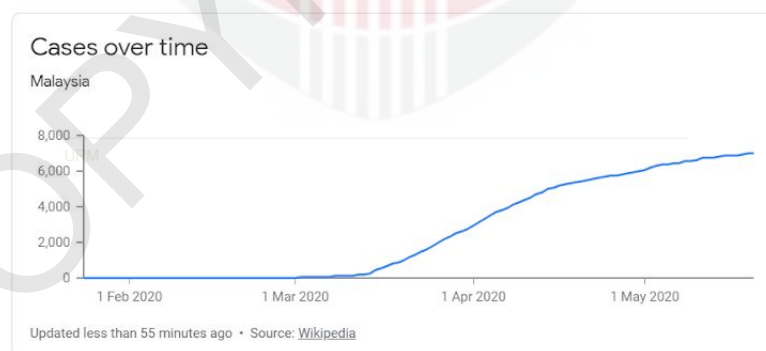
2.2.2 Prevalence in Malaysia

Health director-general Datuk Dr Noor Hisham reported that a number of 6 more COVID-19 cases on Friday (June 19 2020), bringing the total number of COVID-19 infections in the country to 8,535 in Health Ministry's daily COVID-19 media briefing. The COVID-19 recovery rate is now at 93.80% out of the total number of positive cases on June 19 2020. Dr Hisham also announced one new death, putting the death toll at number of 121 on June 19 2020.

The government declared a Movement Control Order (MCO) as part of a social distancing measure from March 18 until April 14. This was later extended to May 12 for continued efforts to reduce virus spread. In short, the restrictions ban mass gatherings and travel

overseas. All educational institutions, businesses and premises, except those involved in essential services, will be closed. The prime minister announced that Malaysia will enter a Recovery MCO (RMCO) phase from June 10 to August 31. Under the RMCO, many restrictions of the MCO will be relaxed.

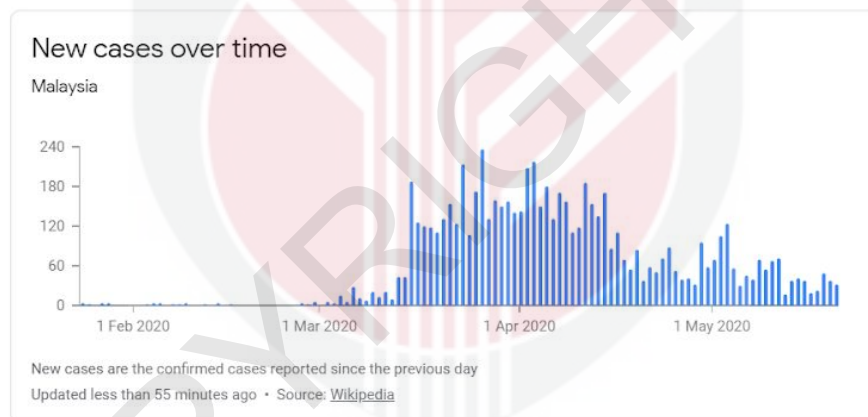
The Star Malaysia announced its first COVID-19 cases involving three tourists from China who had entered Malaysia from Singapore via Johor on Jan 23. Then, by Feb 16, the number of cases increased to 22 representing a first wave of cases. A second wave of cases began on Feb 27 and since then more than 1,000 people have been affected by the coronavirus. According to Google News (2020), the trend of COVID-19 cases in Malaysia is increasing from 1 March 2020 (29 confirmed cases) to 20 May 2020 (7009 confirmed cases) after experienced a significant rise in cases following a Tablighi Jamaat event held at Jamek Mosque in Sri Petaling, Kuala Lumpur, where many people are believed to have been infected. Anne (2020) stated that by 11 March, the Malaysian authorities began to track 5,000 of its citizens believed to have been exposed to the virus in a gathering at a Tablighi jamaat event in the capital city of Kuala Lumpur which being initiated following the first positive case in neighbouring Brunei with source of infection from Malaysia.



The graph showing cases over time in Malaysia from February to May (Google News,2020)

According to Google News (2020), the trend of new COVID-19 cases rate in Malaysia showed an increase drastically from 12 March 2020 (9 new cases per day) to 15 March 2020 (186 new cases per day) due to Tablighi jamaat event in Kuala Lumpur. The peak was on 26

March 2020 that a number of 235 new cases were recorded. Prime Minister Muhyiddin Yassin held a live nationwide telecast to inform the decision of the federal government to implement the Movement Control Order (Sukumaran & Tashny, 2020). The trend showed downward after mid of April 2020. On 17 April 2020, health director-general Datuk Dr Noor Hisham Abdullah said that Malaysia is seeing a downward trend in the number of individuals who tested positive for COVID-19 after the Movement Control Order has been applied for 1 month. The new COVID-19 cases rate in Malaysia from 15 April 2020 (85 new cases per day) decreased to 20 May 2020 (30 new cases per day). Lowest figure since MCO phase recorded from 8 June till 10 June (2 cases per day). The government announced 27 districts as red zones including Lembah Pantai (592), Hulu Langat (446), Petaling Jaya (366), Seremban (288), Kuching (255), and Kluang (221), because of the large cumulative number of positive cases detected in those areas.



The graph showed new cases over time in Malaysia from February to May (Google News,2020)

Selangor, in Malaysia had recorded the second highest number of confirmed COVID-19 cases (2,006) to date (19th April 2020) after Kuala Lumpur with 2,422 Covid-19 cases. The number of deaths recorded so far is 24 in Selangor. The statistics are due to the density of the residents of Selangor who make up more than 20 percent of the population of Malaysia (Muthiah, 2020). The Ministry of Health (MOH) had previously reported that Selangor was a relatively critical state in terms of the number of positive COVID-19 infections, with some districts showing the highest infection prevalence (Azil,2020).

2.3 : Knowledge , Attitude and Practice on COVID-19 Prevention

It is very important for students to have a high level of knowledge, good attitude and strict practice toward COVID-19 as a total prevention measure.

2.3.1 Knowledge on COVID 19

First, the knowledge of COVID-19. Kebede et al. (2020) proposed that the level of knowledge that is promising to protect the most at-risk segment of the population could divert attention from the young / adult public to the adoption of preventive measures. 79.6 percent of the medical students who participated in this study had a high degree of related knowledge, which was higher than the previous surveys of health care professionals (Taghrir et al., 2020). Overall knowledge of the symptoms and unavailability of the vaccine or specific antiviral therapy against COVID-19 was good, with 90 per cent of participants having knowledge of the symptoms and over 80 per cent of participants having knowledge of the unavailability of the vaccine and treatment (Alzoubi et al., 2020). Students represent a strong relationship between their deep understanding and the knowledge available in the literature and media on COVID-19 (Alzoubi et al., 2020). Health authorities have consistently disseminated COVID-19 information since the disease was first detected in Malaysia (Azlan et al., 2020)

2.3.1 Knowledge on COVID-19 Prevention

There were knowledge gaps in several areas including safe preparation of cleaning and disinfectant solutions, use of recommended personal protective equipment when using cleaners and disinfectants, and safe storage of hand sanitizers, cleaners, and disinfectants. A total of 39 percent of respondents reported engaging in unrecommended high-risk activities aimed at preventing transmission of SARS-CoV-2, such as washing of bleached food items, applying household cleaning or disinfectant items to bare skin, and deliberately inhaling or ingesting such drugs. Public messaging should continue to emphasize evidence-based, safe practices such as hand hygiene, and recommended high-touch surface cleaning and disinfection to prevent SARS-CoV-2 transmission in household environments (Gharpure et al., 2020).

The only effective way to respond to the outbreak are non pharmacological public health measures such as isolation, social distancing and quarantine. Isolation refers to the separation of symptomatic patients while quarantine refers to the restriction of asymptomatic healthy individuals who have had contact with confirmed or suspected cases. Quarantine can be voluntarily implemented or legally enforced by authorities, and can be applied at individual, group or community level (Barbara,2020).

2.3.3 : Attitude on COVID-19 Prevention

Then, the discussion regarding the attitude toward COVID-19. Ikhlaq et al., (2020) stated that graduate medical students at CMH Lahore have shown a satisfactory level of awareness and positive attitudes towards coronavirus with a clear difference in awareness among different disciplines. The majority (94.2 percent) of medical students had a high performance in preventive behavior and only 5.8 percent had a low score (Taghrir et al., 2020). 93.6 per cent of participants choose to visit the hospital or, if necessary, to be subject to quarantine, which is considered to be an important attitude towards the containment of ongoing respiratory infection as reported and available data (Alzoubi et al., 2020). Approximately eight out of ten participants agreed that COVID-19 would be successfully controlled in Malaysia as the swift action taken by the Malaysian Government to enforce the MCO may also have contributed to these positive attitudes (Azlan et al., 2020).

2.3.4 : Practice on COVID-19 Prevention

Practice toward COVID-19 is also one of the measures of prevention. Kebede et al. (2020) described the study found that hand washing and avoiding shaking hands were two dominant methods of preventing infection with COVID-19. Besides, 83.4 percent of participants reported avoiding crowded areas in the week prior to the MCO, more than half reported wearing a face mask while going out in public (51.2 per cent) and most of the participants reported that they practiced good hand hygiene by constantly washing their hands and using a hand sanitizer (87.8 per cent) (Azlan et al., 2020). The participants' attitude to the practice reflects the right way to prevent infection by various means, such as hand washing, using alcohol rub, avoiding hand

shaking and following a preventive method (Alzoubi et. al., 2020). However, there are huge gaps between the extent of knowledge of preventive methods and practices (Kebede et al., 2020).

2.4 : Approach Toward COVID-19

COVID-19 is the recent virus that was first discovered in Wuhan, China late of 2019. Since it is not fully understood, the various approaches need to be considered in order to contain this pandemic from becoming worse. Greenhalgh et al., (2020) also found a statement from Wikipedia stating a technique for resolving potential harm issues where there is a lack of comprehensive scientific expertise on the topic regarding the significance of approach toward COVID-19. The approach could be sort out into three main categories which are individual, society and government

2.4.1 Individual

The World Health Organisation (2020) proposed that frequent and proper hand hygiene is one of the most effective steps to avoid infection with the virus COVID-19. Occupational physicians are promoting hand hygiene, an important measure with minimal cost (Belingheri et al., 2020). Alzoubi et al. (2020) also stated that almost all students (99.7%) committed to hand washing as a required personal hygiene to avoid infection. Proper hand hygiene could help to prevent the transmission of this virus as it's communicated through the respiratory droplet and direct contact. Azlan et. al., (2020) proposed that individuals between 18 and 29 years of age and students are most likely to practice proper hand hygiene.

Besides, usage of soap and alcohol-based hand rub is critical as it acts as a removing agent in hand washing. If soap and water are not readily available, a hand sanitizer based on alcohol may be used and a minimum of 60 percent alcohol will be allowed for the students (Bokadia and Ganapathy, 2020). If the hands are not clearly dirty, the recommended way is to use alcohol-based hand rub for 20–30 seconds, but if the hands are noticeably dirty, they should be washed with soap and water for 40–60 seconds using the correct procedure (WHO, 2020).

Most of the basic information and perceived effectiveness products had a crude and optimistic effect on the practice of hand washing to the visitor of Jimma University Medical Centre (Kebede et. al., 2020). The Ministry of Health, Malaysia provides a guideline on its website about the 7 steps of proper handwashing steps as a self-precaution (A'aishah S. & Norrani E., 2020).

Next, social distancing also is known as one of the approaches during this pandemic. Social distance is defined as the minimum distance between people (worker-worker, worker-customer) must be at least 1 m (social distance) which is mostly used to prevent the transmission of droplets (Belingeri et al., 2020). Based on a study conducted by researchers from the University of Chicago, Greenstone and Nigam (2020) stated that social distancing is an effort and strategy in response to the COVID-19 outbreak with important economic benefits among the students. This method eventually protects everyone in the population ideally and individuals in a highly susceptible group powerfully plus maintains the economics sector.

Nowadays, social distancing is also known to be a new norm to most of the population of the world as COVID-19 is a pandemic. Boris Johnson, prime minister of the United Kingdom stated that it is the best time for us to quit non-essential interaction with others, and any unnecessary travel plus people are urged to start working from home to avoid pubs and restaurants (Mahase E., 2020). The University of Nottingham, Malaysia (2020) stated social distance duration is most likely to last for a few months but also depends on updates from the Ministry of Health and the Malaysian Government. As a result, transmission slows but does not cease, and intense measures can interrupt the transmission of COVID-19 and reduce the number of cases to low rates (Mahase E., 2020).

Recently, the face mask has been acknowledged as one of the most crucial approaches that can be taken by an individual. Facemask will be used by people with symptoms of COVID-19 to shield others from the possibility of infection (Bokadia and Ganapathy, 2020). N95 respirator, 3 ply surgical face mask and cotton facemask are among the types of face masks that were introduced in the market for years. Taghrir et. al., (2020) stated that medical students at Shiraz University of Medical Sciences, Iran are aware that N95 masks were given even more to

emergency medical personnel, while ordinary protective equipment such as surgical masks was provided to other departments. The face mask has proven to be effective protection against respiratory infections in the society plus as part of the droplet precaution for medical workers who are treating the disease (Feng et al., 2020).

However, different countries have a different opinion regarding the recommendation of wearing face masks depending on their finding and research. Hong Kong and Singapore have actually proposed that asymptomatic people wear a surgical mask, but Germany has argued that there is not enough evidence to support this approach (Feng et al., 2020). This data could not resist the capability of wearing a face mask in reducing the risk of getting infected by COVID-19. The World Health Organisation (WHO) also recognizes that wearing masks by the general public has a position in extreme pandemics, because even a partial defensive effect may have a significant impact on transmission (Greenhalgh et al., 2020).

2.4.2 Society

There are also approaches that could be applied by society as a response toward COVID-19. Society is advised to avoid mass gathering. The importance of mass meetings for disease transmission is directly related to the epidemiological efficacy of COVID-19 transmission (Shahul & Ziad, 2020). High rates of overcrowded living conditions, regular social and religious ceremonies and high unemployment call for urgent efforts to close the gap between awareness and practice of mass gathering (Kebede et. al., 2020). The mass gathering should be avoided as it minimizes the chances for social distancing and creates a bigger risk of having direct contact from a person to another.

Azlan et. al., (2020) proposed that younger people and those earning less than RM3,000 a month were more likely to avoid crowded areas in the week prior to the MCO. This showed that younger people would have more knowledge and awareness if compared to other age groups. For instance, the huge cruise ship, the Diamond Princess, was quarantined in Japan due to the outbreak of COVID-19, carrying between 2000 and 4000 people, circumstances in which social

distance is almost impossible to achieve (Shahul & Ziad, 2020). Cancellation or suspension of mass gathering would be critical to the mitigation of pandemics, although it is not likely to be a medical response (Shahul & Ziad, 2020).

Besides, public education is also one of the approaches that can be conducted by society. Public education is a critical strategy for educating the public through conventional print and broadcast media as well as social media (Vernon et al., 2020). This method is very useful to society as spreading awareness messages through social media and television would leave a greater impact on them. Medical students should carefully review coronavirus-related knowledge materials before sharing or implementing them (Ikhlaiq et. al., 2020). A significant volume of information circulated and viewed in the community that would need more awareness campaigns to reduce the fear among the population (Alzoubi et. al., 2020). Making people aware of the disease in large populations can help to correct some incorrect information perceived by people about the awareness or attitudes towards the disease (Alzoubi et. al., 2020).

Detailed anonymized information on COVID-19 cases is shared publicly to avoid confusion, although misinformation is easily debunked and clarified on the government website (Vernon et al., 2020). The misconception that young children are at low risk of COVID19 can be found in the WHO list of rumors that may offer false assurances (Kebede et. al., 2020) is one of the examples. The correct and official data from the government is vital to avoid misunderstanding. For example, the Ministry of Health of Malaysia held a particular press conference on COVID-19 cases daily. Given the level of media and telecommunications usage in Malaysian society and evidence from prior research, authorities would benefit from the use of mainstream and social media to disseminate these messages (Azlan et. al., 2020).

2.4.3 Government

The government also has their own respective role in order to counter the effect of COVID-19. Restrictive mass quarantine or lockdown has been introduced as the most effective control mechanism to counter COVID-19 (Sarmistra et al., 2020). Many countries have introduced a lockdown of 2-4 weeks and are expanding the duration depending on their current disease scenario (Sarmistra et al., 2020). This method had been implemented by countries with high rates of COVID-19 such as China, South Korea, and Italy. Jordan's Ministry of Health has taken early significant steps to address diseases such as early closure of airports, specific quarantine and isolation. Hospital offices, the closure of all educational institutions and, more recently, the enforcement of emergency law and curfew in the country (Alzoubi et. al., 2020)

In Malaysia, the quick steps taken by the Malaysian government to enact the MCO [Restriction Movement Order] may also have led to these optimistic attitudes (Azlan et. al., 2020). Then, this results in reduction in some of the cases in a certain country as the World Health Organisation aimed to flatten the curve of this pandemic. The Health General Director described early indications that attempts (Restriction Movement Order) made by the government and the ministry to curb the virus were effective. (Kanyakumari D., 2020)

Next, the government should improve its healthcare setting. Infection prevention interventions strengthen, including strict visitor monitors, registry of patients with pneumonia or respiratory infections, and strict infection management procedures, have been improved in hospitals (Vernon et al., 2020). Retired physicians and nurses returned to the service and the students of medical and nursing schools have volunteered at the corona test stations (Witt et. al., 2020). There are various types of improvements that can be made suitable to the current situation of COVID-19 depending on each country. Ikhlal et. al (2020) stated that The Government of Pakistan has directed the health authorities to set up an enlightening crusade to raise awareness on prevention, treatment and treatment.

As in Wuhan, 16 exhibition centers and stadiums in Wuhan have successively been converted into temporary hospitals with a total capacity of more than 10,000 beds, concentrating on the care of mild cases of COVID-19 patients (Cheng & Huang, 2020). Most institutions have installed pre-screenings to properly sort health concerns and minimize the risk of contact at physical locations as much as possible (Witt et. al., 2020). Generally, the demand for facilities, the number of test kits, personal protective equipment, and supplies of medicines should be estimated to allow for a scale-up, as the health system could be at risk (Fisher & Smith, 2020).

In addition, surveillance and quarantine are also the appropriate approach in combating COVID-19. Surveillance needs to be expanded to screen all patients with atypical pneumonia for COVID-19, and COVID-19 screening needs to be applied to current surveillance systems (Fisher & Smith, 2020). Comprehensive monitoring, effective case identification, prompt isolation, thorough contact tracing and the implementation of quarantine for all contacts, regardless of the process of the outbreak, are also included in (Fisher & Smith, 2020). Vernon et al. (2020) proposed in order to avoid further transmission, all suspected and confirmed patients were immediately isolated in the hospital and contact tracking was also undertaken to establish their history of quarantine purpose. Solid programs [screening, quarantine and treatment centres] and appreciation of the value of public health regarding COVID-19 by the Government of Ethiopia is very effective during these pandemic periods (Kebede et. al., 2020)

Finally, proper legislation also contributes to an effective effort of containing COVID-19. When COVID-19 is in the population, the time has come to foresee and enact public health legislation that emphasizes assistance rather than restriction (Wendy et al., 2020). As a result, authorities must provide a solid justification for regulations that have valid and persuasive evidence to protect public health (Wendy et al., 2020). Closing of schools and universities, banning traveling to other countries and strengthening the national borders is the relevant example of law enforcement that should be taken by the government. Kebede et al. (2020) described that working for private and government companies was a significant predictor of avoiding shaking hands for greeting. Strict border control is a key requirement to ensure that cases of COVID-19

imports do not occur said by Health Director-General, Datuk Dr. Noor Hisham Abdullah (BH Online, 2020)

2.5 Factor associated with epidemiology of COVID-19

Different countries have varying mortality rate and prevalent rate. Some triggering factors such as air temperature, humidity, airflow and ventilation are responsible for the increased mortality rate of COVID-19 compared to SARS and MERS.

2.5.1 Atmospheric temperature

According to Lowen, Mubareka, Steel et al. (2007), in cold temperate countries, winter is the flu season, for three reasons. First, influenza viruses with decreased ultraviolet light survive better in cold-dry weather. Second, the decreased inborn immunity due to low levels of vitamin D and melatonin during winter days. Third, people tend to stay indoors in winter and thereby increase the chances for the virus to spread among them. In addition, minimizing COVID-19 case reports during hot weather will provide enough time for the health systems to cope with the influx of patients, and for the production of a possible vaccine. Cold – to – common cold relation is hypothesized.

Woodward (2020) found that there is a direct correlation between COVID-19 temperature and spatial propagation around the globe. Breathing droplets released from a patient's mouth can scatter several meters on coughs or sneezes, and high temperatures can cause these droplet nuclei to evaporate, which can minimize infectivity.

2.5.2 Population density

By definition, population density is the number of people living in an area per square kilometre. The relationship between high population density and spread of epidemics has been reported earlier (Mangen, Nielen & Burrell, 2002). Several measures need to be implemented for the management and control of COVID-19, such as the implementation of strict measures such

as rapid detection, prevention , and control. Isolation and follow-up of affected persons would be difficult if a majority of the population is affected (Gilbert, Pullano, Pinotti, et al., 2020).

2.5.3 Airflow and Ventilation

According to Centers for Disease Control and Prevention (CDC), closed areas with low airflow and ventilation could increase the risk of infection with COVID-19. As with other respiratory pathogens, including flu and rhinovirus, COVID-19 is believed to be transmitted by coughing and sneezing through respiratory droplets. In the event of prolonged exposure to elevated aerosol concentrations in closed spaces, aerosol transmission is also likely.

2.5.4 Humidity

Humidity is the concentration of airborne water vapour. The principal route of SARS-CoV-2 infection transmission is believed to be respiratory droplets. However, according to the Centers for Disease Control and Prevention (CDC), the virus is also detectable in other body fluids and excreta.

Woodward (2020) also observed that in Asian countries , low COVID-19 infections in tropical region stability lead to high temperature and high relative humidity having a negative effect on COVID-19 spread. It has been documented that the dried virus on smooth surfaces retained its viability for more than 5 days at 22–25 °C temperatures and 40–50 percent relative humidity, i.e., typical air-conditioned environments. However, higher relative humidity, which is 38°C, and more than 95 percent relative humidity, reduced the virus' viability. COVID-19 's improved stability at low temperatures and a high humidity environment can facilitate its transmission in air-conditioned and temperate atmosphere.

2.6 Sociodemographic Factors Associated With COVID-19

Sociodemographic factors are important determinants in COVID-19 infection. Aspects to be discussed further would be the effect of: (1) gender, (2) ethnicity, (3) age, (4) educational level

2.6.1 Gender

According to the World Health Organisation(2020) the crude fatality ratio is higher among males compared to females (4.7% vs. 2.8%). A study led by the University of Liverpool suggested that men were much more likely to be admitted to hospital with COVID-19. Similarly, a study conducted in Wuhan Jinyintan Hospital shows that a greater number of men than women is found in the 99 cases of patients diagnosed with COVID-19 infection (Chen et al., 2020). A study conducted in Malaysia revealed that female participants obtain higher knowledge scores towards COVID-19 and practise good hand hygiene (Azlan et al.,2020). According to the results of the cross-sectional study conducted on a total of 240 Iranian Medical students , there was a significant difference between males and females in risk awareness level of $P < 0.01$ which being lower among females indicates that the women in this study were more aware of the importance of COVID-19 (Taghrir et al., 2020).

Smoking has been identified in particular as a major contributor to the severity of the disease and gender-specific trends are very apparent. China's smoking rates are much higher for men than for women (288 million men versus 12.6 million women; 2018 data) (Cai, 2020). Similarly, men in Italy are more likely to smoke than women at any age (1.12x to 1.7x, depending on age cohort; data for 2018) (Statista Research Department, 2020). The National Institute on Drug Abuse shows that there are similar gender-specific differences in the US, where 17.6% of smokers are men compared to 13.6% of women. Damage to the lungs from smoking makes patients more vulnerable to viral pulmonary infections. Leung, et al., (2020) suggest that active smoking of cigarettes up-regulates ACE-2 expression in lower airways, which can in part explain the increased incidence of severe COVID-19 in those populations. Author reasoned that the up-regulation of ACE-2 can be useful in preventing the host from acute lung injury,

chronically predispose individuals to an increased risk of coronavirus infections, which uses this receptor to gain entry into the epithelial cell.

Globally, more men are infected more than women (Global Health 50/50, 2020). Early evidence suggests that COVID-19 does not affect men and women equally, with men generally at greater risk (Wenham, Smith and Morgan, 2020). Likewise, it is said that being male is considered a risk factor for COVID-19 infection (Chen et al., 2020). In general, men are more likely to engage in health-related risks which, even prior to the COVID-19 pandemic, has been shown to result in higher injury and disease incidence. Women's decreased vulnerability to viral infections may be due to protection from X chromosome and sex hormones, which play a significant role in innate and adaptive immunity (Jaillon et al., 2019). Jaillon et al also pointed out that due to patients' poorer immune systems, COVID-19 is more likely to infect older adult males with chronic comorbidities. In 2019, Suen et al demonstrated that being a middle-aged female was a protective factor with regard to knowledge and practice of hand hygiene. Generally, females are more resistant to infections than men, and this is possibly mediated by several factors including sex hormones and high expression of coronavirus receptors (ACE 2) in men but also life style, such as higher levels of smoking and drinking among men as compared to women. Additionally, women have a more responsible attitude toward the COVID-19 pandemic than men. This may reversibly affect the undertaking of preventive measures such as frequent hand washing, wearing of face mask, and stay at home orders.

2.6.2 Ethnicity

An analysis by the Washington Post found that black majority counties had three times the rate of covid-19 cases and nearly six times the rate of deaths compared to counties where white people were the majority. The higher incidence and severity in minority groups may be related with socioeconomic, cultural or lifestyle factors, genetic predisposition or pathophysiological differences in susceptibility or response to infection. Mohiuddin et al. (2020) stated that the study highlights a higher level of awareness, optimistic attitude and moderate practise among a specific community of Malaysian. Then, Malay individuals had comparatively

better knowledge than other ethnic groups, although the Chinese population was relatively lower in the same category of "good knowledge" (Mohiuddin et al., 2020). The author also stated Chinese people have a stronger attitude than other races, as this may be partly due to the fact that most Chinese people have strong faith in traditional Chinese medicine (Mohiuddin et al., 2020). Mohiuddin et al. (2020) agreed that the study also revealed that the majority of Malaya and Indians had a neutral attitude. Selvarajoo et al. (2020) declared that Malays are 2.3 times more likely to have strong information than non-Malays. Previous research in various regions around the world have also highlighted the influence of race on awareness, along with the racial disparity between different ethnicities (Mohiuddin et al., 2020).

2.6.3 Age

The World Health Organization (2020) revealed that mortality increases with age, with the highest mortality among people over 80 years of age (CFR 21.9%). In 2020, authors Liu, Chen, Lin, & Han also make the point that COVID-19 elderly patients are more likely to progress to severe disease. Malaysians above the age of 50 held higher knowledge scores whereas people between the ages 18 and 49 showed higher percentages in wearing face masks when leaving the house (Azlan et al., 2020). Students belonging to MBBS and nursing and having a higher year of study showed higher levels of knowledge and awareness (Ikhlaiq, Riaz, Bashir, & Ijaz, 2020). The author suggested the year of study was appreciably linked with higher levels of information.

While the entire population is at risk from COVID-19 infection, the elderly often vulnerable and prone to multimorbidity, are at greatest risk of severe and fatal disease. The early deaths of COVID-19 outbreak occurred mainly in the elderly, likely because of a poor immune system that allows for faster progression of viral infection. In a study conducted in Hainan Provincial People's Hospital had found that the mortality in elderly patients with COVID-19 is greater than in young and middle-aged patients. Italy experience shows a median age for men at death of 79 years and 82 for women. In a recent study also found that people 70 years or older

had shorter median days (11.5 days) from the first symptom to death than those with ages below 70 years (20 days), demonstrating that elderly people might have faster disease progression than younger people (Wang, Tang, & Wei, 2020). Multi-system disease characteristics coexisting in the elderly contribute to complicated and complex diseases. Treatment, the difficult factor is significantly increased as elderly patients are vulnerable to malfunction of multi-system organs and even failure.

Children are speculated to be less sensitive to COVID-19, because ACE2 maturity and function for instance binding ability in children may be lower than that in adults. In addition, children often experience respiratory infections (e.g., respiratory syncytial virus (RSV)) and may have higher antibody levels against the virus compared to adults. Furthermore, the immune system of children is still developing, and may respond to pathogens differently from adults. A study had found that the proportion of severe and critical cases was 10.6%, 7.3%, 4.2%, 4.1% and 3.0% for the age group of ≤ 1 , 1-5, 6-10, 11-15 and >15 years, respectively. Children of all ages were susceptible to COVID-19, and the gender difference was not significant. Clinical manifestations of COVID-19 cases for children were less severe than those of the adult patient. However, young children, especially infants, were vulnerable to infection with COVID-19 (Dong et al., 2020).

Elderly have greater knowledge on Covid-29 probably due to a greater risk awareness of contraction and disease complications (Azlan et al., 2020). The authors Dong et al., 2020 suggested although it is puzzling that most COVID-19 cases for children were less serious than the cases for adults, this may be attributed by factors of exposure as well as host. The author reasoned that children were typically well cared for at home and would have had less chances to become exposed to diseases or patients who are infected.

2.6.4 Educational Level / Year of Study

A cross sectional study conducted on 384 medical students in CMH Lahore Medical College resulted overall more than 90 percent of people were aware about the etiology, mode of transmission and possible symptoms. However, very few of them knew the information in depth. Knowledge score showed that 80 percent of participants had sufficient knowledge of coronavirus. Discipline and year of study was as expected, considerably linked with higher levels of information. MBBS and nursing students who had a higher year of study showed greater levels of awareness and knowledge compared with other students. In terms of attitude, more than 80 percent of students demonstrated positive attitudes among which the nursing students were dominant. (Ikhlaq, Riaz, Bashir, & Ijaz, 2020). However, in a cross-sectional study carried out in Malaysia the average knowledge score of students was significantly lower than those of other occupation categories, but practise good hand hygiene and wearing face masks when leaving the house. On the other hand, a cross-sectional study conducted among students and employees belonging to the medical, pharmacy and allied health sciences fields of education institutions in Lahore, Pakistan showed despite the overall good knowledge and attitudes, it was worrisome that preventive practices related to COVID-19 were far from satisfactory (Salman, et al., 2020).

Due to limited access to online health information resources, vulnerable populations such as illiterate or low-literate, geriatric and rural populations would be more likely to have poor knowledge, attitudes, and preventive practices. More educational efforts regarding the current pandemic are still needed with periodic educational interventions (Salman, et al., 2020).

2.6.5 Religion

With regard to ethnicity, 74 per cent of respondents practising Buddhism were found to have moderate knowledge and 14 per cent had strong knowledge compared to respondents practising other religions (Mohiuddin et al., 2020). Lye et al., (2020) mentioned that linked to the deep belief in faith, religious issues influence the actions of the respondents as much as they do.

2.7 Conceptual Framework

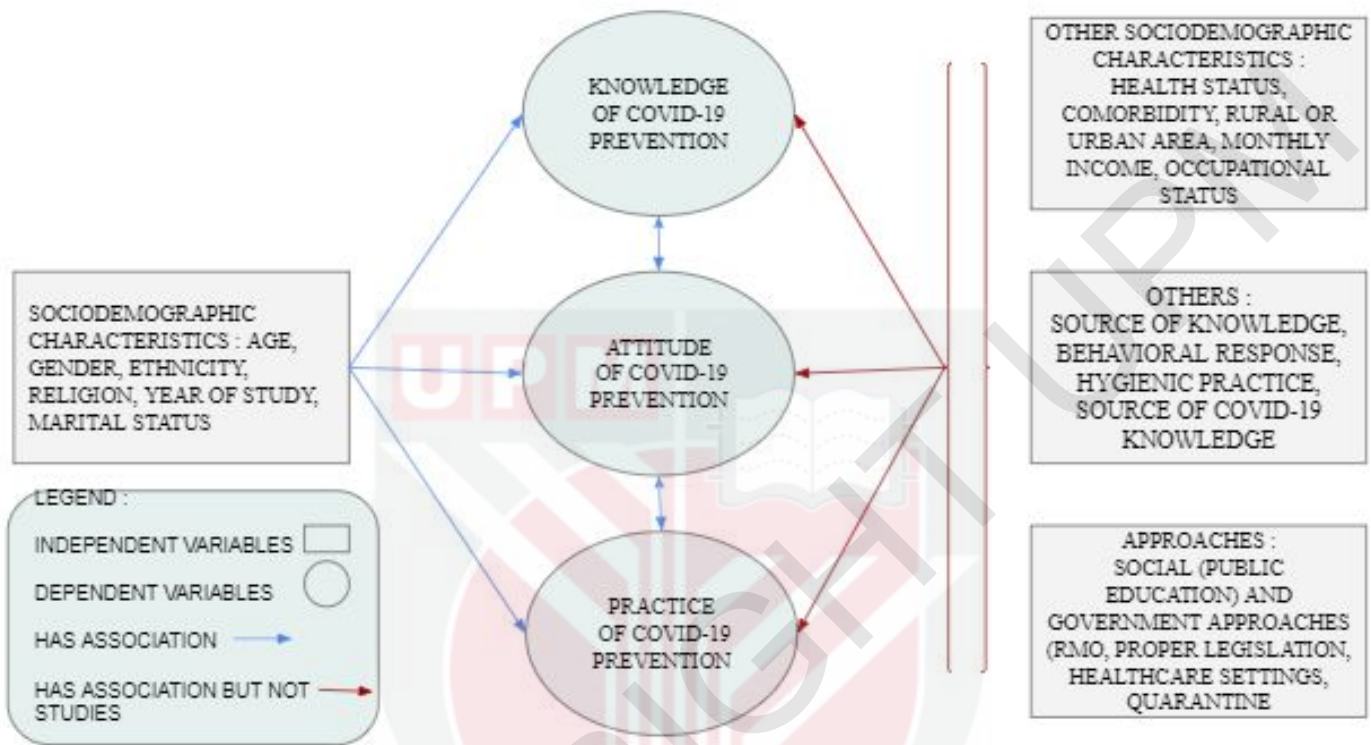


Figure 1: Conceptual framework of knowledge, attitude, practice of COVID-19 prevention among medical student in Faculty of medicine and Health Sciences, UPM

CHAPTER 3

METHODOLOGY

3.1 Study Location

This study took place at the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia in Serdang. This faculty is one of the 16 faculties in Universiti Putra Malaysia and it has almost 2000 health sciences and medical students. There were total of 490 medical students in this faculty; 113 first year medical students, 114 second year medical students, 95 third year medical students, 86 fourth year medical students and 82 fifth year medical students.

3.2 Study Design

The study design was a cross-sectional study.

3.3 Study Duration

The study was conducted from June 2020 to October 2020.

3.4 Sampling

3.4.1 Study Population

The study population were medical students of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang in 2020.

3.4.1.1 Inclusion Criteria

Medical students of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang in 2020 who were able to give their consent in this study.

3.4.1.2 Exclusion Criteria

Medical students who were on leave, cannot be reached or unavailable during the data collection week had been excluded.

3.4.2 Sampling Frame

List of names of all medical students in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

3.4.3 Sampling Unit

The sampling unit were medical students of the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia who fulfils the inclusion and exclusion criteria.

3.4.4 Sample Size

To determine the prevalence of good knowledge, good attitude and good practice of COVID-19 prevention among the medical students of Faculty of Medicine and Health Science, Universiti Putra Malaysia. (*P value is taken from Taghrir, M. H., Borazjani, R., & Shiraly, R. (2020). COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception. Archives of Iranian Medicine, 23(4), 249–254. <https://doi.org/10.34172/aim.2020.06>*)

$$n = \frac{z_{1-\alpha}^2}{d^2} P(1-P)$$

Where,

Prevalence, $P = 0.56$ Precision, $d = 0.05$ Confidence Interval, $z = 1.96$ (Assuming 95% level of confidence)

Sample size, $n = 378$

Total sample size calculated is 378. Hence, a sample size of 378 used for the study.

To determine the association between sociodemographic factors and knowledge, attitude and practice of COVID-19 prevention among medical students in Faculty of Medicine and Health Science, Universiti Putra Malaysia

$$n = \frac{\{[z_{(1-\alpha/2)} * \sqrt{2P(1-P)}] + [z_{(1-\beta)} * \sqrt{P_1(1-P_1) + P_2(1-P_2)}]\}^2}{(P_1 - P_2)^2}$$

Where, $\bar{P} = (P_1 + P_2)/2$ P_1, P_2 = Estimated Proportion sample size, n

Confidence Interval, $z_{(1-\alpha/2)} = 1.96$ (95% level of confidence) Power, $z_{(1-\beta)} = 0.8$ (20% beta error)

Sample Size Calculation

Objectives	Calculation	Sample Size
To determine the prevalence of high knowledge of COVID-19 prevention among the medical students of the Faculty of Medicine and Health Science, Universiti Putra Malaysia.	Use, $n = \frac{z_{1-\alpha}^2}{d^2} P(1-P)$ Prevalence, P= 0.56 (P value is taken from Taghrir, M. H., Borazjani, R., & Shiraly, R. (2020). COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception. Archives of Iranian Medicine, 23(4), 249–254. https://doi.org/10.34172/aim.2020.06	N = 378
To determine the prevalence of positive attitude of COVID-19 prevention among the medical students of Faculty of Medicine and Health Science, Universiti Putra Malaysia.	Precision, d = 0.05 Confidence Interval, z = 1.96 (Assuming 95% level of confidence)	
To determine the prevalence of good practice of COVID-19 prevention among the medical students of Faculty of Medicine and Health Science, Universiti Putra Malaysia.		
To determine the level of association between the socio demographic factors (age, gender, ethnicity, religion, educational level, marital status) and the knowledge, attitude and practice of COVID-19 prevention among the medical students of Faculty of Medicine and Health Science, Universiti Putra Malaysia.	Use, $=\{[z(1-2)*2P(1-p)]+[z(1-)*P1(1-P1)+P2(1-P2)]\}^2(P1-P2)^2$ $P=(P1-P2)/2$ P1,P2=Estimated Proportion sample size,n P1 - 0.35, P2 - 0.65 (P value from Ikhlq, A., Bint-E-Riaz, H., Bashir, I., & Ijaz, F. (2020). Awareness and Attitude of Undergraduate Medical Students towards 2019-novel Corona virus. Pakistan Journal of Medical Sciences, 36, S-1-S-5. https://doi.org/10.12669/pjms.36.COVID19-S4.2636) Confidence Interval, z(1-2)=1.96 (Assuming 95% level of confidence) Power, z(1-)= 0.8 (Assuming 20% beta error)	N = 86

3.4.5 Sampling Method

Universal sampling was used in this study. The researchers contacted the class representative from year 1 to year 5. A google form link was forwarded to them and they were being asked to disseminate the questionnaire into their batch's whatsapp group. Then, the researchers obtained the contact numbers for each student of respective years for the follow up period after distributed the google form link.

3.5 Variables

3.5.1 Dependent variables

The dependent variables were knowledge, attitude and practice on COVID-19 prevention among medical students of Faculty Medicine and Health Sciences.

3.5.2 Independent variables

The independent variables were sociodemographic factors (age, gender, ethnicity, religion, educational level, marital status), attitude and practice towards COVID-19 prevention among the medical students at Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

3.6 Data Collection

3.6.1 Instruments of Study

A sheet of self-administered questionnaire and online survey used. There were four sections in this questionnaire which are Section A: sociodemographic factors (age, gender, ethnicity, religion, educational level, marital status) , Section B : knowledge regarding COVID-19 and its prevention, Section C : attitude towards COVID-19 prevention and Section D : practices on COVID-19 prevention.

3.6.1.1 Questionnaire

The instrument that was used during data collection is questionnaire. It comprises of a few sections based on the objectives of the study:

Section A:

Sociodemographic Factors

There were six items that involved sociodemographic factors which were age, gender, ethnicity, religion, educational level (Year 1-Year 5) and marital status.

Section B:

Modified version of COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception (Mohammad, Roham & Ramin, 2020) .

Section B intended to assess the knowledge of COVID-19 and its prevention among respondents. It was a modified version of the COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception that was developed by

Mohammad and his team in 2020. It contains 15 questions that were to be answered according to the respondent's understanding. The scoring was based on the total questions that were answered correctly. Higher total scores reflected an excellent understanding regarding the subject matter by the respondents and vice versa.

Section C:

Modified version of the Awareness and Attitude of Undergraduate Medical Students towards 2019-novel Coronavirus (Ikhlaiq, Riaz, Bashir & Ijaz, 2020).

Section C was designed to determine the attitude of the respondents towards COVID-19 prevention. It was a modified version of the Awareness and Attitude of Undergraduate Medical Students towards 2019-novel Coronavirus at CMH Lahore Medical College. The questionnaire contained 2 options which were Yes and No. This questionnaire contained 8 items in which higher marks were given to students who answered Yes. The scores for this questionnaire ranged from 0 to 8. Higher scores reflected a favorable attitude towards COVID-19 and vice versa.

Section D:

Modified version of A questionnaire for assessing COVID-19 prevention intentions and practices in Knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study (Maheshwari, Gupta, Sinha & Rawat, 2020)

Section D aimed at assessing the practice of COVID-19 prevention. This section was only to be completed by respondents who are medical students. This section contained 8 questionnaire items that were related to the respondents' experiences and practice of COVID-19 prevention. From the response, we evaluated the factors associated with COVID-19 prevention.

We provided this questionnaire in only English because we were confident that the medical students of the Faculty of Medicine and Health Sciences would have a good English

understanding and literacy. Besides, we only used simple english words and sentences to ease the respondent for doing this research purpose.

3.6.2 Data Collection Techniques

Data collected by distributing self-administered questionnaires. The questionnaire was distributed to the participants during the data collection period from 17 August 2020 until 24 August 2020 and they are required to complete the questionnaire and return the questionnaire back to the researcher.

3.6.3 Quality Control

3.6.3.1 Validity and Reliability of Questionnaire

1. Content Validity: This assessed by the members of supervisory teams and other experts in the field. Comments had been taken and corrections also had been made.
2. Face Validity: The face validity assessed by giving the questionnaire to 30 medical students who went through the questionnaire to see if they understand each section. Comments were taken and appropriate corrections had been made.

3.6.3.2 Validity and Reliability of Instrument

Pre-testing of the questionnaires prior to the actual data collection week conducted. This was done in order to check the validity and reliability of the questionnaires. It was approximately 30% of the sample size and results to around 38 respondents which did not involve medical students, FMHS UPM. Then, Cronbach's alpha was computed. Cronbach alpha was used to check the internal consistency and the reliability of the questions. The range of Cronbach alpha coefficients was between 0 to 1. The closer the alpha towards 1, the more reliable the questions

are. In this research, the accepted value of Cronbach alpha coefficient was 0.7. The content validity was evaluated by the supervisors and co-supervisors to make sure that the contents of the questions met the requirement of the study. The arrangement of questions and time taken to answer the questionnaires were also evaluated to ensure the face validity. The feedback from the respondents in the pretest were obtained. Then, the questions were modified based on all above. Thus, the results produced were valid and reliable.

3.7 Operational Definition

NO	Terms	Definition
1.	Age	It was determined by the respondent's date of birth
2.	Gender	Male, Female
3.	Ethnicity	Malay, non-Malay
4.	Religion	Islam, non-Islam
5.	Year of study	Preclinical, Clinical
6.	Marital status	Single, Married
7.	Knowledge towards COVID-19 prevention	The scores obtained by answering the questionnaire.
8.	Attitude towards COVID-19 prevention	The scores obtained by answering the questionnaire.
9.	Practice towards COVID-19 prevention	The scores obtained by answering the questionnaire.

3.8 Data Analysis

The collected data from the participants fed into the computer by using a IBM Statistical Package for Social Science (SPSS) Statistics version 25 for data analysis purposes. The data had help to determine descriptive analysis which measured the central tendency (mean, mode, median) and measure of dispersion (variance, standard deviation, range) of socio demographic characteristics. Group categorical variables had been analysed and evaluated using Chi Square Test or Mann Whitney Test. The level of significance was set $\alpha = 0.05$. P value less than 0.05 was considered significant. If data is normally distributed, mean and standard deviation will be calculated. But if the data is not normally distributed, mean and interquartile range will be analysed instead. Then, the association between knowledge, attitude and practice of COVID-19 prevention and socio demographic factors (age, gender, ethnicity, religion, educational level, marital status) can be obtained. For the testing of more than one variable that is equally distributed, ANOVA method is used. If the variables are not equally distributed, Kruskal wallis test is performed instead. Then, the association between sociodemographic factors and level of knowledge, attitude and practice towards COVID-19 prevention among the respondents can be determined.

3.9 Ethical Consideration

1. The approval letter submitted to the Ethic Committee for Research Involving Human Subject, Universiti Putra Malaysia (JKEUPM) obtained permission for conducting this research. Along with that approval letter, proposal draft and questionnaire also attach for reference.
2. The approval from the Dean of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia also obtained because this research involves the medical students from this faculty.
3. Informed written consent also was obtained from the participants. The research ethics were strictly followed as to make sure the confidential data of the participants would be safe and

not misused. A very high respect was expressed regarding the participants' data as to maintain their confidentiality



CHAPTER 4

Result

4.1 Response Rate

Data was collected among the medical students of the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia in Serdang, Selangor. All the respondents were selected randomly based on the list names of medical students from Year 1 to Year 5. The response rate was 100.0%. For this study, the minimum sample size was 378 and we managed to obtain 400 respondents which were more than the minimum sample size.

4.2 Socio-demographic characteristics of respondents

The socio-demographic characteristics of respondents were shown in Table 4.2. The socio-demographic aspect of the respondents were made up of the following: Majority of respondents were female which occupied 68.8%, most of the respondents were 20 years old (25.4%), respondents who were Islam and Malay occupied 60.1%, most respondents were clinical medical studen (50.5%) and majority of the respondents were single (99.5%). The eldest respondent was 26 years old while the youngest respondent was 19 years old.

Table 4.2(a): Socio-demographic characteristics of respondents (n=378).

Variables	Frequency (n =378)	Percentage (%)
Gender		
Male	118	(31.2)
Female	260	(68.8)
Age		
19-20 years old	101	(26.7)
21-22 years old	152	(40.2)
23-24years old	120	(31.7)
25-26 years old	5	(1.4)
Religion		
Islam	230	(60.8)
Non-islam	148	(39.2)
Ethnicity		
Malay	227	(60.1)
Non-malay	151	(39.9)

Table 4.2(b): Socio-demographic characteristics of respondents (n=378).

Variables	Frequency (n =378)	Percentage (%)
Year of study (n= 378)		
Pre-clinical	187	(49.5)
Clinical	191	(50.5)
Marital status		
Single	376	(99.5)
Married	2	(0.5)

4.3 Knowledge on COVID-19 and its prevention among respondents

Normality test showed that the total knowledge score was normally distributed. The score which was higher than the median score was classified as good knowledge whereas the score which was lower than the median score was classified as poor knowledge. The mean score from this study was 13.00. The results from the total knowledge score showed that 85.2% of respondents had good knowledge scores while 14.8% of respondents had poor knowledge scores as shown in Table 4.3(a). Table 4.3(d) and Table 4.3(e) showed the distribution of the percentage of correct and incorrect answers for each knowledge of COVID-19 and its prevention questions.

From the study, the highest score was 15 while the lowest score was 10. Among this, question number 6, 9 and 10 had the highest number of respondents who answered correctly with 99.5% whereas question 12 had the lowest number of respondents who answered correctly with 7.4%.

Table 4.3(a): Frequency and percentage of total knowledge score among respondents. (n=378)

Total Knowledge Score	Frequency (n)	Percentage (%)
Good	322	85.2
Poor	56	14.8

Further analysis of socio-demographic characteristics using chi-square analysis showed there was significant association between the ethnicity ($\chi^2 = 4.880$, $df = 1$, $P = 0.027$) and religion ($\chi^2 = 4.650$, $df = 1$, $P = 0.031$) with the total knowledge score. A number of 52.9% malay respondents showed good knowledge scores in COVID-19 prevention. There are 54.0% Islam respondents showed good knowlege in preventing COVID-19 infection. In this study, most of the medical students were found to have good knowledge scores.

Table 4.3(b): Chi-Square test between ethnicity with total knowledge score.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.880 ^a	1	0.027		
Continuity Correction ^b	4.250	1	0.039		
Likelihood Ratio	4.789	1	0.029		
Fisher's Exact Test				0.038	0.020
Linear-by-Linear Association	4.867	1	0.027		
N of Valid Cases	378				

Table 4.3(c): Chi-Square test between religion and total knowledge score.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.650 ^a	1	0.031		
Continuity Correction ^b	4.031	1	0.045		
Likelihood Ratio	4.545	1	0.033		
Fisher's Exact Test				0.037	0.023
Linear-by-Linear Association	4.638	1	0.031		
N of Valid Cases	376				

Table 4.3(d): Frequency and percentage of correct and incorrect answer for each knowledge of COVID-19 questions among respondents (n=378)

Knowledge questions	Correct answer		False answer	
	n	%	n	%
Question 1: COVID-19 is a respiratory infection caused by a new species of coronavirus family.	369	97.6	9	2.4
Question 2: The first case of COVID-19 was diagnosed in Wuhan, China.	375	99.2	3	0.8
Question 3: The origin of COVID-19 is not clear but it seems that it has been transmitted to human by sea foods, snakes or bats.	357	94.4	21	0.6
Question 4: Its common symptoms are fever, cough and shortness of breath but nausea and diarrhea were reported rarely.	375	99.2	3	0.8
Question 5: Its incubation period is up to 14 days with a mean of 5 days.	374	98.9	4	1.1

Question 6: It can be diagnosed by PCR test on samples collected from nasopharyngeal and oropharyngeal discharge or from sputum and bronchial washing.	376	99.5	2	0.5
Question 7: It is transmitted through respiratory droplets such as cough and sneeze.	371	98.1	7	1.9
Question 8: It is transmitted through close contacts with an infected case (especially in family, crowded places and health centers).	375	99.2	3	0.8

Table 4.3(e): Frequency and percentage of correct and incorrect answers for each knowledge of COVID-19 prevention questions among respondents (n=378).

Knowledge questions	Correct answer		False answer	
	n	%	n	%
Question 9: The disease can be prevented through handwashing and personal hygiene.	376	99.5	2	0.5
Question 10: A medical mask is useful to prevent the spread of respiratory droplets during coughing.	376	99.5	2	0.5
Question 11: The disease can be prevented through no close contacts such as handshakes or kissing, not attending meetings and frequent hand disinfection.	375	99.2	3	0.8
Question 12: All people in society should wear masks.	28	7.4	350	92.6
Question 13: Only during intubation, suction, bronchoscopy and	258	68.3	120	31.7

cardiopulmonary resuscitation, you have to wear a N95 mask.				
Question 14: The disease can be treated by usual antiviral drugs.	214	56.6	164	43.4
Question 15: If symptoms appear within 14 days from direct contact with a suspected case, the person should inquire at a nearby public health center.	368	97.4	10	2.6

4.4 Attitude on COVID-19 prevention among respondents

Based on the normality test, the total attitude score of this study was not normally distributed. The respondents who had a higher than median score had positive attitudes while the respondents who scored lower than the median score had negative attitudes on COVID-19 prevention. From the study, the median score was 8. Based on the total score of the attitude, 66.4% of respondents were reported to have a positive attitude towards COVID-19 prevention while 33.6% of respondents had a negative attitude towards COVID-19 prevention. The highest attitude score was 8 while the lowest attitude score was 3. Table 4.4(a) shows the frequency and percentage total attitude score among respondents.

Table 4.4(a): Frequency and percentage of total attitude score among respondents (n = 378).

Total Attitude Score	Frequency (n)	Percentage (%)
Positive	251	66.4
Negative	127	33.6

Tables 4.4(d) show the questions on attitude towards COVID-19 prevention. Questions 1, 2, 3, 4, 5, 6, 7, and 8 were questions that indicated a positive attitude towards COVID-19 prevention. Based on the table of attitude questions, question number 2 had the highest number of respondents who answered Yes, with 375 (99.2%) indicating the respondents have a positive attitude towards this statement regarding COVID-19 prevention. Question number 7 had the highest number of respondents who answered No, with 71 (18.8%) indicating the respondents have a negative attitude towards this statement regarding COVID-19 prevention.

Table 4.4(b) and Table 4.4(c) showed the chi-square test between sociodemographic factor and total attitude score. Based on the chi-square analysis on the socio-demographic characteristics and attitude of COVID-19 prevention among respondents, ethnicity ($\chi^2 = 9.572$, df = 1, P = 0.002) and religion ($\chi^2 = 9.955$, df = 1, P = 0.002) had statistically significant association with the total attitude score. In this study, malay respondents (72.6%) and islam respondents (44.4%) had a more positive attitude in preventing COVID-19.

Table 4.4(b): Chi-Square test between total attitude score and ethnicity.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.572 ^a	1	0.002		
Continuity Correction ^b	8.898	1	0.003		
Likelihood Ratio	9.497	1	0.002		
Fisher's Exact Test				0.003	0.001
Linear-by-Linear Association	9.547	1	0.002		
N of Valid Cases	378				

Table 4.4(c): Chi-Square Test between total attitude score and religion.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.955 ^a	1	0.002		
Continuity Correction ^b	9.260	1	0.002		
Likelihood Ratio	9.855	1	0.002		
Fisher's Exact Test				0.002	0.001
Linear-by-Linear Association	9.928	1	0.002		
N of Valid Cases	376				

Table 4.4(d): Frequency and percentage of answers for positive attitude on COVID-19 prevention questions among respondents (n=378).

Attitude questions	Correct answer		False answer	
	n	%	n	%
Question 1: Are you worried one of your family members may get an infection?	350	92.6	28	7.4
Question 2: Transmission of coronavirus can be prevented by using standard and isolation precautions given by WHO.	375	99.2	3	0.8
Question 3: Prevalence of coronavirus can be reduced by active participation of health care workers in hospital infection control programs.	345	91.3	33	8.7
Question 4: If a coronavirus vaccine were available, would you have it?	369	97.6	9	2.4
Question 5: Intensive treatment should be given to diagnosed patients.	350	92.6	28	7.4
Question 6: Health care workers must avail themselves of all information about the virus.	372	98.4	6	1.6

Question 7: Is available information in the Malaysian society sufficient?	307	81.2	71	18.8
Question 8: Are the government institutions capable of combating the epidemic of coronavirus?	363	96.0	15	4.0

4.5 Practice of COVID-19 prevention among respondents

Based on the normality test, the result showed that the total practice score was not normally distributed. The respondents who score higher than median score indicate they had good practice on COVID-19 prevention while respondents who score lower than median score indicate they had poor practice on COVID-19 prevention. From the study, the median score was 8. Based on Table 4.5(a), 210 (55.6%) of medical students have good practice on COVID-19 prevention whereas 168 (44.4%) of medical students have poor practice in preventing COVID-19..

Table 4.5(a): Total practice score among respondents (n = 378).

Total Practice Score	Frequency (n)	Percentage (%)
Good	210	55.6
Poor	168	44.4

Tables 4.5(b) show the questions on practice towards COVID-19 prevention. Questions 1, 2, 3, 4, 5, 6, 7, and 8 were questions that indicated good practice towards COVID-19 prevention. Based on the table of practice questions, question number 3 had the highest number of respondents who answered Yes, with 377 (99.7%) indicating the respondents have good practice towards this statement regarding COVID-19 prevention. Question number 5 had the highest number of respondents who answered No, with 145 (38.4%) indicating the respondents have poor practice towards this statement regarding COVID-19 prevention. Among all the respondents, the highest practice score was 8 while the lowest practice score was 4.

None of the socio-demographic characteristics had statistically significant association with the total practice score of COVID-19 prevention after chi-square test have been done.

Table 4.5(b): Frequency and percentage of answers for good practice on COVID-19 prevention questions among respondents (n=378).

Practice questions	Correct answer		False answer	
	n	%	n	%
Question 1: Did the outbreak of covid-19 virus make you increase the frequency of hand washing?	372	98.4	6	1.6

Question 2: Did the outbreak of covid-19 virus make you use the hand sanitizer more frequently?	376	99.5	2	0.5
Question 3: Did the outbreak of covid-19 virus make you use the personal protective equipment (eg: mask) more often than you used to?	377	99.7	1	0.3
Question 4: Did you carry hand sanitizer with you during the outbreak in Malaysia?	342	90.5	36	9.5
Question 5: Did you write down or store in your phone any helpline number to contact in case you suspected that you or someone you know had the COVID-19 virus?	233	61.6	145	38.4
Question 6: Did you maintain social distance during the outbreak?	376	99.5	2	0.5
Question 7: Did you cover cough and sneeze with a tissue, handkerchief, etc. During the outbreak?	369	97.6	9	2.4
Question 8: Did you avoid unnecessary travel or outing during the outbreak?	361	95.5	17	4.5

4.6 Association between Knowledge, Attitude and Practice of COVID-19 prevention

Based on the Chi-Square test , it showed that there is a significant association between attitude and practice of COVID-19 prevention. The p-value was less than 0.05. The results stated that 61.4% of respondents who had a positive attitude were having good practice in preventing COVID-19. However, there is no significant association between knowledge of respondents with their attitude and practice. Table 4.8 showed the result of the Chi-Square test between attitude and practice of COVID-19 prevention among the respondents.

Table 4.8: Chi-Square test between attitude and practice among respondents. (n=378)

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.175 ^a	1	0.001		
Continuity Correction ^b	9.488	1	0.002		
Likelihood Ratio	10.157	1	0.001		
Fisher's Exact Test				0.002	0.001
Linear-by-Linear Association	10.148	1	0.001		
N of Valid Cases	378				

CHAPTER 5

Discussion

5.1 Response rate

378 medical students have participated in our study out of 378 medical students that were in our sample size, giving us a response rate of 100%. Table 4.1 shows the distribution and frequency percentage of our respondents' gender, age, religion, ethnicity, year of study, and marital status.

5.2 Socio-demographic characteristics (age, gender, ethnicity, religion, year of study and marital status) among medical students of Faculty Of Medicine and Health Sciences, University Putra Malaysia.

5.2.1 Age

Majority of the respondents were in the age group of 21-22 which accounts for 40.2% (n=152), followed by age group of 23-24 at 31.7% (n=120) and age group 19-20 at 26.7% (n=101) and least were in the age group 25-26 made up 1.3% (n=5). The age group of 21-22 has the highest number of respondents because mostly respondents were from year 2 and year 3 if added together.

5.2.2 Gender

Female respondents were higher than male respondents. Majority of the respondents were female which accounts for 68.8% (n=260) while male respondents only accounted for 31.2% (n=118). In a previous study that was conducted in Malaysia among 4850 adolescents, majority of the respondents were also female where females made up 57.9%(n=2808) of the total respondents and the remaining 42.1%(n=2042) made up of male.

5.2.3 Religion

Majority of the respondents were Muslim which accounts for 60.8% (n=230) while Non-muslim for 39.2 % (n=148). High number of Muslim in the UPM is probably due to the majority in the population distribution were Muslim.

5.2.4 Ethnicity

Majority of the respondents were Malay which accounts for 59.8% (n=226) while Non-malay for 40.2 % (n=152). High number of Malay in the UPM is probably due to the majority in the population distribution being Malay.

5.2.5 Year of Study

Clinical year of study respondents were higher than pre-clinical year of study respondents. Majority of the respondents were in clinical years which accounted for 50.5 % (n= 191) while pre-clinical years at 49.5% (n=187).

5.2.6 Marital Status

Out of 378 total respondents, majority of the respondents were single which accounts for 376 respondents (99.5%) and married accounts for 0.5% (n=2).

5.3 Association between socio-demographic characteristics and level of knowledge of COVID-19 prevention.

5.3.1 Gender

There was no significant association between gender and level of knowledge of COVID-19 prevention. The $p = 0.814$. Based on the study conducted, females had a higher percentage of good knowledge of COVID-19 prevention (68.6%) compared to male (31.4%). A study conducted in Malaysia revealed that female participants obtain higher knowledge scores towards COVID-19 (Azlan et al., 2020). Besides, the research that was conducted by Iranian Medical Students (2020) stated that the difference between males and females was significant in risk perception at level of $P < 0.01$. Females had lower risk perception. But from the study being conducted, gender played no role in determining the knowledge toward COVID-19 prevention eventually.

5.3.2 Age

There was no significant association between age and level of knowledge of COVID-19 prevention. The p value was 0.484. Based on the study conducted, respondents with age group 21 - 22 had the highest percentage of good knowledge toward COVID-19 prevention (40.7%), followed by 23 - 24 age group (32.0%), 19 - 20 age group (25.8%) and 25 - 26 age group (1.6%). A study showed that Malaysians above the age of 50 held higher knowledge scores whereas people between the ages 18 and 49 showed higher percentages in wearing face masks when leaving the house (Azlan et al., 2020). But from the study being conducted, age played no role in determining the knowledge toward COVID-19 prevention eventually.

5.3.3 Religion

There was a significant association between religion and level of knowledge of COVID-19 prevention. The p value was 0.038. Based on the study conducted, Muslim group had a higher score of good knowledge of COVID-19 prevention (63.4%) compared to Non Muslim group (36.6%). Muslim group have a higher percentage of respondents with good knowledge toward COVID-19 prevention (63.04%) compared to non muslim group (36.96%). In another research,

with regard to ethnicity, 74 per cent of respondents practising Buddhism were found to have moderate knowledge and 14 per cent had strong knowledge compared to respondents practising other religions (Mohiuddin et al., 2020). However in our study, it showed that Islam have higher levels of knowledge if compared to other religions. Then, religion plays a significant role in ensuring a good knowledge of COVID-19 prevention.

5.3.4 Ethnicity

There was a significant association between ethnicity and level of knowledge of COVID-19 prevention. The p value was 0.029. Based on the study conducted, Malay groups have a higher percentage of respondents with good knowledge toward COVID-19 prevention (62.1%) compared to non Malay groups (37.9%). Then, Malay individuals had comparatively better knowledge than other ethnic groups, although the Chinese population was relatively lower in the same category of "good knowledge" (Mohiuddin et al., 2020). Selvarajoo et al. (2020) declared that Malays are 2.3 times more likely to have strong information than non-Malays. These studies supported the outcomes of our research that Malay have a higher level of knowledge compared to other races. Then, ethnicity proved to play significant roles in determining knowledge of COVID-19 prevention.

5.3.5 Year Of Study

There was no significant association between year of study and level of knowledge of COVID-19 prevention ($p=0.213$). Based on the study conducted, clinical students had a slightly higher percentage of good knowledge pf COVID-19 prevention (51.9%) compared to preclinical students (48.1%). Students belonging to MBBS and nursing and having a higher year of study showed higher levels of knowledge toward COVID-19 prevention (Ikhlaq, Riaz, Bashir, & Ijaz, 2020). Besides, compared to research from Iranian medical students, their average of correct answers of knowledge was 86.96%; and 79.60% had high level of related knowledge which is higher level of knowledge than medical students of Universiti Putra Malaysia. But from the study being conducted, years of study played no role in determining the knowledge toward COVID-19 prevention eventually.

5.3.6 Marital Status

There was no significant association between marital status and level of knowledge of COVID-19 prevention. The p value was 1.000. Based on the study conducted, the respondents who were single had a higher score of good knowledge toward COVID-19 prevention (99.4%) compared to married (0.6%). From the study being conducted, marital status played no role in determining the knowledge toward COVID-19 prevention eventually.



5.4 Association between sociodemographic characteristics and level of attitude of COVID-19 prevention.

5.4.1 Age

There was no significant association between age and attitude of COVID-19 prevention. The p value was 0.520. 42.2% of medical students from age group 21-22 stated to have a more responsible attitude toward the COVID-19 pandemic than other age groups (23-24 group - 29.1%, 19-20 group - 27.5% and 25-26 group - 1.2%). But from the study being conducted, age played no role in determining the attitude toward COVID-19 prevention eventually.

5.4.2 Gender

There was no significant association between gender and attitude of COVID-19 prevention. The p value was 0.750. Based on study conducted, females were found to have a higher percentage of positive attitude toward COVID-19 prevention (69.3%) compared to male (30.7%). Women stated to have a more responsible attitude toward the COVID-19 pandemic than men. But from the study being conducted, gender played no role in determining the attitude toward COVID-19 prevention eventually.

5.4.3 Ethnicity

There was a significant association between ethnicity and attitude of COVID-19 prevention. The p value was 0.002. Based on the study conducted, Malay groups have a higher percentage of respondents with positive attitude toward COVID-19 prevention (65.3%) compared to non Malay groups (34.7%). In a study, an author stated that Chinese people have a stronger attitude than other races, as this may be partly due to the fact that most Chinese people have strong faith in traditional Chinese medicine (Mohiuddin et al., 2020). Mohiuddin et al. (2020) agreed that the study majority of Malaya and Indians had a neutral attitude only. Next, previous research in various regions around the world have also highlighted the influence of race on awareness, along with the racial disparity between different ethnicities (Mohiuddin et al., 2020). But, in our research it demonstrated that Malay have a positive attitude compared to other races that we

study. Then, this proved that ethnicity plays a significant role in determining attitude toward COVID-19 prevention.

5.4.4 Religion

There was a significant association between religion and attitude of COVID-19 prevention. The p value was 0.002. Based on the study conducted, Islam group have higher percentage of respondents with positive attitude toward COVID-19 prevention (66.8%) than non Islam group (33.2%). Even though Wong (2011) stated that with regard to faith, the mean total awareness score for the Muslim (2.6) and Taoist (2.7) participants was slightly lower than for other religious groups. Lye et al., (2015) mentioned that linked to the deep belief in faith, religious issues influence the actions of the respondents as much as they do. This statement supported our finding that Islam respondents was more positive attitude compared to others religion group. Eventually religion would play a significant role in ensuring a positive attitude toward COVID-19 prevention.

5.4.5 Year of study

There was no significant association between year of study and attitude of COVID-19 prevention. The p value was 0.090. Based on the study conducted, preclinical students had a higher score of positive attitude of COVID-19 prevention (52.2%) than clinical students (47.8%). In terms of attitude, more than 80 percent of students demonstrated positive attitudes among which the nursing students were dominant. (Ikhlaq, Riaz, Bashir, & Ijaz, 2020). This occurs maybe because of their environment that was more related to healthcare settings that influence their attitude. But, in this study it showed that the year of study did not affect the attitude of respondents toward COVID-19 prevention.

5.5.6 Marital Status

Based on the Chi-Square test, there was no significant association between marital status and attitude of COVID-19 prevention. The p-value was 0.113. Based on the study conducted, the respondents who were single found to have a higher percentage of positive attitude toward COVID-19 (99.6%) compared to the respondents who were married (0.4%). From the study being conducted, marital status played no role in determining the attitude toward COVID-19 prevention eventually.



5.5 Association between socio-demographic characteristics and level of practice of COVID-19 prevention.

5.5.1 Age

There was no significant association between age and practice of COVID-19 prevention. The p value was 0.352. 37.6% of medical students from age group 21-22 stated to have a better practice in preventing COVID-19 pandemic than other age groups (23-24 group - 33.8%, 19-20 group - 27.1% and 25-26 group - 1.4%). But from the study being conducted, age played no role in determining the practice toward COVID-19 prevention eventually.

5.5.2 Gender

There was no significant association between gender and practice of COVID-19 prevention. The p value was 0.728. Based on the study conducted, 69.5% of female respondents stated to have a better practice toward the COVID-19 prevention than male respondents (30.5%). This is supported by Solehan et al. (2020) stated that women are 0.6 times more likely to have good practise in hand hygiene relative to males. Solehan et al. (2020) also mentioned it was observed that gender and profession were related to COVID-19 practise. But from the study being conducted, gender played no role in determining the practice toward COVID-19 prevention eventually.

5.5.3 Ethnicity

There was no significant association between ethnicity and practice of COVID-19 prevention. The p value was 0.174. The study found that 62.9% of Malay respondents showed better practice in preventing COVID-19 than Non-Malay respondents (37.1%). However, other research stated that ethnicity played no role in determining the practice toward COVID-19 prevention.

5.5.4 Religion

There was no significant association between religion and practice of COVID-19 prevention. The p value was 0.051. Based on the study conducted, 65.6% of Islam respondents showed good practice in preventing COVID-19 compared to non-islam respondents (34.4%). However, other research stated that practice played no role in determining the level of practice toward COVID-19 prevention.

5.5.5 Year of study

There was no significant association between the year of study and practice of COVID-19 prevention. The p value was 0.421. Based on the study conducted, clinical respondents found to have a higher percentage of good practice toward COVID-19 prevention (52.4%) than the preclinical students (47.6%). In this study, there was a significant difference between staggers and interns in risk perception. It can be inferred that the interns' greater experience and higher self confidence in caring for patients have led them to perceive lower risk and experience less stress and anxiety (Mohammad, Roham & Ramin, 2020). However, in this study it showed that the year of study did not affect the practice of respondents toward COVID-19 prevention.

5.5.6 Marital Status

There was no significant association between marital status and practice of COVID-19 prevention. The p value was 0.113. Based on the study conducted, 100.0% of the single respondents showed a good practice toward COVID-19 prevention compared to the respondents who were married. From the study being conducted, marital status played no role in determining the practice toward COVID-19 prevention eventually.

5.6 Association between knowledge and attitude of COVID-19 prevention

There was no significant association between the knowledge and attitude of COVID-19 prevention. The p value is 0.503. The respondent with good knowledge was 85.2% of total respondents and was 66.4% of the respondents who participated had a positive attitude toward COVID-19 prevention. A significant volume of information circulated and viewed in the community that would need more awareness campaigns to reduce the fear among the population (Alzoubi et. al., 2020). Then, Alzoubi et al. (2020) also stated that students represent a strong relationship between their deep understanding and the knowledge available in the literature and media on COVID-19. The statement retrieved from Alzoubi et al. (2020) proved that knowledge would lead to better attitudes of a population. This is because when a person has a good or deep understanding about a certain issue or matter, only then that person would change their attitude better. Muhammad et al. (2020) also mentioned that almost 50 per cent of respondents had an outstanding level of information (47.6 per cent) and a constructive attitude (47.4 per cent) towards COVID-19. However, from the study conducted, the knowledge showed to not have a significant association with the attitude of COVID-19 prevention. This clearly showed that when a person has a high knowledge but it did not entitled that particular person to have a positive attitude toward COVID-19 prevention.

5.7 Association between the knowledge and practice of COVID-19 prevention

There was no significant association between the knowledge and practice of COVID-19 prevention. The p value was 0.538. The respondents with good knowledge was 85.2% and the respondents with good practice was 55.6% from the total sample size. This statement was supported by Abu Samah et al. (2020) which stated that while knowledge alone is correlated with social distancing activities, a majority of respondents practised good social distancing, while nearly 30% practised strict social distancing. This may be due to factors relevant to the cooperation and compliance of the authorities with the Movement Control Order. Kebede et al. (2020) proposed that the level of knowledge that is promising to protect the most at-risk segment

of the population could divert attention from the young / adult public to the adoption of preventive measures. Azlan et al. (2020) also supported this statement by stating that a study conducted in Malaysia revealed that female participants obtain higher knowledge scores towards COVID-19 and practise good hand hygiene. However, Kebede mentioned that there are huge gaps between the extent of knowledge of preventive methods and practices (Kebede et al., 2020). Salman et al. (2020) had stated that despite the overall good knowledge and attitudes, it was worrisome that preventive practices related to COVID-19 were far from satisfactory. In addition, Solehan et al. (2020) declared that more than half of the respondents have little knowledge and inadequate practice. The study also clearly shows there was no association between the knowledge of a person and the practice of preventive measures of that person. This proved that a good knowledge did not guarantee a good preventive practice from a person itself.

5.8 Association between the attitude and practice of COVID-19 prevention

There was a significant association between the attitude and practice of COVID-19 prevention. The p value is 0.001. The respondent with a positive attitude was 66.4% and respondents with good practice was 55.6% from total sample size. A study showed that awareness and practices among Malaysian adults against COVID-19 has been considered poor, and these factors may lead to the emergence of cases of COVID-19 in that country during this early phase of the pandemic (Solehan et al., 2020). However, Alzoubi et al. (2020) stated that the participants' attitude to the practice reflects the right way to prevent infection by various means, such as hand washing, using alcohol rub, avoiding hand shaking and following a preventive method. Then, 93.6 percent of them also choose to visit the hospital or, if necessary, to be subject to quarantine, which is considered to be an important attitude towards the containment of ongoing respiratory infection as reported and available data (Alzoubi et al., 2020). The statement where medical students should carefully review coronavirus-related knowledge materials before sharing or implementing them (Ikhlaq et. al., 2020) showing that a positive attitude would result in good practice especially when relating to COVID-19 issue. Besides, Abu Samah et al. (2020) stated that in coping with disease infections, the perception and attitude of individuals can have positive

effects on their behaviours. Muhammad et al. (2020) also said that there is a significant correlation between awareness and social distancing practise in the study conducted by the authors. From the study also showing that there was significant association between attitude and practice of COVID-19 prevention. This clearly showed that a positive attitude that performed by a person would eventually lead to a good preventive practised by that person.



CHAPTER 6

CONCLUSION

6.1 Conclusion

Our study was done on 378 respondents from year one to year five medical students of University Putra Malaysia. Majority of the respondents are female and Malay. In the conclusion, generally the respondents had good knowledge (85.2%), positive attitude (66.4%) and good practice (55.6%) toward COVID-19 prevention. Knowledge of COVID-19 prevention found to be significantly associated with ethnicity and religion but not with age, gender, year of study and marital status. Then, the attitude of COVID-19 prevention also found to be significantly associated with ethnicity and religion but not with others socio demographic characteristics. However, there were no sociodemographic characteristics that were significantly associated with practice of COVID-19 prevention. There was no significant association between the knowledge and attitude of COVID-19 prevention among the respondents. There was also no significant association between the knowledge and practice of COVID-19 prevention. But, the study found a significant association between the attitude and practice of COVID-19 prevention among the respondents that participated.

6.2 Limitations

There were a few problems that arose during the data collection period. As the data collection period was only for 2 weeks, researchers were facing problems to reach the respondents and fulfil the sample size expected. However, the respondents group managed to achieve the sample size that was calculated and expected (378 respondents). But, researchers were also facing a problem in waiting for respondents' response because the clinical students mostly on their End Of Posting examination and the first year students prepared for their assessment. So, respondents took some time before reaching the target. To solve this limitation, the researchers' team had

tried the best to minimise the limitation that arose. The team had done a follow up 2 to 3 days after distributing the questionnaire to the respondents as a method of reminder.

Our study only focused on the medical students of Universiti Putra Malaysia (UPM), hence the validity of this study is limited only to the medical students of UPM. Then, the outcome of this research cannot be generalised to represent the medical students of others universities in Malaysia. Another limitation that was met by the researchers' team was the slight low responses from male respondents. These two factors influence the result obtained in this study as the findings cannot be generalised to represent the public. Other than that, our study was a cross-sectional study. The limitation of this type of study is that we are not able to determine the causal relationship.

6.3 Recommendation

Based on the study, generally the respondents have a good knowledge, positive attitude and good practice toward COVID-19 prevention. However, there is always room for improvement especially for the attitude and practice of the respondents as they achieved around 55% to 65% only. Then, a system of health education which could suitably applied in the community should be develop and promoted to the community

A proper health education programme should be designed by the authorities to empower the community with the high knowledge of COVID-19 prevention, alter the people's attitude toward COVID-19 prevention and also educate them regarding the proper preventive practices of COVID-19 during this pandemic still going on. It is very crucial to develop the knowledge, attitude and practice altogether in order to result in a significant difference upon the COVID-19 prevention. Besides, it is a well known fact that knowledge alone would not guarantee a major change if it does not come along with a positive attitude and good practice toward this issue simultaneously.

The study of knowledge, attitude and practice of COVID-19 prevention can be regarded as the initial step to come out with an efficient COVID-19 health education programme. Therefore, more studies should be encouraged and done among the researchers especially in Malaysia as to strengthen the COVID-19 prevention programme. Besides, there is also lack of study conducted toward this issue as it is a new pandemic and the number of victims of this virus is still increasing day by day.

Lastly, the study should be carried out in a wide range of areas that could actually represent the whole county population and should include a large number of population for more significant results. Recruitment respondents consist of non medical students from different faculty of various universities to represent the public and investigate the knowledge, attitude and practice of COVID-19 prevention among medical students from other universities can be used to represent a wider population. However, the study was carried out by researchers just to confine a particular area which was Faculty of Medicine and Health Sciences, UPM which does not represent the general community.

Work Plan

Gantt Chart 2020

Month	Jun	July	August	September
Activity				
Proposal preparation				
Submission of proposal				
Proposal Presentation				
Preparation of ethical approval to organization				
Data collection and analysis				
Presentation of analyzed data				
Report writing				
Poster competition				
Final presentation and submission of log book				
Literacy Review				

Budget Planning

Item	Cost (RM)
Printing	30.00
Photostatting	30.00
Binding	20.00
Total	80.00

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**ETHICS COMMITTEE FOR RESEARCH INVOLVING HUMAN SUBJECTS
(JKEUPM)
UNIVERSITI PUTRA MALAYSIA**

Research title	: Knowledge, Attitude and Practice of COVID-19 Prevention Among Medical Students in Faculty of Medicine and Health Science, Universiti Putra Malaysia.
Study Site	: Faculty of Medicine and Health Sciences, Universiti Putra Malaysia
JKEUPM Ref No.	: JKEUPM-2020-223
Researcher	: Syed Zulhilm Syed Zulfadil, Sim Siew Lenn, Nor Nashira Mohd Ibrahim.
Supervisor	: Dr. Titi Rahmawati Hamedon

Documents received and reviewed with reference to the above study:

1. Ethics Application Form, Version 1 dated 24/6/2020
2. Respondent Information Sheet & Consent (English), Version 1 dated 24/6/2020
3. Proposal (English), Version 2 dated 6/8/2020
4. Questionnaires/ Interviews (English), Version 1 dated 24/6/2020
5. Curriculum Vitae of:
 - a. Dr. Titi Rahmawati Hamedon

The University Research Ethics Committee, Universiti Putra Malaysia (JKEUPM) operates in accordance to the ICH-GCP Guidelines.

Decision by JKEUPM:

- ☒ Approved
- ☒ **Permission MUST BE OBTAINED** from the respective hospitals/ institutions before conducting the research
- ☐ Disapproved

Please note that the approval is **VALID UNTIL 11 AUGUST 2021**

Researchers should comply with the following:

- I. Complete a Study Final Report upon study completion (Form 3.2).
- II. Ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.
- III. Applicable for Clinical Trial Studies and Clinical Interventional Studies only; Progress Report has to be submitted to JKEUPM at every 6 months from the date of approval (Form 3.1). Report occurrences of all Serious Adverse Events (SAEs), Suspected Unexpected Serious Adverse

Appendix



JAWATANKUASA ETIKA UNIVERSITI UNTUK
PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG,
SELANGOR, MALAYSIA

FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE

**KNOWLEDGE, ATTITUDE AND PRACTICE OF COVID-19 PREVENTION AMONG
MEDICAL STUDENTS OF FACULTY MEDICINE AND HEALTH SCIENCES,
UNIVERSITI PUTRA MALAYSIA**

2. INTRODUCTION

This study is an undergraduate research project that will be conducted from June till October 2020 among medical students of Faculty Medicine and Health Sciences, University Putra Malaysia. The number of participants in this study is approximately around 380. This research project is conducted by three medical students of Universiti Putra Malaysia.

COVID-19 is a global pandemic that affects every population regardless of ethnicity or age group. Nowadays, almost 400, 000 deaths have been recorded by World Health Organisation due to the effect of this highly-contagious virus. This study is mainly to determine the knowledge, attitude and practice COVID-19 prevention among medical students of the Faculty of Medicine and Health Sciences, University Putra Malaysia. Besides, the study also highlights the association between the sociodemographic factors (age, gender, ethnicity, religion, educational level and marital status) and the knowledge, attitude and practice of COVID-19 prevention among medical students of Faculty of Medicine and Health Sciences, University Putra Malaysia.

3. WHAT WILL YOU HAVE TO DO

The questionnaire consists of 4 sections. The first section is the sociodemographic factors. The second part is regarding your knowledge of COVID-19 and its prevention. The third part is about your attitude toward COVID-19 prevention. The last section on your practice toward COVID-19 prevention.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY

Those respondents who do not fulfil the criteria below will be excluded from the study.

- Medical students of Faculty of Medicine and Health Sciences, University Putra Malaysia for 2020/2021 session.
- Respondents who are Malaysians

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

Participation of respondents will help the researchers to determine the prevalence of high knowledge, positive attitude and good practise of COVID-19 prevention among medical students in UPM. By evaluating the information collected, appropriate intervention can be taken to prevent Covid-19 transmission. Your participation in this study is voluntary and you have the right to withdraw from this study without any penalty. No fees will be charged on you if you are interested in participating in this study. If you are interested in knowing the results of the study you have participated in, please leave your email address in the provided questionnaire.

(b) TO THE INVESTIGATOR?

Data that is obtained from the feedback of respondents will assist the researcher to determine the sociodemographic factors and prevalence of knowledge, attitude and practice on Covid-19 prevention among medical students in UPM. This study also can contribute to promote awareness among family members, community, public, employers and workplace, the government sectors and also to non-government bodies.

6. WHAT ARE THE POSSIBLE RISK

There will be no risk towards the respondents participating in this study. All information regarding the identities of respondents will be kept confidential.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

Yes, all forms of information and identities of respondents that are stated in the questionnaire will be kept confidential.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

1. Dr Titi Rahmawati Binti Hamedon : 012-6498088 titi_rahmawati2006@yahoo.co.uk
2. Syed Zulhilmi Bin Syed Zulfadil : 016-9844239 yedzul1527@gmail.com
3. Sim Siew Lean : 017-5729118 slean990407@gmail.com
4. Nor Nashira Bt Mohd Ibrahim : 011-15480318 nashira.ibrahim99@gmail.com

Please initial here if you have read and understood the contents of this page _____

9. CONSENT

I Identity Card No.
address.....
.....hereby voluntarily agree to take
part in the research stated above *(clinical /drug trial/video recording/ focus
group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse
effects and complications (as written in the Respondent's Information Sheet). I understand that I
have the right to withdraw from this research at any time without giving any reason whatsoever.
I also understand that this study is confidential and all information provided with regard to my
identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature

(Respondent)

Signature

(Witness)

Date :

Name :

I/C No. :

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date

Signature

(Researcher)

Questionnaire

Below is the link to our questionnaire in the form of a google form. It is divided into two ; english version and bahasa melayu version.

English version of questionnaire

<https://forms.gle/zobGZSkHVvfmqswZ7>



SECTION A : SOCIODEMOGRAPHIC FACTORS DATA

In this section, all the collected data with remained confidential

Matric Number

.....

Phone Number

.....

Age

.....

Gender

☐ Male

☐ Female

Ethnicity

☐ Malay

☐ Chinese

☐ Indian

☐ Kadazan Dusun

☐ Iban

☐ Others ...

Religion

- ☐ Islam
- ☐ Christian
- ☐ Hindu
- ☐ Buddha
- ☐ Others ...

Educational Level

- ☐ Year 1
- ☐ Year 2
- ☐ Year 3
- ☐ Year 4
- ☐ Year 5

Marital Status

- ☐ Single
- ☐ Married
- ☐ Divorced



SECTION B : KNOWLEDGE OF COVID-19 AND ITS PREVENTION

(Modified version of COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception (Mohammad, Roham & Ramin, 2020))

Question	T	F	DK
COVID-19 is a respiratory infection caused by a new species of coronavirus family			
The first case of COVID-19 was diagnosed in Wuhan, China			
The origin of COVID-19 is not clear but it seems that it has been transmitted to human by sea foods, snakes or bats			
Its common symptoms are fever, cough and shortness of breath but nausea and diarrhea were reported rarely			
Its incubation period is up to 14 days with a mean of 5 days			
It can be diagnosed by PCR test on samples collected from nasopharyngeal and oropharyngeal discharge or from sputum and bronchial washing			
It is transmitted through respiratory droplets such as cough and sneeze.			
It is transmitted through close contacts with an infected case (especially in family, crowded places and health centers)			
The disease can be prevented through handwashing and personal hygiene.			
A medical mask is useful to prevent the spread of respiratory droplets during coughing.			
The disease can be prevented through no close contacts such as handshakes or kissing, not attending meetings and frequent hand disinfection.			
All people in society should wear masks			
Only during intubation, suction, bronchoscopy and cardiopulmonary resuscitation, you have to wear a N95 mask.			
The disease can be treated by usual antiviral drugs			
If symptoms appear within 14 days from direct contact with a suspected case, the person should inquire at a nearby public health center			

SECTION C : ATTITUDE TOWARD COVID-19 PREVENTION

Modified version of the Awareness and Attitude of Undergraduate Medical Students towards 2019-novel Corona virus (Ikhlaiq, Riaz, Bashir & Ijaz, 2020).

Question	Yes	No
Are you worried one of your family members may get an infection?		
Transmission of coronavirus can be prevented by using standard and isolation precautions given by WHO		
Prevalence of coronavirus can be reduced by active participation of health care workers in hospital infection control programs.		
If a coronavirus vaccine were available, would you have it?		
Intensive treatment should be given to diagnosed patients.		
Health care workers must avail themselves of all information about the virus		
Is available information in the Malaysian society sufficient?		
Are the government institutions capable of combating the epidemic of coronavirus?		

SECTION D : PRACTICE TOWARD COVID-19 PREVENTION

Modified version of a questionnaire for assessing COVID-19 prevention intentions and practices in knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study (Maheshwari, Gupta, Sinha & Rawat, 2020)

Question	Yes	No
Did the outbreak of covid-19 virus make you increase the frequency of hand washing		
Did the outbreak of covid-19 virus make you use the hand sanitizer more frequently		
Did the outbreak of covid-19 virus make you use the personal protective equipment (eg : mask) more often than you used to		
Did you carry hand sanitizer with you during the outbreak in malaysia		
Did you write down or store in your phone any helpline number to contact in case you suspected that you or someone you know had the covid-19 virus		
Did you maintain social distance during the outbreak		
Did you cover cough and sneeze with a tissue, handkerchief, etc. During the outbreak		
Did you avoid unnecessary travel or outing during the outbreak		