

# KNOWLEDGE, RISK PERCEPTION AND PROTECTIVE BEHAVIOUR AMONG

# MALAYSIAN YOUNG ADULTS DURING COVID-19 PANDEMIC

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among Malaysian Young Adults during COVID-19 Pandemic

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# APPROVAL FORM

This research paper attached here to, entitled "Knowledge, Risk Perception and Protective Behaviour among Malaysian Young Adults during COVID-19 Pandemic" prepared and submitted by "Gan Hui Min, Jeanette Elena Tan, and Swi Zi Qing" in partial fulfilment of the requirements for the Bachelor of Social Science (Hons) Psychology is hereby accepted.

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#### Abstract

In recent years, a novel infectious disease, COVID-19, has spread worldwide includes in Malaysia. This air-borne disease (COVID-19) causes illnesses ranging from the common cold to severe diseases. Individuals are required to practice protective behaviour to reduce the risk of getting infected. A previous study mentioned that an individual's knowledge and risk perception of COVID-19 could contribute to the engagement of protective behaviour. Hence, our study aimed to examine the role of risk perception as a mediator between knowledge and protective behaviour of COVID-19. Furthermore, our study also hypothesized that knowledge predicts an individual's protective behaviour through risk perception as a mediator. The study was conducted using a cross-sectional survey design. A total of 323 young adults (Mean age = 21.89; SD = 1.513) were recruited via the purposive sampling method. The collected data was tested with linear regression to analyse the predicting effects of the variables, and PROCESS Macro was run mediation analysis. The regression model result found that knowledge ( $\beta = .026$ , p = .640) does not significantly predict risk perception; knowledge ( $\beta$ = .082, p = .140) does not significantly predict protective behaviour; while only risk perception ( $\beta = -.112$ , p = .044) significantly predicted protective behaviour among young adults in Malaysia. Besides, the findings of mediation analysis showed no significant mediating effect of risk perception on knowledge and protective behaviour. Since there is limited research in Malaysia regarding the determinants of protective behaviour, this study broadens the research perspective in this relevant field in Malaysia context and contributes substantial knowledge for further study.

*Keywords*: Knowledge of COVID-19, Risk Perception, Protective Behaviour, COVID-19, Malaysian young adults

# DECLARATION

We declare that the material contained in this paper is the end result of our own work and that due acknowledgement has been given in the bibliography and references to ALL sources be they printed, electronic or personal.

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# List of Abbreviations

COVID-19	-	Coronavirus Disease 2019
HBM	-	Health Belief Model
SKAPCOV-1	9 -	Students' Knowledge, Attitude, and Practice towards COVID-19
H7N9	-	Asian Lineage Avian Influenza A
SARS	-	Severe Acute Respiratory Syndrome
A/H1N1	-	Influenza A Virus Subtype H1N1
KAP	-	Knowledge, Attitude and Practice
UTAR	-	Universiti Tunku Abdul Rahman
МОН	-	Official Ministry of Health
SOP	-	Standard Operating Procedure
МСО	-	Movement Control Order
EMCO	-	Enhanced Movement Control Order
RMCO	-	Recovery Movement Control Order
СМСО	-	Conditional Movement Control Order

#### **Chapter I**

#### Introduction

#### **Background of Study**

Coronavirus disease (COVID-19) is a novel pneumonia infectious disease that causes illnesses ranging from the common cold to more severe diseases, and it can be transmitted between animals and people (World Health Organization, 2021a). There is much fluctuation towards the cases of COVID-19 in Malaysia. Malaysia is currently one of the countries battling with the novel coronavirus, and up to today, over 2.45 million cases have been confirmed within the year 2020 to 2021 (Ministry of Health Malaysia, 2021).

After the COVID-19 outbreak struck for more than a year, there have been various COVID-19 detection kits and vaccines. Although researchers have tried to invent effective intervention aids against COVID-19, the constantly mutated virus makes no completely effective prevention for the people from the virus. Thus, herd immunity against COVID-19 by vaccination is recognized as the most effective way to reduce the COVID-19 outbreak. According to the Ministry of Health Malaysia (2021), almost 80% of the population of Malaysian have been fully and partially vaccinated. Besides, Kaos (2021) stated that the Malaysia health minister told people who had been fully vaccinated with Sinovac (at least three months prior) and Pfizer (at least six months earlier) would be given the booster doses or shots. Malaysians who are fully vaccinated against COVID-19 and residing in the state under phase three and four of the recovery plan are allowed to take benefits of Malaysia's eased restrictions such as dining at restaurants and visiting the hairdresser upon presenting their COVID-19 digital vaccination certification ("Eased Covid-19 controls", 2021). Besides, fully vaccinated individuals residing in a state under phase four of the recovery plan in Malaysia are allowed to travel interstate nationwide, carry out religious congregations, and

others (National Recovery Plan, 2021). Malaysia has been trying to adapt to the situation of COVID-19 and back to its normal state subject to current risk assessment in Malaysia, slowly opening up the educational institutions for students returning to school and allowing the market to reruns, including the international tourism sector (Anand, 2021).

According to the World Health Organization (2021b), being fully vaccinated against COVID-19 helps individuals prevent getting seriously ill or dying from COVID-19. In other words, it does not entirely fend off or avoid the COVID-19 infection. Given this, the number of COVID-19 cases in Malaysia might be increased, and there is a high probability for the next outbreak wave. The new clusters of COVID-19 also appear in the workplace, which is considered one of the critical sources of COVID-19 infection in Malaysia (Hassan, 2021). The non-stop appearance of new clusters might be because of the reluctance to perform recommended protective behaviour such as social distancing and mask-wearing. Thus, it is crucial to examine the factors to promote COVID-19 protective behaviour.

There is a high level of avoidance and protective behaviour, such as avoiding travel abroad and wearing a face mask among Malaysians during the COVID-19 outbreak (Wong & Alias, 2021). Similarly, the study reported that a high percentage of Malaysians perform protective behaviour, such as using hand sanitizer and avoiding close contact with a COVID-19 positive person, and others to prevent widespread infection during the COVID-19 pandemic (Ab Malik et al., 2021). Although Wong and Alias (2021) reported that some Malaysians are not wearing face masks when out in public during the early stage of COVID-19, in line with the increase of COVID-19 cases in Malaysia, the use of face masks increased.

One of the factors to predict the protective behaviour of COVID-19 is the individual's knowledge of COVID-19. Although it is well-known that the government has played its role in providing accurate and truthful information about COVID-19 in Malaysia, the individuals'

knowledge of COVID-19 is an individual protective factor for Malaysians to prevent the infection of COVID-19 in the long run. Wearing face mask behaviour might be enforced by the law under the "Prevention and Control of Infectious Diseases Act" in which people who fail to comply with the new rule of wearing face masks in public spaces will be fined up to RM1,000 ("Malaysia implements", 2020). A study by Ssebuufu et al. (2020) reported that people with adequate COVID-19 knowledge could promote their protective behaviour towards COVID-19. Hence, people who lack of COVID-19 knowledge might perform erroneous health behaviour that exposes themselves to the infection risk of COVID-19. It will be difficult for Malaysia to adapt to the new norm of life under COVID-19 if people have a low level of knowledge on COVID-19, especially the misconception about COVID-19. Therefore, it highlights the importance of investigating the levels of knowledge of Malaysian young adults and their association with protective behaviour.

Previous research has established that individuals are more likely to change their behaviour by developing protective behaviour when they perceive a high risk of perception (Mat Dawi et al., 2021). Risk perception has a pivotal role in an individual's subjective judgments about the chances of contracting COVID-19 and the ability to process information related to the COVID-19. The individual's risk perception about being infected by COVID-19 diseases could trigger their protective behaviour such as hygiene and cleaning practices. When individuals perceive a high risk of infection, more social distancing behaviour is considered obligatory by the individual to reduce the risk (Savadori & Lauriola, 2021). Therefore, this study also examines the predicting effect of Malaysian young adults' risk perception and protective behaviour.

As aforementioned, there is a relationship between the knowledge of disease and protective behaviour. Knowledge on COVID-19 may predict the individuals' engagement in protective behaviour via increasing their perception of risk of COVID-19 (Iorfa et al., 2020;

Wang et al., 2017). In other words, knowledge of COVID-19, such as knowing the symptoms when getting infected, preventive measures, and vaccine information, would help raise individuals' risk perception and contribute to the individual's protective behaviour over COVID-19. West et al. (2020) mentioned knowledge as an important factor in reducing the transmission of COVID-19. People who are more knowledgeable about COVID-19 are more worried because they are aware of the risk of getting infected (Vartti et al., 2009). Hence, they will engage more in protective behaviour. The Health Belief Model (HBM) that discussed the modifying factors that enable individuals to be engaged in health behaviour will be used to explain the individual's beliefs which further predict the individual's health decisions will be used in our study (Glanz & Bishop, 2010; Rosenstock et al., 1988).

Since young adults aged from 18 to 25 years old (Bonnie et al., 2015), therefore, the purpose of this study is to examine the predicting role of knowledge of COVID-19 on risk perception and protective behaviour; the predicting role of risk perception on protective behaviour; and also to examine the mediating role of risk perception on the relation between knowledge of COVID-19 and protective behaviour among young adults who aged between 18 to 25 years old in Malaysia during COVID-19 pandemic.

# **Problem Statement**

Due to the novel characteristics of the virus, there is a lack of knowledge regarding the aspects of transmission across different countries, including Malaysia (Aziz et al., 2020). As COVID-19 symptoms are similar to common diseases like fever and flu, the public with low knowledge of the symptoms of COVID-19 might neglect the potential risk of infection until it causes some severe symptoms. However, some Malaysians only know COVID-19 as a virus without getting a deeper understanding of its severity. Viruses spread rapidly as human-to-human transmission occurs. There is much unknown regarding the causes of the virus and effective prevention methods in Malaysia in the early pandemic (Azlan et al., 2020). The government is trying to enhance the knowledge of COVID-19 by introducing the current proven knowledge regarding COVID-19, for example, how COVID-19 spread through e-government and social media. However, the study stated that there is still a knowledge gap and misconception in people, especially in remote areas (World Vision International, 2020). Besides, according to Mohamad and Azlan (2020), the large amount of misinformation and false information shared on social media also confuses people and clouds their understanding of COVID-19. This might lead them to develop exaggerated panic and employ dysfunctional protective behaviours such as panic buying and hoarding. At the same time, people lacking knowledge might not be alert of the severity and spreading rate of COVID-19. Lack of knowledge may jeopardize an individual's engagement in proper preventive behaviour and health.

According to recent research, community risk perception on COVID-19 is very low, as it found 78.6% of Malaysians report that COVID-19 is not dangerous (COVID-19: Community insights, 2020). Recently, Prime Minister Ismail Sabri Yaakob announced that most economic sectors are allowed to reopen as prolonged lockdown might negatively affect Malaysians, including the economy and mental health. There are many unemployment cases and emotional distress reported in Malaysians ("More sectors", 2021). However, there is no risk-free way to open those economic sectors as well as schools. Although the vaccination has been highly recommended and implemented in Malaysian, COVID-19 still disrupts the economic stability and social conditions of Malaysians as there is no effective and perfect treatment towards COVID-19. With the number of COVID-19 death cases leading to over 28576 deaths from March 2020 until November 2021, some Malaysians still perceive a low risk of COVID-19 and neglect the danger of the virus, especially when approaching someone they know better. Challenges such as the outspread of the virus are still existing as most of the economic sector has reopened. A large population begins to flock to the holiday destination, and some of them perceive low risk in COVID-19 by gathering with their close ones without wearing face masks ("More sectors", 2021). As Malaysia is less likely to have a long-term lockdown, the low-risk perception on COVID-19 of Malaysians might cause another pandemic outbreak at any time. A recent finding found that younger adults believe that COVID-19 is not dangerous as they are considered a low-risk group of getting infected by COVID-19 (COVID-19: Community insights, 2020). Niepel et al. (2020) mentioned that younger age groups had underestimated their risk of dying from COVID-19. This study showed that young adults did not perceive the risk for the infection of COVID-19 and contributed to the increasing fatal rate globally. There is a low amount of research regarding the overall risk perception of Malaysian young adults, while some studies provide evidence that young adults with low-risk perception have a low engagement in protective behaviour regarding COVID-19 (COVID-19: Community insights, 2020; Niepel et al., 2020). Therefore, we would like to examine the level of risk perception of young adults in Malaysia during the COVID-19 pandemic through our study.

According to Totu et al. (2021), the Ministry of Health encourages people to practice health-protective behaviour such as frequently washing hands, using face masks regularly, and advising people to avoid "3C" areas that are confined spaces, crowded places, and also intimate conversation. Even though the Ministry of Health has shared and promoted many protective behaviours to the public, the study of Wong and Alias (2021) found out that less than 33% of participants wear masks in public places before the Movement Control Order period even though wearing a mask is proven to be one of the important protective behaviours during this pandemic. Besides, the study reported that it is more important and impactful for the individuals voluntarily to adapt with protective behaviour than the one-sided effort from the government to delay the transmission of the COVID-19 (Anderson et al., 2020). However, there are fewer personal protective behaviour practices among Malaysians, and most of them applied dysfunctional protective behaviour rather than appropriate personal protective behaviour (Weismüller et al., 2020). In addition, according to Zhang et al. (2021), the study also showed that vaccination would reduce the individuals' practices of protective behaviour as some vaccinated people perceived less risk of acquiring COVID-19, which might expose them to the potential risk of following waves of various developing variant viruses such as Alpha and Delta viruses. Protective behaviour is important in reducing the contagious of COVID-19, and hence our current study aims to study protective behaviour as our research outcomes and its factors.

At the beginning of the COVID-19 outbreak as a global pandemic, few studies on the individual's risk perception of infection and protective behaviour engagement in the early stages of the COVID-19 pandemic (Liao et al., 2019). Our current study aims to examine the risk perception and protective behaviour after Malaysians may adapt to the pandemic for almost two years as the pandemic has become a norm towards the public. In addition, most of the studies on knowledge, risk perception and protective behaviour focuses on the clinical setting that targets the dental and medical students to prepare them in developing effective infection control management towards the current pandemic (Arslanca et al., 2021; Batra et al., 2021). Our present study focuses on the young adults in Malaysia (18-25 years old) as data support that younger adult in Malaysia perceive themselves to have a low risk to get infected by COVID-19 and always explore themselves in a highly contagious area (COVID-19: Community insights, 2020). Other than that, Iorfa et al. (2020) also stated that it is vital to study protective behaviour as it can reduce the transmission of a contagious disease. Many health-related studies reported inconsistent findings on the association between knowledge and protective behaviour (De Buck et al., 2017; Phillips et al., 2015; Seimetz et al., 2016). Thus, this study will be essential to fill in the gap. One study suggests that the path of

knowledge and protective behaviour is mediated by personal factors such as perception and worries (Iorfa et al., 2020). In addition, Champion and Skinner (2008) suggested that the Health Belief Model (HBM) supported the path that individual's decision to engage in a heath action through modifying factors and individual beliefs which can support our variable as the individual's adoption of protective behaviour through the factors (COVID-19 knowledge) and individual's belief (risk perception). Hence, our study aims to support the theory propositions.

# Significance of study

This study aims to contribute to the research field by investigating the role of knowledge and risk perception on protective behaviour of young adults in Malaysia during COVID-19. Our study could provide evidence regarding the relationships of knowledge of COVID-19 and protective behaviour, and how it can be explained through risk perception among young adults in Malaysia. According to Goruntla et al. (2020), it is crucial to understand the public's awareness to prevent widespread COVID-19. The study mentioned that knowledge plays a vital role in fighting against the infection rate of COVID-19 in a country. Therefore, this study makes a significant contribution to research by demonstrating whether Malaysian young adults have adequate knowledge regarding COVID-19.

Besides, Moussaoui et al. (2020) mentioned that there are not many studies regarding the determinants regarding protective behaviour, and most of the studies only examine the protective behaviour in the early stage of COVID-19 (Blair et al., 2021; Moussaoui et al., 2020; Wise et al., 2020). Since Malaysia's COVID-19 cases have been increasing (Yi, 2021), this study provided a significant opportunity to understand the current level of risk perception and protective behaviour of young adults in Malaysia after almost two years of the COVID-19 pandemic. Understanding the level of protective behaviour of young adults' after almost two years is vital because according to O'Donnell (2020), getting vaccinated is not the perfect solution to avoid getting infected by COVID-19. Protective behaviour such as wearing a mask and maintaining personal hygiene are still required to prevent the infection of COVID-19. Hence, the level of protective behaviour is vital to examine because having adequate protective behaviour can reduce the infection of COVID-19. Furthermore, our study can provide evidence for researchers to create psychological interventions if similar pandemic situations happen in the future. Our study could provide evidence of the Health Belief Model in explaining the relationship between our study variables (knowledge of COVID-19, risk perception and protective behaviour). Thus, this study is able to provide relevant information regarding knowledge of COVID-19, risk perception, and protective behaviour for future researchers as they are able to come out with more research regarding these variables to strengthen the research on health behaviour in Malaysia. Having more research on the health behaviour field is able to contribute to the research field in promoting health-protective behaviour among young adults.

The findings of this study not only able to act as a guideline to strengthen the protective behaviour of young adults in Malaysia and reduce the infection rate of COVID-19 or other infectious diseases in the future in Malaysia, but policymakers also able to implement ways such as implementing rules and regulations for the public to stress the importance of knowledge of infectious diseases for young adults. Having adequate knowledge of infectious diseases could increase young adults' risk perception and protective behaviour before they risk their lives and health for the infectious diseases.

Lastly, we hope our study's findings can provide more insights into protective behaviour information during COVID-19 among young adults in Malaysia based on the theoretical framework. As the theoretical framework, Health Belief Model (HBM) mentioned that knowledge and risk perception are two factors that have a relationship with the health behaviour of people (protective behaviour). Besides, based on this model our study is able to provide evidence on how the Health Belief Model is able to apply in the current situation to predict the health behaviour of young adults in Malaysia.

# **Research Objectives**

- To identify the levels of knowledge, risk perception and protective behaviour of COVID-19 among Malaysian young adults during COVID-19 pandemic.
- To examine the predicting role of knowledge of COVID-19 on risk perception among Malaysian young adults during COVID-19 pandemic.
- To examine the predicting role of knowledge of COVID-19 on protective behaviour among Malaysian young adults during COVID-19 pandemic.
- To examine the predicting role of risk perception on protective behaviour among Malaysian young adults during COVID-19 pandemic.
- To examine the mediating effect of risk perception on the relation of knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19 pandemic.

# **Research Questions**

- 1. What are the levels of knowledge, risk perception and protective behaviour of COVID-19 among Malaysian young adults during COVID-19 pandemic?
- 2. Does knowledge of COVID-19 predict risk perception among Malaysian young adults during COVID-19 pandemic?
- 3. Does knowledge of COVID-19 predict protective behaviour among Malaysian young adults during COVID-19 pandemic?

- 4. Does risk perception predict protective behaviour among Malaysian young adults during COVID-19 pandemic?
- 5. Does risk perception have a mediating effect on the relation of knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19 pandemic?

# Hypotheses

*H*<sub>1</sub>: Knowledge of COVID-19 predicts significantly risk perception among Malaysian young adults during COVID-19 pandemic.

 $H_2$ : Knowledge of COVID-19 predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic.

 $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic.

*H*<sub>4</sub>: Risk perception has a mediating effect on the relation of knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19 pandemic.

# **Conceptual Definitions**

#### Knowledge of COVID-19

According to Cambridge University Press (2021a), knowledge is an individual's understanding of a subject acquired from his or her experience or through study. According to Greco and Sosa (2017), knowledge is about what we know throughout our life. For example, knowledge of COVID-19 is about what we know about this virus of COVID-19.

# **Risk Perception**

According to Paek and Hove (2017), risk perception refers to people's subjective judgments regarding the probability or chance to have unfortunate circumstances under two

main dimensions: cognitive and emotional. The individual's knowledge about a disease is categorised under the cognitive dimensions of risk perception, and the individual's feelings towards the information about the risks are categorised under the emotional dimensions. The unfortunate circumstances can be death, injury or disease (Paek & Hove, 2017). People will use the available resources and informal thought processes to evaluate the risk to make their final health decision or risk decision (Paek & Hove, 2017). Risk perception on COVID-19 is the subjective judgments of people about the chance of getting infected by COVID-19.

#### Health Protective Behaviour

Health-protective behaviour is defined as activities carried out by an individual to protect, promote or maintain their health (Harris & Guten, 1979). Besides, it is the actions that an individual engages to reduce the risk or adverse health consequences to improve or maintain a healthy lifestyle (Rossman et al., 2019). In this context of this study, health-protective behaviour is being engaged to increase the hygiene of young adults in Malaysia and reduce the risk of getting COVID-19 infection, such as hand sanitizing, wearing a mask, washing hands and social distancing (Zickfeld et al., 2020).

#### Young Adults

According to Cambridge University Press (2021b), young adults are defined as individuals who are in their late teenage years. Other than that, according to Bonnie et al. (2015), the age groups of young adults in Malaysia are 18 to 25 years old.

# **Operational Definitions**

### Knowledge of COVID-19

In our study context, knowledge of COVID-19 is the information acquired by the individual regarding COVID-19. Knowledge of COVID-19 is measured by the first part of

the Students' Knowledge, Attitude, and Practice towards COVID-19 (SKAPCOV-19) questionnaire. This 18-item scale measures several dimensions such as knowledge on etiology, risk group, transmission and prevention of COVID-19 (Saefi et al., 2020).

# **Risk Perception**

A total of 3-item risk perception construct is used from COVID-19 Protective Behaviour Questionnaire (Shi et al., 2021) to measure risk perception in this study. This scale measures the degree of risk perception of an individual. This scale contains 5-point Likert scales to measure the risk perception of an individual. The higher the score indicates a higher level of risk perception of an individual (Shi et al., 2021).

# Health Protective Behaviour

Health protective behaviour of Malaysian young adults can be measured using the protective behaviour construct from the Protective behaviour Questionnaire (Shi et al., 2021), which applies to the COVID-19 context. There are a total of 4-items in the scale with 5-point Likert scales to measure the protective behaviour of an individual during COVID-19. The scale measures how often an individual engages in protective behaviour. The higher the score, the more frequently an individual adapts to protective behaviour (Shi et al., 2021).

# Young Adults

The criteria of young adults will be recruited in our study who range between 18 to 25 years old (Bonnie et al., 2015). Young adults of our study will be recruited through an online questionnaire survey form.

#### **Chapter II**

#### **Literature Review**

# **Knowledge of COVID-19**

Knowledge is defined as the fact or condition of knowing or understanding something with familiarity gained through experience or association and being aware of something. In other words, it is the sum of what is known (Merriam-Webster, 2021). By having adequate knowledge regarding a disease, individuals are able to be aware and take action to practice behaviour that is beneficial for their health (Alzammam & Almalki, 2019). Conversely, people who are lacking of knowledge, are more prone towards have failed to accept health services, high risk to be infected by diseases or illness, misconceptions about a disease or illness, and they often show negative attitudes towards practicing health behaviour (Craig et al., 2017; Kazaura, 2020; Nyasulu et al., 2018). Hence, it is crucial to understand people's adequacy of knowledge in order to promote and practice health behaviour.

Knowledge of COVID-19 refers to the understanding and awareness of the information related to coronavirus disease. Recent studies have shown that the knowledge of COVID-19 could be mainly examined by several domains, such as the transmission and symptoms of COVID-19, and the prevention knowledge regarding the COVID-19 disease (An et al., 2021; Dubey et al., 2020; Morgul et al., 2020; Saefi et al., 2020; Zhong et al., 2020). The knowledge of COVID-19 is vital to the public as it is a relatively new disease. It is reported that Malaysians have a moderate level of knowledge of COVID-19 (Azlan et al., 2020). There is a variation in level of knowledge between the age groups, which could be explained by the availability of seeking the current accurate COVID-19 information (Azlan et al., 2020). The quick and widespread information available on social media or the internet is likely to misguide people with inaccurate information (Serwaa et al., 2020). Study shows that

increasing knowledge of COVID-19 can provide value to the public as it gives impact and information to health professionals and policymakers to produce or promote interventions to reduce the risk of transmission of COVID-19 (Ali et al., 2020). Therefore, when an individual has acquired adequate knowledge of COVID-19, their perception towards COVID-19 leads them to be aware of the risk and perform protective behaviour to protect themselves from infection of COVID-19.

#### **Risk Perception in COVID-19**

Risk perception is the subjective judgment on how people evaluate the level of risk they will face in a particular situation (Paek & Hove, 2017). Individuals use their available information to judge the level of risk and decide to engage in a behaviour (Butler & Mathews, 1987; Weinstein, 1988). Individuals may perceive risk differently from others due to individual characteristics, cultural values, knowledge and world views, psychological traits, and optimism bias (Siegrist & Árvai, 2020).

Rosenstock (1974a) stated that risk perception is an essential component for researchers to study and predict an individual's health behaviours because risk perception is one of the factors in predicting whether people will engage in health-protective behaviour. Siegrist and Árvai (2020) mentioned that risk perception is important for people because it can help them to understand their current risk to prevent or reduce any negative consequences such as illness, disease, or virus. Suppose people do not have a risk perception towards a disease or hazardous situation. In that case, people might face adverse outcomes such as getting ill, injury, or death because people will not engage in health behaviour to protect or prevent themselves from risk. According to Wang et al. (2017), risk perception plays a vital role in an individual's decision to follow the recommended action to prevent H7N9. Another study by Iorfa et al. (2020) mentioned that risk perception plays a significant role because risk perception is able to avoid or reduce the tragedy of a disease. Individuals who perceive risk in their surroundings are predicted to perform more preventative measures to reduce or prevent the illness threatening their health (Chen et al., 2017).

Risk perception on COVID-19 means the subjective judgement of people regarding their chances of being infected by COVID-19 (Paek & Hove, 2017). Cori et al. (2020) mentioned that COVID-19 is one of the most severe global infectious diseases. The transmission of COVID-19 is faster than both previous epidemics, which are SARS and MERS (Middle East respiratory syndrome) (Cori et al., 2020). COVID-19 is globally transmitted through human-to-human infection (Huynh, 2020). It is important that people perceive COVID-19 as high risk because there are several chronic effects on our body if COVID-19 infects us. It could possibly manifest the risk of heart failure, especially in people with cardiovascular disease (Zaim et al., 2020). Studies have shown that people's risk perception towards disease can reduce the infection rate among people directly (Abedelrahman, 2020; Weston et al., 2018).

Previous studies showed that people do not perceive COVID-19 as a risk to their health, and most of them who are not wearing masks in public are younger people as they do not think surgical masks can be a preventative measure for them to reduce the risk of being infected by COVID-19 (Al-Hanawi et al., 2020; Lau et al., 2020). Furthermore, Azlan et al. (2020) mentioned that future studies should research more about factors like risk perception of Malaysians as risk perception plays a role in influencing the infection rate of COVID-19 in Malaysia. A study also mentioned that young adults have low-risk perception towards COVID-19 (COVID-19: Community insights, 2020). Hence, from previous studies, we can understand that young adults do not perceive COVID-19 as a risk for them. However, it is important for young adults to engage in risk perception regarding COVID-19.

#### **Protective Behaviour towards COVID-19**

According to Harris and Guten (1979), protective behaviour is an individual's behavioural performance based on the situation to protect, promote and maintain the individual's health from suffering a threat to his health or safety. Protective behaviour of COVID-19 is how people engage in a behaviour that avoids or reduces the risk of having COVID-19 infection (Zickfeld et al., 2020). According to Tang et al. (2021), individuals are recommended to include in protective behaviour such as avoiding gathering, wearing a mask, maintaining social distancing, and maintaining hand hygiene. In Malaysia, The Minister of Health also put much effort in encouraging the public to practice with "3W" which is washing hands frequently, wearing masks when placing themselves in a public area, as well as practicing caution by staying at home when they discover any symptoms related to COVID-19 such as coughing (Totu et al., 2021).

According to Bhati et al. (2021), protective behaviour of people will affect a country's infection rate, and countries that practice good protective behaviour are dealing better with the infections of COVID-19. Protective behaviour is needed to perform during the COVID-19 pandemic as individuals place themselves under a highly contagious disease and engage in the preventive method. Al-Hasan et al. (2020) reported that protective behaviour is vital until the availability of approved vaccination has been functioned effectively in public to bring the virus under control. Another study by Moussaoui et al. (2020) mentioned that one of the ways to face COVID-19 and reduce the risk of infection is to adopt protective behaviour. However, it only works if people are willing to cooperate, and the population widely applies it. Besides,

facing a pandemic like COVID-19 it is vital for people to adapt and change their behaviour rapidly to survive and protect their health. Hence, from the past studies, we understand that studying protective behaviour is important and relevant to understanding the individual's behavioural response to this COVID-19 pandemic.

According to Azlan et al. (2020), during the first and second wave of COVID-19 pandemic, most of the Malaysians voluntarily engaged in taking precautionary behaviour such as practicing hand hygiene and avoiding crowds a week before the establishment of Movement Control Order by the government. However, only 51% of Malaysians are found to wear a face mask (Azlan et al., 2020). While the COVID-19 pandemic outbreak continues to have a substantial effect on Malaysia, Ab Malik et al. (2021) stated that there are over 97 percent of Malaysian respondents claimed that protective behaviours such as washing hands for 20 seconds, using disinfectants and avoiding traveling abroad are effective measures towards controlling the transmission of COVID-19. Most of the respondents are Malaysian young adults aged between 18 to 25 years old. The study also showed that a high percentage of Malaysians, especially young adults, wear face masks in the later stage of the pandemic, which is in contrast with the early study on the early stage of pandemic (Ab Malik et al., 2021). This underlying reason might be that Movement Control Order has been applied in Malaysia for an extended period, and continuous pandemic outbreaks have changed Malaysians' decision to comply with adherence protective behaviour.

#### **Knowledge and Risk Perception on COVID-19**

Several studies have linked knowledge of COVID-19 with the risk perception towards COVID-19. A study from Ding et al. (2020) also mentioned that there is a positive relationship between knowledge and risk perception towards coronavirus disease. Another study by Torales et al. (2020) mentioned that people would often seek and explore eventrelated information to stay informed and updated regarding the event during each community crisis. Therefore, when people start to understand the trustful information they studied, they acquire the knowledge.

Besides, one's knowledge usually shapes risk perception as knowledge allows one to appropriately assess the risk and consequences of an event (Tenkorang, 2018). In other words, knowledge of COVID-19 would help avoid leading an individual towards misperceptions. Similarly, Cori et al., (2020) stated that knowledge enables the growth of collective awareness. In other words, knowledge is a factor to increase the perceived risk of a community. Cori et al., (2020) also mentioned that before people take protective actions, the risk of COVID-19 is being evaluated by several factors such as knowledge. For instance, people's understanding of information related to COVID-19 allows them to evaluate, determine and be aware of the possibility of getting infected or the risk of COVID-19. Hassan et al. (2021) mentioned that Malaysians who seek COVID-19 information using social media platforms become more aware about the consequences of COVID-19 and would have a higher risk perception towards COVID-19. In other words, understanding the COVID-19 information enhanced the COVID-19 knowledge and increased the risk perception towards COVID-19. Also, a study by Azlan et al. (2020) mentioned that elder Malaysians have a higher knowledge of COVID-19 can be explained by having a higher risk perception regarding the contraction and complications of the disease.

Moreover, it is mentioned that the public's knowledge and risk perception are important when considering the control of epidemics from what we had learned from previous communicable diseases such as severe acute respiratory syndrome (SARS), Ebola, and H1N1 (Li et al., 2020). Likewise, several studies believe that people with adequate knowledge are more aware of the risk and have a higher risk perception (Ding et al., 2020; Karasneh et al., 2021; Udomah et al., 2021; Xu et al., 2020). In other words, the higher levels of COVID-19 knowledge about the transmission mode, and primary symptoms, the more profound people can fully realise COVID-19 is a highly contagious, which enhances people's risk perception. Hence, it is important to consider knowledge of COVID-19 in examining the predicting effect on risk perception.

# **Knowledge and Protective Behaviour towards COVID-19**

The protective behaviour during the COVID-19 pandemic has been widely associated with the knowledge of COVID-19. A systematic review and meta-analysis by Bhagavathula et al. (2020) concluded that people's knowledge is linked to protective behaviour in diseasespecific settings. Similarly, Ssebuufu et al. (2020) mentioned that knowledge is able to determine the attitude and prevention practice of people towards COVID-19. In other words, knowledge of COVID-19 can help us to decide on ways to prevent infection and the health behaviour during the pandemic of COVID-19. Besides, several studies focused on COVID-19 related variables reported that most people with adequate COVID-19 knowledge are more likely to engage in protective behaviour towards COVID-19 (Elhadi et al., 2020; Honarvar et al., 2020). A study by Alzoubi (2020) stated that there is no significant difference between the medical and non-medical students regarding the knowledge and protective behaviour towards COVID-19. In other words, people involved in the medical field have the same knowledge of COVID-19, which enhances the likelihood of engagement in protective behaviour. Also, it is reported that the medical students in Malaysia with a good level of knowledge are more likely to adopt the protective behaviour towards COVID-19 (Chee et al., 2021). This is because the individuals' adequacy of knowledge is related to strong intentions to comply with the new rules of prevention and control of infectious diseases and engage in protective behaviour (Prasetyo et al., 2020).

However, the contradiction was shown in some studies that high adequacy of COVID-19 knowledge predicts a low involvement in the protective behaviour towards

COVID-19 (Clements, 2020; Zhong et al., 2020). For instance, those with high knowledge of COVID-19 have a higher probability of performing threatening behaviour, such as not wearing face masks in public areas towards the COVID-19 pandemic (Zhong et al., 2020). Some studies mentioned that people need to adopt protective behaviour based on reliable policies and evidence-based information instead of relying on what they felt was right (Faggiano et al., 2014; Teovanović et al., 2020; Wilson & Juarez, 2015). Hence, we proposed to examine the relationship between the knowledge of COVID-19 and protective behaviour in this study under the context of Malaysian young adults.

#### **Risk Perception and Protective Behaviour towards COVID-19**

According to Alegria et al. (2021), the study reported that risk perception is one of the factors underlying COVID-19 related behaviour response. Understanding the risk is significantly correlated with reducing risk behaviour in COVID-19, such as going shopping, having houseguest, and enhancing protective behaviour, such as washing hands frequently and using hands sanitizer (Alegria et al., 2021). The public's risk perception depends on how much they trust the perceived information, perceived uncertainty, and awareness regarding the risk. Fear of the risk of infection explores their protective measures and their behavioural response towards the pandemic with their different protective behaviours.

Siddiqui and Qamar (2021) explore the linkage between risk perception and protective behaviour in qualitative research. One of the respondents perceived the information and symptoms regarding COVID-19 as high risk and thus reflected protectiveness in her following behaviour. Individuals' perceived risk encourages them to engage themselves in protective behaviour to reduce subsequent potential risk, especially in a pandemic. According to Tan et al. (2004), in the 2004 SARS epidemic, an individual's perceived risk of a disease might trigger behavioural change. Individuals practice social distancing to avoid contagion after they understand the severity of the virus (Abdelrahman, 2020). When individuals consider COVID-19 to be a danger and perceive risk factors from COVID-19, they react to the risk by adopting different ways to avoid the infection and survive the contagious virus.

Heydari et al. (2021) mentioned that exact risk perception plays a vital role in helping people decide on a specific behaviour to prevent infection or any injuries. In addition, when the A/H1N1 virus outbreaks in 2009, a study showed that an individual's risk perception of the disease is vital and positive results in a public health intervention program (Renner & Reuter, 2012). Many health interventions programs that promote health-protective behaviour were reported successfully depending on an individual's risk perception (Vai et al., 2020). Risk perceptions allows us to understand that individuals involved in taking a protective action. For example, many populations have been infected with disease due to low-risk perception and crucial for them to perceive the risk personally. At the same time, in Malaysia, young adults are found to perceive a lower risk perception of getting an infection (COVID-19: Community insights, 2020). An early study also found that Malaysians in the early stages of COVID-19 pandemic less commonly engage in wearing a face mask when people are out in public because they perceive low risk. Other than that, face masks were just being encouraged by the government but not compulsory during the early stage of COVID-19 in Malaysia (Wong & Alias, 2021). It is important to test the relationship between risk perception and protective behaviour for the COVID-19 pandemic in Malaysia. Hence, we propose the hypothesis to examine that risk perception on COVID-19 has a positive relationship with protective behaviour.

There is a vast number of research examining and exploring the significant relationship between risk perception and protective behaviour. However, Shi et al. (2021) state that the relation between the two variables is still unclear. It is also contradictory that one of the studies from Wachinger et al. (2018) propose a risk perception paradox to argue that higher levels of risk perception neither lead to behavioural preparation nor decrease public risk behaviour. There is also questioning the strength of the relationship between risk perception and protective behaviour (Brewer et al., 2007; Harrison et al., 1992). Therefore, we tend to investigate the predictive effect of risk perception towards health-related protective behaviour on COVID-19 and provide a systematic as well as a theoretical integrated overview on the relationship between the two variables.

#### Knowledge and Protective Behaviour: Risk Perception as a Mediator

Barrett and Cheung (2021) claim that the habits and time factors are directly linked to the protective behaviour such as hand hygiene behaviour rather than the knowledge of the COVID-19. However, knowledge is the critical element in influencing an individual to perform protective behaviour by raising the awareness or perception of the risk (Bhagavathula et al., 2020). A previous study mentioned that knowledge is needed to shape risk perception and risk perception was counted as one of the factors to perform protective behaviour (Alegria et al., 2021; Tenkorang, 2018). Studies mentioned that risk perception is mediated for the relationship of protective behaviour or precautionary behaviour and information from the government or knowledge of COVID-19 (Duan et al., 2020; Iorfa et al., 2020; Taglioni et al., 2013). Another study showed that people who perceived the risk of pandemics shaped their protective behaviour by applying the protective behaviour recommended by the health professional such as maintaining personal hygiene (Siddiqui & Qamar, 2021).

The proposed mediation model may help us to get a fuller picture of the factors of Malaysian young adults to adopt protective behaviour during this COVID-19 pandemic. Some studies suggest that knowledge itself might not predict precautionary health behaviour,
but a predictive effect occurs once other factors mediate the relationship (Raza et al., 2020; Taglioni et al., 2013). Taglioni et al. (2013) suggested the path of knowledge and precautionary behaviour is mediated by various factors such as risk perception, worry, attention, and self-efficacy. Some other researchers also access risk perception as a mediator to mediate the path from participant's knowledge on the diseases to protective behaviour or preventative behaviour, or precautionary behaviour (Iorfa et al., 2020; Wang et al., 2017). Furthermore, research also found that people who have higher knowledge on the diseaserelated etiology perceive a higher risk of being infected and worry more (Vartti et al., 2009). It is supported by the previous study that individuals with a high level of disease-related knowledge but who did not perceive the risk might not engage in precautionary behaviour (Iorfa et al., 2020). Thus, suggesting that there is a linkage between knowledge and risk perception. Precautionary or protection behaviour such as complying with social distancing and maintaining hygiene practice has a strong effect in limiting the rapid transmission of COVID-19, and the related behaviour that individuals willing engage in is an association with the risk perception (Abdelrahman, 2020; Vijayaraghavan & Singhal, 2020; Zhang et al., 2020). In addition, the Health Belief Model (HBM) also highlighted that for individuals' willingness to take protection or precautionary action is due to their perceived risk of the disease that might infect them.

# **Theoretical Framework**

The Health Belief Model (HBM) is used to explain and guide an individual's health promotion and disease prevention programs (Glanz & Bishop, 2010; Rosenstock et al., 1988). It was first developed because it is used to understand why people are not willing to accept any health screening test such as an X-rays scan for tuberculosis or any health-preventative behaviour such as seeking medical help (Janz & Becker, 1984). HBM has been evolved and modified over the period of time. In our study, we use the HBM model that is adapted from Champion and Skinner (2008), which is used to explain the path for a person to engage in health action through modifying factors and individual beliefs. Even though HBM was developed to understand health behaviour in the United States context, over the years it is being adapted and able to apply and fit in various cultures and topical contexts, including in the Asia context (Scarinci et al., 2012).

According to Mehraban et al. (2018), a study using HBM to explain knowledge increase the awareness of the individuals to engage in health preventative behaviour. Other than that, according to HBM, it also explains the role of modifying factors (i.e., knowledge of COVID-19) in predicting an individual's health behaviour (i.e., protective behaviour). Based on HBM adequate knowledge (modifying factor) of the disease that the individuals have, the individuals will prevent themselves to get infected by the disease, hence they are more likely to have precautionary behaviour or protective behaviour towards the diseases. Besides, HBM explains and supports our path in this study as HBM explains the role of modifying factors (i.e., knowledge of COVID-19) in predicting an individual's beliefs on a disease such as risk perception of COVID-19 in this study. Based on HBM, individuals may perceive the disease as a threat and risky to their own life (risk perception) if they have adequate level of knowledge on the disease. Hence, based on the model of HBM is able to explain that the more knowledge that an individual has will lead to more risk perception towards a certain disease.

The individual's risk perception as perceived susceptibility can promote an individual to take action in health-promoting behaviour or preventive behaviour (Glanz et al., 2008; Green et al., 2020). Risk perception as perceived susceptibility refers to how an individual perceived the level of risk of being infected by COVID-19. When the individual perceives the illness as a higher risk illness, the individual person will take action to prevent this particular

illness. Hence, according to HBM model it is able to explain that the more risk perception that an individual has may lead to individual has high preventative or protective behaviour.

HBM was also applied to study the mediating effect of risk perception between knowledge and protective behaviour towards the disease (Duan et al., 2020; Iorfa et al., 2020). Based on HBM, it predicts that high knowledge (modifying factors) of an individual will lead to increase in perceived threat (risk perception) on an individual and eventually leads them to practice preventative measures such as protective behaviour to reduce the risk of getting infected by the diseases.

The HBM is applied to avoid or lower the risk of certain illnesses by increasing people's awareness of the illness. This model is used to explain individuals' engagement in preventing or lowering the risk of illness by increasing people's awareness and concern regarding the illness (Green et al., 2020). So, people with a higher risk perception of the disease tend to engage in protective behaviour. HBM is applied in several studies to study people's protective behaviour, such as vaccination and preventive behaviours (Barakat & Kasemy, 2020; Shahnazi et al., 2020; Wong et al., 2020). Thus, applying HBM in this study is able to understand the relationship of knowledge, risk perception and protective behaviour of young adults in Malaysia.



# **Conceptual Framework**

c= Direct Pathway

c'= Indirect Pathway

*Figure 1*. The mediating effect of risk perception on the relationship between knowledge and protective behaviour.

This research framework has a total of four paths which are young adults' knowledge predicts their risk perception towards COVID-19, the relationship of young adults' risk perception predicts their protective behaviour towards COVID-19, the relationship of young adults' knowledge of COVID-19 will directly predict their protective behaviour towards COVID-19 and the indirect effect (i.e., the young adults' knowledge of COVID-19 predicts their protective through their risk perception).

The theory that applies to this framework is the Health Belief Model (HBM). HBM was used to study and understand the relationship of knowledge of COVID-19, risk perception, and protective behaviour of the participants aged 18 to 25 years old in our study.

#### **Chapter III**

#### Methodology

# **Research Design**

This study was conducted using a cross-sectional survey design. A cross-sectional design refers to the study's data collected concurrently (Cummings, 2017). Other than that, several studies use cross-sectional survey design to understand the research participants at a single point in time during the COVID-19 pandemic (Ezati Rad et al., 2021; Zou et al., 2019). This study aimed to examine the predicting effect of knowledge of COVID-19 and risk perception on protective behaviour of Malaysian young adults. Furthermore, risk perception was tested to mediate the relation between knowledge and protective behaviour.

According to Rice et al. (2017), internet survey-based design allows researchers to have easy access to the data from the participants. Other than that, an internet survey-based design can provide a better generalisation to the population as it can easily access participants with different backgrounds, such as location, age, gender, and this design enables the study to recruit a larger sample size. Recruiting a large sample size is beneficial for a study because it helps researchers recruit diverse participants and allows researchers to have enough participants to identify the study's effect size (Brydges, 2019; Chandler et al., 2019). Considering the outbreak of COVID-19, an internet survey method was applied to collect quantitative data.

# **Research Sample**

This study used non-probability sampling, which is a purposive sampling method. It is also known as judgmental sampling, where the sample is selected because some of their specific characteristics fit the study itself. Non-probability sampling is chosen because the population size of Malaysian young adults in the year 2021 is unknown as the Department of Statistics Malaysia Official Portal categorised the population groups as in the category of 0 to 14 years old, 15 to 64 years old and 65 years old and above (Mohd. Uzir, 2021). Hence, the exact population size for Malaysian young adults aged 18 to 25 years old is unrevealed.

This study recruited Malaysian young adults aged 18 to 25 as the past study found that people aged between 20 to 24 years old are reported to have a higher infection rate of COVID-19 (Povera, 2020). Furthermore, people aged between 15 to 24 years old in Malaysia have reported a high mortality rate if they were infected by COVID-19 in Malaysia (Nearly 14% of Covid-19, 2021). Since the risk perception of Malaysian young adults is considerably low and they have reported have high mortality and infection rate of COVID-19 in Malaysia, the selection criteria of this study are Malaysian young adults aged from 18 to 25 years old. Purposive sampling is used when researchers want the participants' particular characteristics to fulfill the study's demand (Bhardwaj, 2019). Besides that, non-probability sampling can understand the relationships between variables over time and help researchers predict reliable and accurate results of their studies (Langer, 2017). Monte Carlo Power was used in this study for power analysis by measuring the power of the studies. The suggested sample size is 280 participants. 280 participants have achieved a power of 0.85 (refer to appendix A), which is considered a desirable power level (Schoeman et al., 2017). 20% of an additional number of participants was added to avoid missing data (Enders, 2003). The current study collected 450 respondents, but only 323 responses were analysed after excluding outliers and incomplete cases as some of the participants quit answering questionnaires halfway.

# **Research Location**

The questionnaire of this study was created using Qualtrics, and a poster was created with a QR code generated by Qualtrics. The questionnaire was posted on a few social

networking platforms such as Facebook and Instagram and distributed through instant messaging applications such as WhatsApp, Instagram, and Messenger.

#### Instrumentation

#### Knowledge of COVID-19

COVID-19 knowledge in this study was measured with the knowledge domain under Students' Knowledge, Attitude, and Practice towards COVID-19 (SKAPCOV-19) questionnaire that assesses an individual's knowledge, attitude and practice (KAP) towards the COVID-19 pandemic. SKAPCOV-19 questionnaire will measure respondents' basic knowledge of the etiology, risk groups, transmission, and prevention of COVID-19. A total of 18 items including six negative statements (item 6, 7, 8, 11, 12, 13) and 12 positive items. Respondents are required to answer the following questions with *"yes", "not sure",* and *"no".* Those who select the option *"yes"* score 1 while answering *"no"* and *"not sure"* score 0 and vice versa for the negative questions. Total scores are 18, and the minimum score is 0. A higher score in knowledge means participants have a greater understanding and comprehension of COVID-19. According to Saefi et al. (2020), SKAPCOV-19 questionnaire items have excellent reliability,  $\alpha = 0.98$ , when analysed with the RASCH model. In addition, it shows good content validity, with all items having a CVI > .80 (Saefi et al., 2020).

#### **Risk Perception**

Risk perception was measured with three items self-report scale from the risk perception scale from COVID-19 Protective Behaviour Questionnaire (Shi et al., 2021). The questionnaire includes item such as "I think I may be likely to get infected with COVID-19" to examine an individual's risk perception of being infected by COVID-19. In addition, there is a 5-point Likert scale ranging from (1 = strongly disagree to 5 = strongly agree). The higher the score refers to the higher risk perception of the individual. The reliability of risk perception  $\alpha = .831$  indicates a good internal consistency, while the scale has achieved good structural, convergence, discriminant, and content validity (Shi et al., 2021).

#### **Protective Behaviour**

Protective behaviour is measured with four items self-report scale from COVID-19 Protective Behaviour Questionnaire (Shi et al., 2021). Items include "wash my hands regularly and maintain hand hygiene" to examine whether participants practice protective behaviour in the COVID-19 pandemic. It is measured with a 5-point Likert scale ranging from (1 = not at all to 5 = very much so). The higher the score indicates, the more frequent protective behaviour an individual adopts. The reliability of protective behaviour is  $\alpha = .762$ , which indicates good internal consistency. Other than that, the scale achieved good structural, convergence, discriminant, and content validity (Shi et al., 2021).

# **Research Procedure**

Ethics clearance was reviewed and approved by UTAR to conduct this study. An online questionnaire was created with Qualtrics. Research briefing, consent and confidentiality were presented on the first few pages of the survey. According to McInroy (2017), it is essential that the participants of the study are fully informed consent to acknowledge the rights of the participants due to ethical consideration. Therefore, participants were given a digital consent form before responding to the survey. After participants have given consent to the questionnaire, they can respond to it. Besides, they are allowed to quit the questionnaire without any penalty.

Since the group of participants that we selected for our pilot test was UTAR Year 3 Semester 3, January 2022 psychology students, the actual data collection excluded the same group of participants by inserting a filter question in Qualtrics. If the participants reported themselves as UTAR Year 3 Semester 3, January 2022 psychology students, the questionnaire would end, and they could not proceed to answer it. Demographic information such as age, gender, race, highest educational level, working status, self-rated health condition, the importance of COVID-19 vaccination, and history of COVID-19 infection was obtained at the beginning of the questionnaire after participants had been informed consent and agreed to participate in the study. The questionnaire consisted of 25 questions for three instruments: knowledge of Covid-19, risk perception, and protective behaviour. The responses were collected from 11th January 2022 until 24th January 2022.

# **Pilot study**

A pilot study was conducted among 45 UTAR Year 3 semester 3, the January 2022 batch of psychology students from the 30th of December 2021 until the 4th of January 2022. The questionnaire was distributed among Year 3 semester 3 psychology students through instant messaging applications such as WhatsApp and Instagram direct message. A filter question was provided to ensure that only this particular group of students could answer the survey. The responses were collected within five days and analysed by SPSS version 23. After screening out the uncomplete responses and outliers, there were 31 complete responses left. The reliability for knowledge, risk perception and protective behaviour were .60, .57 and .62 respectively. According to Hinton et al. (2004), the reliability of these three scales is moderate. A filtered question was set to exclude all UTAR Year 3 semester 3 psychology students in participating in the actual test.

#### **Data Analysis**

Data from the questionnaire were imported from Qualtrics to IBM SPSS statistics version 23. Exploratory data analysis (EDA) was conducted to exclude any outliers in our study, such as histogram and Q-Q plot. Preliminary analyses were conducted to run normality tests of the data through histogram, Q-Q plot, Kolmogorov-Smirnov (K-S) test, skewness and kurtosis. After excluding the outliers and finishing the assumptions of parametric data, the data was further processed via descriptive data analysis. It will be used to identify the frequency of our respondent demographic variables such as the age of participants, the number of participants, race, and gender to analyse participants' background in our studies. Mean, standard deviation and the total score was analysed for our study variables (i.e., knowledge of COVID-19, risk perception and protective behaviour). The data was further processed via inferential analyses where the multiple linear regression was run to examine the predicting effects of our variables which stated in our hypotheses ( $H_1$ : Knowledge of COVID-19 predicts significantly risk perception among Malaysian young adults during COVID-19 pandemic. ;  $H_2$ : Knowledge of COVID-19 predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic. ;  $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic. ;  $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic. ;  $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic. ;  $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic. ;  $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic. ;  $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic. ;  $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic).

In addition, the mediation process ( $H_4$ : Risk perception has a mediating effect on the relation of knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19 pandemic.) was tested by using PROCESS macro.

#### **Chapter IV**

## Results

# **Reliability of Actual Study**

An actual study has recruited 450 respondents among 18 to 25 years old Malaysians. There were 323 complete responses left after data cleaning. The reliability for knowledge, risk perception and protective behaviour were .72, .74 and .69 respectively. It showed that the knowledge and risk perception scale are high reliability while showing moderate reliability for the protective behaviour scale (Hinton et al., 2004).

# **Influential Cases**

Univariate outliers were detected and identified from the box plot where small circles labelled by case ID were shown in the box plot chart. After being assessed by boxplot, 15 univariate outliers are detected, which are C88, C285, C324, C328, C203, C332 C295, C277, C337, C229, C318, C128, C141, C173 and C228 (see Appendix E).

# **Assumption of Normality**

There was a total of six normality indicators being assessed to check the assumption of normality which included visual displays such as histograms and Q-Q plots. At the same time, skewness, kurtosis, and Kolmogorov- Smirnov test, also known as K-S test and Shapiro-Wilk test, are presented and interpreted as a numerical display.

#### Histogram

According to Figure F1.1 to Figure F1.3 (refer to appendix F1), it showed that the variable of "knowledge" and "risk perception" were normally distributed as they formed a bell-shaped curve, while the variable of "protective behaviour" was not normally distributed as the bell-shaped curve was slightly skew at the right side. However, two variables,

knowledge, and risk perception, showed no violation of the normality indicator for the histogram.

# Q-Q Plot

Figure F2.1 to figure F2.3 (refer to appendix F2) showed that three study variables showed good normality as the observed values did not deviate much from the diagonal line representing the expected values. Hence, there is no violation of the normality indicator of the Q-Q plot.

#### Skewness and kurtosis

Other than that, the acceptable values for both skewness and kurtosis are between -2 to +2 (George & Mallery, 2010; Gravetter & Wallnau, 2014). In this study, skewness, and kurtosis values for all of the study variables fell within the acceptable range (see Table 1), which could be interpreted that there is no violation for skewness and kurtosis indicators.

# Table 1

	Skewn	Skewness		5
	Statistic	SE	Statistic	SE
Knowledge	269	.136	.009	.271
Risk Perception	-0.74	.136	233	.271
Protective Behaviour	419	.136	283	.271

Skewness and Kurtosis (N = 323)

*Note*. SE = standard error

# Kolmogorov- Smirnov and Shapiro-Wilk test

According to Pallant (2016), the *p*-value greater than .05 in the Kolmogorov-Smirnov test indicates the variables' normality. Table 2 (refer to appendix F4) showed that the *p*-value of all three of the study variables did not meet this assumption of normality as all of the study variables were assessed lesser than .001. Furthermore, if a *p*-value greater than .05 in the

Shapiro-Wilk test indicates the variables' normality (Ghasemi & Zahediasl, 2012; Mishra et al., 2019). Table 2 (refer to appendix F4) showed that the *p*-value of all three of the study variables did not meet this assumption of normality as all of the study variables were assessed lesser than .001. Hence, in this study, all three variables did not meet the assumptions of normality for the Kolmogorov-Smirnov and Shapiro-Wilk tests.

# **Conclusion for normality test**

All in all, our study variables of "knowledge" and "risk perception" have passed most of the normality tests: Histogram, Q-Q plot, and skewness kurtosis. While study variable of "protective behaviour" did not pass the normality test of the histogram. Besides, all study variables did not meet the assumption for Kolmogorov-Smirnov and Shapiro Wilk test. According to Pallant (2016), it is common that the assumptions of normality for the Kolmogorov-Smirnov and Shapiro tests are not met in a large sample size. Since our study variables have passed most of the normality tests, we could conclude that the data of our study are normally distributed.

# **Descriptive Statistics**

Table 3 shows that 323 Malaysian within the age range of 18 to 25 years old fully participated in this study. The mean age of the participants was 21.89 (SD = 1.513). The majority of the participants, 31.3% (n = 101), were 22 years old, and six of them were 18 years old (1.9%). Other than that, most of the participants were female, 62.8% (n = 203). Furthermore, among the 323 Malaysian participants, Chinese participants have the highest percentage of the racial groups, 81.7% (n = 264), followed by 9.0% (n = 29) are Malay, 8.0% (n = 26) are Indian, and 1.2% (n = 4) were other racial groups which include Chindian, Melanau, Punjabi and Sikh. The majority of the participants had bachelor's degrees as their highest education level 70.3% (n = 227) and 85.4% (n = 276) are currently students. There

were 10.2% (n = 33) of the participants are full time employed and 4.3% (n = 14) unemployed. Besides, most of our participants live in the city area, (n = 244; 75.5%) and 79 of them live (24.5%) in rural areas.

In addition, there are 49.8% (n = 161) of participants rated themselves as having a general health condition, followed by 36.8% (n = 119) of the participants rated themselves has a good health condition, 27 of them (8.4%) rated themselves to have a very good health condition and 16 of them (5%) rated themselves have a bad health condition. On the other hand, none of the participants rated themselves of having a very bad health condition. Regarding the importance of vaccination, 60.7% (n = 196) think that the vaccination of COVID-19 is very important. Additionally, most of the participants has taken both doses for vaccination 52.6% (n = 170), 47.1% (n = 152) has taken the booster dose of vaccination, and 0.3% (n = 1) has yet to take the second dose. There were 133 of the participants (41.2%) reported that they go out 2-3 days per week, 17% (n = 55) go out 1 day a week, 16.1% (n = 52) go out 4-5 days a week, 13.3% (n = 43) go out every day a week, 7.4% (n = 24) go out six days a week, and 5.0% (n = 16) never go out in a week. On top of that, there were 306 of participants (94.7%) reported that they did not infect and diagnose with COVID-19 but 52.9% (n = 171) reported that someone they have known such as family member has been infected and diagnosed with COVID-19.

#### Table 3

	п	%	М	SD	Min	Max
Age			21.89	1.513	18	25
18	6	1.9				
19	14	4.3				
20	30	9.3				
21	71	33.0				
22	101	31.3				
23	62	19.2				
24	17	5.3				

Descriptive Statistics for the Demographic Data of Respondent (n = 323)

25	22	6.8	
Sex			
Male	120	37.2	
Female	203	62.8	
Races			
Malay	29	9.0	
Chinese	264	81.7	
Indian	26	8.0	
Others	4	1.2	
Highest Education			
Secondary school/ SPM	17	5.3	
Foundation/A- Level/ STPM	66	20.4	
Bachelor's degree	227	70.3	
Master's degree	5	1.5	
Others	8	2.5	
Working Status			
Student	276	85.4	
Unemployed	14	4.3	
Full time employed	33	10.2	

*Note.* n = number of participants; % = percentage; M = mean; SD = standard deviation; Min = minimum value; Max = maximum value

# Table 3 (Cont')

	n	%	M	SD	Min	Max
Current Residential						
area						
Rural	79	24.5				
City	244	75.5				
Self-rated health			3.49	.719	2	5
condition						
Very Bad	0	0				
Bad	16	5.0				
General	161	49.8				
Good	119	36.8				
Very Good	27	8.4				
Perceived of the			4.51	.698	2	5
importance of						
COVID-19						
vaccination						
Not important	0	0				

Descriptive Statistics for the Demographic Data of Respondent (n = 323)

Slightly important	6	1.9
Moderately	20	6.2
important		
Important	101	31.3
Very important	196	60.7
Have you taken the COVID-19 vaccine?		
Yes (first dose)	1	.3
Yes (both doses)	170	52.6
Yes (both and	152	47.1
booster dose)		
No	0	0
1 0	• •	0 (

*Note.* n = number of participants; % = percentage; M = mean; SD = standard deviation; Min = minimum value; Max = maximum value

# Table 3 (Cont')

Descriptive Statistics for the Demographic Data of Respondent (n = 323)

	п	%	M	SD	Min	Max
Frequencies of going						
out						
Never	16	5.0				
1 day a week	55	17.0				
2-3 days a week	133	41.2				
4-5 days a week	52	16.1				
6 days a week	24	7.4				
Everyday	43	13.3				
Have you been infected and diagnosed with COVID-19 Yes No	17 306	5.3 94.7				
Has someone you know been infected and diagnosed with COVID-19? (e.g., family member)						
Yes	171	52.9				
No	152	47.1				

*Note.* n = number of participants; % = percentage; M = mean; SD = standard deviation; Min = minimum value; Max = maximum value

Table 4 showed that knowledge (M = 12.39, SD = 1.994), most of the participants (n

= 222; 68.7%) have scored an average score on knowledge while there are only 47 of

participants (14.6%) have achieved a high knowledge score. Furthermore, for risk perception (M = 8.11, SD = 2.417), the majority of our participants (n = 203; 62.8%) were reported to have an average risk perception, on the other hand, there were only 47 of them (14.6%) were reported to have high-risk perception. Lastly, for protective behaviour (M = 17.31, SD = 2.037), most of the participants (n = 150; 46.4%) has reported having a high protective behaviour, while only 25 of them (7.7%) has reported themselves as having a low protective behaviour.

# Table 4

	'n	%	M	SD	Min	Max		
Knowledge			12.39	1.994	7	18		
Low (7-10)	54	16.7						
Average (11-14)	222	68.7						
High (15-18)	47	14.6						
Risk Perception			8.11	2.417	3	14		
Low (3-6)	73	22.6						
Average (7-10)	203	62.8						
High (11-14)	47	14.6						
Protective			17.31	2.037	12	20		
Behaviour								
Low (12-14)	25	7.7						
Average (15-17)	148	45.8						
High (18-20)	150	46.4						
M. (	4:-:							

Descriptive Statistics for study variables (n = 323)

*Note.* n = number of participants; % = percentage; M = mean; SD = standard deviation; Min = minimum value; Max = maximum value

# **Inferential Statistics**

Correlation analysis was run as correlation analysis is a prerequisite for linear

regression.

# Knowledge and Risk Perception. There is no significant relationship between

knowledge and risk perception, r(321) = .026, p = .640.

# Risk Perception and Protective Behaviour. There is a significant relationship

between risk perception and protective behaviour, r(321) = -.110, p = .048. It implies that the higher an individual's risk perception is correlated with a low degree of protective behaviour.

**Knowledge and Protective Behaviour.** There is no significant relationship between knowledge and protective behaviour, r(321) = .079, p = .157.

# Table 5

Summary correlation on Knowle	edge, Risk Perce	ption and Pro	otective Behav	iour (n = 323)
Variables	1	2	3	
1. Knowledge	-	.026	.079	
2. Risk Perception	-	-	110*	
3. Protective behaviour	-	-	-	
$N_{oto} * m < 05$				

*Note.* \**p* < .05

# Linear Regression between Knowledge, Risk Perception and Protective Behaviour

Even though only the relationship between risk perception and protection behaviour is significantly correlated in the Person correlation test, this study still tested all hypothesised predicting effects as proposed.

Durbin Watson has assessed the assumption of independent error prior to assessing linear regression analyses. If the value falls between 1 to 3, it shows that there is no violation in the assumption of independent error (Durbin & Watson, 1950). The value of Durbin-Watson in this study is 1.976, which falls between values 1 to 3. Therefore, there is no violation of the assumption of independent error. Other than that, the assumption of multicollinearity was assessed by tolerance and Variance Inflation Factor (VIF). The cut-off point for tolerance is  $\leq .10$ , while the cut-off point for VIF is  $\geq 10$  (Hair et al., 2010; Pallant, 2010). The value of tolerance in this study is .999, greater than the value of .10 while the VIF value is 1.001, which is within the value of 10. Hence there is no violation of the assumption of multicollinearity.

Simple linear regression was conducted to test on our  $H_I$ . Refer to Table 6, the result of simple linear regression model was statistically insignificant, F (1, 321) = .219, p = .640with 0.1% of the variance. Knowledge ( $\beta = .026$ , p = .640) does not significantly predict risk perception. Hence, our alternative hypothesis 1 is not supported.

Multiple linear regression was conducted to test the predicting effects of our study variables. Refer to Table 7, the multiple linear regression model was statistically significant, F (2, 320) = 3.066, p = .048 with 1.9% of the variance. Knowledge ( $\beta$  = .082, p = .140) does not significantly predict protective behaviour, while the variable risk perception ( $\beta$  = -.112, p = .044) significantly predicted protective behaviour among young adults in Malaysia. Since there is no significant relationship between knowledge to risk perception when we run simple linear regression prior, hence our **alternative hypothesis 2 is not supported**. Lastly, since risk perception predict protective behaviour, hence our **alternative hypothesis 3 is supported**.

# Table 6

Adj.  $\mathbb{R}^2$ Variables Std. Beta Sig. В t Error 7.722 .848 9.101 .000 -.002 Constant Knowledge .032 .068 .026 .468 .640

Simple Linear Regression on Knowledge and Risk Perception (n = 323)

*Note.* B = unstandardized coefficient; Std. Error = Standard error; Beta = standardized coefficient; Sig = significant value; Adj.  $R^2$  = adjusted  $R^2$ 

# Table 7

*Multiple Linear Regressions on Knowledge, Risk Perception and Protective Behaviour* (n = 323)

Variables	В	Std.	Beta	t	Sig.	Adj. R <sup>2</sup>
		Error				
Constant	17.036	.796		21.397	.000	.013
Knowledge	.084	.057	.082	1.479	.140	
Risk Perception	095	.047	112	-2.024	.044	

*Note.* B = unstandardized coefficient; Std. Error = Standard error; Beta = standardized coefficient; Sig = significant value; Adj.  $R^2$  = adjusted  $R^2$ 

# Mediation analysis of Knowledge, Risk Perception and Protective Behaviour

Even though there is no predicting effect for the path between knowledge and protective behaviour, the mediation analysis was continued being analysed as we would like to analyse the data as a record to reassure the proposed hypothesis testing (i.e.,  $H_4$ : Risk perception has a mediating effect on the relation of the knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19 pandemic.).

This study used Model 4 of PROCESS macro (Hayes, 2018), with 5000 bootstrapping, to analyse whether risk perception has a mediating effect between knowledge and protective behaviour. The analysis indicated that the path a to b of knowledge on risk perception (B = .032, SE = .068,  $\beta = .026$ , p = .64) were not significant, and risk perception on protective behaviour (B = .095, SE = .047,  $\beta = .112$ , p = .044) was significant. Path c' of knowledge on protective behaviour (B = .084, SE = .057,  $\beta = .082$ , p = .1401) was not significant, while the indirect effect of knowledge on protective behaviour was not significant as well (B = .003, SE = .008, 95% CI [-.02, .0121]). Other than that, the direct effect of knowledge on protective behaviour B = .084, SE = .057, 95% CI [- .03, .20] and total effect of knowledge on protective behaviour B = .081, SE = .057, CI [-.03, .19] were not significant. According to Hayes (2018), the results showed no significance with 95% of the confidence interval because the CI values include the value 0. Therefore, hypothesis 4 is not supported. Risk perception has no mediating effect on the relation of the knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19 pandemic.



c = Direct Pathway

c'= Indirect Pathway

*Figure 2.* The mediating analysis of risk perception on the relationship between knowledge and protective behaviour. \*p < .05.

#### **Chapter V**

# **Discussion & Conclusion**

# Discussion

This study referred to the Health Belief Model (HBM) to survey engagement of protective behaviour and its association factors structurally. Our study investigated the knowledge of COVID-19, risk perception, and protective behaviour among Malaysian young adults and the mediation effect of risk perception. The first objective of this study aimed to examine the level of knowledge, risk perception and protective behaviour of COVID-19 among Malaysian young adults during COVID-19 pandemic. Our finding showed that participants reported having average level of knowledge, average level of risk perception and high level of protective behaviour. Our findings showed that knowledge has no predicting effect on risk perception, and protective behaviour. At the same time, risk perception was found to have a significant predicting effect on protective behaviour. Furthermore, this study also reported that risk perception has no mediating effect on the relation between knowledge and protective behaviour.

# Level of Knowledge of COVID-19

The level of knowledge of coronavirus was reported as average in most of the participants (68.7%) which is found to be consistent with the previous study from Azlan et al. (2020) that Malaysian has a moderate level of knowledge of COVID-19. Participants in our study are young adults aged 18-25 years old. Circella et al. (2016) mentioned that young adults are well-educated, tech-savvy, and more committed themselves to the technology world as they able to access information online easily. Hence, they are able to gain information regarding coronavirus more easily. However, although most of them reported themselves as an undergraduate student (70.3%), they are taught to have critical thinking

which make them have the ability to distinguish the authenticity of the news and avoid getting false information online (Butler, 2021); the dissemination of misleading information has led the WHO to warm of an "information epidemic" or information overload about COVID-19 (World Health Organization, 2020b; Zarocostas, 2020). In this case, although Malaysian young adults have the ability to differentiate information, at the same time, it provided much more difficulties for them in finding credible and reliable information (van der Linden et al., 2020). Thus, their levels of knowledge on COVID-19 are found to be at moderate levels.

#### Level of Risk Perception

There are 62.8% of the participants were found to have an average level of risk perception that they perceived average risk on the severity of COVID-19. It is slightly inconsistent with the previous study from COVID-19 as Community insights (2020) mentioned that Malaysian young adults have low-risk perception. The inconsistency can be understood that the first case of COVID-19 in Malaysia was detected on the 25th of January 2020 (Elengoe, 2020), and in the year 2020, Malaysian may not be aware of the severity of COVID-19 as they believe that the wave of COVID might not be transmitted rapidly, and they might have less likely to be infected by COVID-19 due to the ignorance (Rashid, 2020). James Chin, a Malaysian political scientist, also mentioned that both government and Malaysian are not well-prepared as some due to political drama, and healthcare bureaucrats did not expect the virus to transmit rapidly to Malaysia (Varagur, 2020). Hence, it can be understood that in year 2020, Malaysian young adults are reported to have low risk perception. In the first year of COVID-19 outbreak in Malaysia as in year 2020, the public may still put hope that the COVID-19 outbreak could be just a short period; however, after almost three years of time, Malaysian young adults may understand that COVID-19 is still risky and less likely to be disappeared in recent time. In our study conducted at the end of

2021, the participants were found to have an average level of risk perception as the increasing infected cases and mobility rate in Malaysia. In addition, we can imply that Malaysian young adults may recognize and acknowledge the risk of COVID-19 due to the third wave of COVID-19 and the rise of COVID-19 cases in Malaysia in year 2021 (Tan et al., 2021). Thus, Malaysian young adults increased their risk perception gradually and showed a moderate level of risk perception in this study.

# Level of Protective Behaviour

The level of protective behaviour is reported to be high among participants (n = 150) and it reflected that most of them engage themselves in protective practices. It is consistent with the previous finding from Azlan et al. (2020) that Malaysian voluntarily to involve in protective behaviour before the stage of Movement Control Operation and highly engage in protective behaviour after the government laid down related rules and regulations. Malaysia's government has imposed several policies and rules in responding to COVID-19 to alleviate the public panic and safeguard Malaysian citizens' health (Shah et al., 2020). Movement Control Order (MCO) was implemented on March 18, year 2020, to restrict public movement and ban mass gathering nationwide. MCO has been extended to enhanced movement control order (EMCO), recovery movement control order (RMCO), and conditional movement control order (CMCO) according to the situation of the pandemic. Protective behaviour is legally enforced during the period of MCO, EMCO, RMCO and CMCO. The Health of Ministry (MOH) strictly implements Standard Operating Procedure (SOP) and keeps on updating SOP to protect the public. The latest SOP consists of 10 requirements which are strictly enforced public to wear mask in a public area, ensure social distancing in one meter, require organizations to adhere to operation hour, use MySejahtera and MySJTrace for admission registration, conduct COVID test based on National Testing Strategy, maintain hand hygiene and so on (Kaos, 2022) to enhance the protective measure among public and

avoid transmission. The government also implements a law during the MCO period that individuals who fail to comply with SOP will be liable to a fine not exceeding RM1,000.00 or imprison not exceeding six months, or both (Thoo, 2020). Thus, with the enforcement from the government, Malaysian young adults adhered to SOP and protective behaviour actively.

In addition, practicing protective behaviour and maintaining hygiene has become part of the social norm in Malaysian life (Bernama, 2021). When individuals refuse to perform hygiene practices, such as wearing face masks and maintaining social distancing, others might judge the person and censure him for his morals. Hence, to fit in the social norm, Malaysians are reported to have a high level of protective behaviour. Malaysian young adults used to have gatherings and social events; however, our study found that they also practice personal hygiene and fully cooperate to protective behaviour during this pandemic. zur Raffar et al. (2021) also supported that Malaysian youth reacted positively and fully complied towards MCO. On the other hand, this can explain that Malaysian young adults make much account of adhering to social norms to avoid having a prospect of social disapproval and social exclusion. Hence, regardless of voluntary or involuntary engaging in protective behaviour, participants also highly engage themselves in practicing precautionary measures to protect themselves.

# Knowledge and Risk Perception

*H*<sub>1</sub>: Knowledge of COVID-19 predicts significantly risk perception among Malaysian young adults during COVID-19 pandemic.

The first proposed alternative hypothesis was not supported as the results showed no significant relationship between knowledge of COVID-19 and risk perception. This study is inconsistent with the previous study by Azlan et al. (2020) which mentioned that Malaysian with higher knowledge of COVID-19 reported having a higher level of risk perception. The

finding in this study is also contrasted with several previous studies, which believed that people with adequate knowledge are more aware of the disease risk (Ding et al., 2020; Karasneh et al., 2021; Udomah et al., 2021; Xu et al., 2020). The results in this study showed that most of the participants had an average level of knowledge but had no significant relationship with risk perception. It implies that participants with or without adequate knowledge related to COVID-19 do not necessarily affect their concern about the risk of COVID-19.

A possible explanation for this finding is that a large amount of information regarding COVID-19 is being shared. Knowledge is identified from information produced, and it can be extracted from information shared on the web (Talakokkula, 2015). When information is over-bombarded, individuals will mentally shortcut the incoming information and refuse to generate relevant knowledge based on the information. Hence, it might lead them not aware of the severity of the virus. Young adults reported information overload and had an impact on psychological well-being (Liu et al., 2021) which might have mental exhaustion in responding to COVID-19. Thus, they do not perceive the severity of COVID-19 gradually. Information regarding different variants of viruses such as Omicron, Delta, and Delmicron being widely introduced might cause information-overload and fatigue and confuse individuals and confuse them to generate inappropriate knowledge, which might lead them to ignore the seriousness of COVID-19 (Mohammed et al., 2021). Thus, knowledge could not contribute to the risk perception of Malaysian young adults in this study.

Furthermore, when the information provided has surpassed the cognitive capacity, people will not only experience information-overload but also message fatigue in which the information or the knowledge shared is less persuasive to them and hence might neglect the risk perception on COVID-19 (Rathore & Farooq, 2020; So & Popova, 2018; So et al., 2017). Narcotizing dysfunction of media occurs when the audiences are so heavily bombarded with

information, and it inundates people, hence making them apathetic to the specific issue (Hossain & Acharya, 2021) and does not contribute to the perceived risk of COVID-19. Due to the overloaded information, young adults in this study with an average and high level of knowledge might be insensitive and indifferent towards the risk of COVID-19; thus, knowledge is not a significant predictor of their risk perception. Hence, it can be explained with the results that there is no significant relationship between knowledge of COVID-19 and risk perception.

#### Knowledge and Protective Behaviour

 $H_2$ : Knowledge of COVID-19 predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic.

Contrary to expectations, the results showed that knowledge of COVID-19 does not significantly predict protective behaviour, which alternative hypothesis 2 was not supported. It is inconsistent with studies from Elhadi et al. (2020) and Honarvar et al. (2020), who mentioned that people with adequate knowledge are more likely to adopt protective behaviour. A possible explanation for this contradictory expectation is that people might adopt protective behaviour based on the rules laid down by the government instead of contributing to their COVID-19 related knowledge (Iorfa et al., 2020). This study found that most participants reported having an average level of knowledge, but most of them (46.4%) still scored high in protective behaviour based on reliable policies and evidence-based information instead of depending on their knowledge and what they felt was right (Faggiano et al., 2014; Teovanović et al., 2020; Wilson & Juarez, 2015) which supported with our finding that knowledge is not significant predictor of protective behaviour. As COVID-19 is a novel virus that Malaysian young adults might not fully understand its nature, they may just

perform the protective behaviour by following policies made by the government. These policies strictly encourage and enforce Malaysians to adopt protective behaviour such as wearing masks in a confined space and some protective behaviours in public places such as putting hand sanitizer in every entrance and exit. Ministry of Health (MOH)'s guidelines mentioned that frequently cleaning and disinfecting workplaces and touching surfaces in their working area is needed. World Health Organization (2020a) also suggested and advised on the disinfection of the workplace and maintaining employees' hand hygiene. Thus, our results may imply that Malaysian young adults could perform protective behaviour as authorities enforced, but their level of knowledge on COVID-19 did not contribute to it.

On the other hand, this can explain that adopting protective behaviour such as covering when coughing or sneezing has become a habit and social norm for Malaysians. Malaysia's government imposes strict protective measures to mitigate COVID-19 cases, including wearing face masks in a public area and applying SOP to reduce the possibility of contact and limit virus transmission. Malaysians adhere to the protective measures and follow SOP to get rid of penalties from the government and follow the social norms. Triandis (2001) stated that Malaysia is a collectivist country that emphasizes group interdependence; hence, it might lead them to adhere to particular protective behaviour to follow social norms. Murali and Ahmad (2021) also supported that, students in Malaysia demonstrated a high level of awareness of norms, leading them to follow SOP, rules, and regulations. Besides, Anpalagam et al. (2020) supported that rural communities adhere to protective behaviour and practice proper personal hygiene according to cultural norms, and they reported having good sanitation. Maintaining personal hygiene has become a social norm in Malaysia, and hence, it is reasonable that knowledge is not a significant predictor of protective behaviour, but participants still are mainly engaging in protective behaviour.

A study from Hossain et al. (2021) found knowledge is not the determinant for preventive behaviour, but education level might serve as a potential predictor to the preventive behavioural practice. Our results showed that Malaysian young adults have moderate level of knowledge; however, their education level differs from secondary school to master's degree while there are also some of them (n = 8) reported with other education level. Hence, it is supported that education level whether they have received higher education might be the predictor of protective behaviour instead of knowledge (Hossain et al., 2021). Education provides the opportunity for them to take care of their health condition and those who have higher education level might have the opportunity to access health information and health programs more easily.

Moreover, another explanation might be the media coverage about the importance of protective behaviour. Malaysian young adults adhere to protective behaviour as wearing masks might due to excessive media coverage on the effectiveness of applying with the protective measures as Rattay et al. (2021) stated that the population's protective behaviour is regarded to be more influenced by media coverage than by the actual transmission of an epidemic. Hence, it implied that knowledge of COVID-19 does not contribute to the engagement in protective behaviour in our study.

#### **Risk Perception and Protective Behaviour**

 $H_3$ : Risk perception predicts significantly protective behaviour among Malaysian young adults during COVID-19 pandemic.

Based on the findings of this study, alternative hypothesis 3 has been supported as risk perception significantly predicts protective behaviour among Malaysian young adults during COVID-19 pandemic. The present study was consistent with previous studies that mentioned risk perception has a linkage with protective behaviour in a pandemic (Alegria et al., 2021; Siddiqui & Qamar, 2021). Although studies explore a linkage between these two variables, previous studies also question the strength of the relationship between risk perception and protective behaviour (Brewer et al., 2007; Harrison et al., 1992). Our finding supported a significant relationship between risk perception and protective behaviour, but it is a negative coefficient, meaning a lower level of risk perception might lead to a higher level of protective behaviour or vice versa.

Our results are inconsistent with studies from Mohd. Salleh et al. (2021) which reported that risk perception positively predicts protective behaviour. One of the explanations might be that the respondents in our study are Malaysian young adults, while the study mainly focused on healthcare workers. They perceived higher risk in this pandemic, leading them to adopt higher protective behaviour by adhering SOP and maintaining personal hygiene to protect themselves from infection. While Malaysian young adults do not have much experience with COVID-19 compared to healthcare workers, thus, they might less perceive the severity of COVID-19 and are reported to have a moderate level of risk perception. Malaysian young adults might also suffer from pandemic exhaustion as this pandemic lasted almost three years, causing them to pay less attention to the situation of COVID-19 pandemic (Bernama, 2021) and have a moderate level of risk perception rather than risk perception high level. Risk perception in our study negatively predicts the protective behaviour. The results revealed that Malaysian young adults with a lower risk perception will engage in a higher level of protective behaviour. Malaysian young adults' risk perception might be affected by well-publicized world events as previously COVID-19 was a pandemic in year 2020. However, COVID-19 turned to an epidemic from a pandemic. Ministry of Health Malaysia (n.d.) also reported the reducing rate of fatality (from 1.1% in October 2021 to 0.8% in January 2022) and the majority of COVID-19 (from 8.5% in October 2021 to 13% in January 2022) positive are in Categories A/B with mild symptoms (Ritchie, 2020).

COVID-19 might be publicized as a low-risk illness by the Ministry of Health Malaysia as well as other related authorities and mass media. Other than that, Malaysia fatality rate is considered low than what it is globally (Hashim et al., 2021) and with the increases of vaccination rate, Malaysian young adults perceived their risk of dying in COVID-19 is relatively low. Over 290 young people caught in nightclubs for violating Malaysia's COVID-19 measures ("More than 290", 2020). Malaysian young adults also engage themselves in the black flat movement in protest against the delay in implementing the lowering of the voting age from 21 to 18, which was passed in Parliament in July 2019 (Ding, 2021). However, practicing protective behaviour is still enforced by the government and SOP in public places including shopping malls, schools or working places. The result of this study may reflect the concept of "living with COVID-19". It implied that Malaysian young adults who perceived COVID-19 as low risk are still choosing to practice health protective behaviour in their daily life routine.

Besides rules and regulation in public places, as there are more young adults being infected with coronavirus, they are advised to self-quarantine and actively practice protective behaviour by their families (Rodzi, 2021). A recent review showed that young adults' fatality rate is quite low (Tchicaya et al., 2021). Hence, Malaysian young adults might not fear infection of coronavirus. However, with a low and average level of risk perception, they actively adhere to protective behaviour due to family members, social norm and cultural worldview. In order to avoid social exclusion and stigma from others, Malaysian young adults adhere to protective behaviour and follow the regulations imposed by the government to avoid any penalty. The cultural worldview is that Malaysia is a collectivist country, and in collectivistic cultures, wearing face masks is a responsibility and a symbol of solidarity (Lu et al., 2021). Malaysia young adults are responsible and actively fight against the pandemic and hence although with low-risk perception, they still adhere to protective behaviour.

#### Knowledge, Risk Perception and Protective Behaviour

 $H_4$ : Risk perception has a mediating effect on the relation of knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19 pandemic.

In our study, our results revealed that risk perception has no significant mediating effect on the relation of knowledge and protective behaviour, in which our alternative hypothesis 4 is not supported. In other words, knowledge will not predict protective behaviour through the pathway of risk perception. It is inconsistent with Taglioni et al. (2013) study that assumed risk perception as the mediator for precautionary or protective behaviour and knowledge. Taglioni et al. (2013) suggested that risk perception mediate the path of knowledge and precautionary behaviour, but our finding showed that risk perception does not mediate the relation between knowledge and protective behaviour of Malaysian young adults during COVID-19 pandemic.

The discrepancy can be explained that in the previous study, Taglioni et al. (2013) examined an influenza H1N1 epidemic that happened in the year 2009, with no vaccination and medical interventions to control the transmission of the epidemic at that time; while our study examines on COVID-19 which is a pandemic disease that spread over a large area and prevalent throughout the whole world. Several vaccinations such as Sinovac, Pfizer, and AstraZeneca are being introduced when conducting this study, and according to the statistic in Malaysia, over 97.5% of young adults commit themselves to taking the vaccination. While in our study, over 99% of the respondents also reported having taken vaccinations. Thus, they reported a low and average level of risk perception due to their vaccination status. Other than that, Gu et al. (2020) stated that both influenza H1N1 and COVID-19 shared similar clinical manifestations and transmission routes. Both viruses are transmitted through the respiratory system. It is also supported by Nasir et al. (2021) that both H1N1 and COVID-19 patients

reported similar symptoms, for example, coughing, fever, sore throat, myalgia, dizziness, and others. With the H1N1 experiences and knowledge shared during that epidemic, an individual might have adequate information and less worry while dealing with this COVID-19 pandemic. Despite Malaysian young adults with adequate knowledge and low-risk perception, they are willing to adopt protective behaviour based on protective measures tailored by the government rather than knowledge and risk perception. Hence, it is reasonable that risk perception is not an essential pathway in mediating knowledge and protective behaviour in this study.

As knowledge is not a significant predictor of protective behaviour of Malaysian young adults, statistically, risk perception couldn't be a significant mediator to the path from knowledge and protective behaviour. In the mediation model, knowledge is not a significant predictor of risk perception (mediator) also. As aforementioned, overloaded and confusing information of COVID-19 variants may cause Malaysian to be mentally exhausted and may not relate COVID-19 to the severity outcomes. In addition, Malaysian young adults' knowledge of COVID-19 may not reflect their health literacy thus failed to predict their protective behaviour. Thus, there is no mediating effect of risk perception on the relation of knowledge and risk perception of Malaysian young adults.

Other than that, Health Belief Model was applied in our study, and according to Rosenstock, (1974b), HBM is widely employed to explain the factors of preventive health behaviour and several studies examine public health behaviour with HBM in flu pandemic (Sarwar et al., 2020). However, perceived risk is evaluated by two dimensions: perceived susceptibility and perceived seriousness of the threat in a pandemic period. According to Shi et al. (2021), in the theoretical framework, risk perception reflects individual's subjective judgment or prediction of various risks. It includes both individual and social aspects, in which testing individual's risk of being infected and society susceptibility of infection (Shi et al., 2021). Even though the risk perception we assessed from COVID-19 protective behaviour questionnaire was developed based on the theoretical framework and combining experts' advice, butit focused on perceived susceptibility and didn't consider another risk perception dimension (i.e., perceived seriousness). Hence, it could be one of the reasons that explain no mediating effect of risk perception on the path of knowledge of COVID-19 and protective behaviour as HBM propositioned.

In addition, Rattary et al. (2021) stated that there are only a few studies specifically investigating education-related differences in COVID-19 knowledge, risk perception and protective behaviour. Most of the past research studied regarding this area is in the early months of the pandemic which is close to year 2020; at the same time, their studies have relatively small samples. This is also limited research examine on this area in Malaysia, while it is needed to consider the country differences as the predicting effect may vary from country to country depending on the education systems and the preventive measures they imposed (Rattary et al., 2021). Hence, this might be one of the reasons that our study differs from the expected hypothesis and does not support the path of knowledge of COVID-19 and protective behaviour. The result revealed that Malaysian young adults' knowledge of COVID-19 will not contribute to protective behaviour via risk perception.

# **Implications of study**

Since the outbreak of COVID-19, the knowledge of COVID-19, protective behaviour and risk perception has become the major concerns of the society as it is considered factors to prevent the non-stop continuous COVID-19 spreading. This research provided several contributions to ensure and enhance the current prevention of the COVID-19 widespread situation. The theories applied in this study were the Health Belief Model (HBM), which proposed an individual engaged in health behaviour through modifying factors and individual beliefs. Since there is limited similar research in Malaysia, the present study broadens the research perspective in this relevant field in Malaysia context and contributes substantial knowledge for further study.

The results showed no significant relationship between the knowledge pathways (knowledge of COVID-19 does not predict protective behaviour; knowledge of COVID-19 does not predict risk perception). However, prevention programmes may consider increase knowledge as well as health literacy of the Malaysian young adults and the citizens of Malaysia. According to Hashim et al. (2021), Malaysia's government has begun to adapt and promote its citizens to migrate into an era of living with the new norm that COVID-19 exists in daily life. The findings of this study can increase the importance of COVID-19 knowledge of Malaysian not only the young adults as it might affect their perception and give an insight into how to prevent or even cope with future disease-related pandemics. The policymakers may consider developing some workshops or prevention programs or any activities that can enhance the Malaysian young adult's knowledge of COVID-19 or health literacy as an early preparation for future unknown diseases.

Besides, this study can report the perceptions of Malaysian young adults towards the risk of COVID-19 and protective behaviour. This study showed a significant negative relationship between the risk perception and protective behaviour. In other words, although Malaysian young adults have a low-risk perception towards COVID-19, they still perform the protective behaviour towards COVID-19 pandemic. As the government of Malaysia work as a primary source of protecting, preventing, and overcoming the current COVID-19 disease from its citizen, there are several actions taken by the Malaysian government such as Movement Control Order (MCO) and Standard Operating Procedure (SOP) (Shah et al., 2020). The low-risk perception of Malaysian young adults who perform protective behaviour can be due to the strict enforcement of the Malaysian government law and regulations.

Although the high performance of protective behaviour can reduce the infection rate of COVID-19, people with low-risk perception who perceive COVID-19 as not severe may be lazy to perform protective behaviour in the future while SOP is not legally enforced. This study heightened the awareness to the policymakers about the importance of increasing the Malaysian young adults' perception of risk towards the COVID-19 since new transmission of variants can occur in future.

The current study found that knowledge is not a significant predictor of protective behaviour but most of the participants practice protective behaviour. It can imply that most of the Malaysian young adults might be blindly follow the SOP and practice protective behaviour. People who blindly perform the protective behaviour can be attributed to the fact that they do not understand the in-depth meaning of practicing protective behaviour or have inadequate knowledge of COVID-19 or due to the strictly enforcement of the Malaysian government law and regulations. Therefore, those who blindly perform protective behaviour without knowing the reasons and highly rely on the government rules can put themselves at a high risk in the early stage of similar disease pandemic in the future. This study can increase the awareness of the importance of the COVID-19 knowledge, risk perception and protective behaviour to the public as it might affect their overall prevention and early-preparation when future similar disease settings occur. The public may consider understand the disease, reasons for performing protective behaviour, and the severity of the disease in reducing self and people surrounding risk of getting infected at current or future unknown disease pandemic.

According to Champion and Skinner (2008), HBM supported the path which individual's decision to engage in a health behaviour through modifying factors and individual beliefs. However, our findings of this study show contradictory from past studies which there is no significant mediating effect on the relation of knowledge of COVID-19 and protective behaviour, and a significant negative relationship between the risk perception and
protective behaviour was found in current study. This can be explained that due to lack of consideration on the other dimensions in current study. For instance, the level of perceived risk which is evaluated by two dimensions, which are perceived susceptibility and perceived seriousness of the threat of disease in a pandemic setting. But, the measured risk perception in this study focused more on perceived susceptibility. Therefore, future research can further employ the HBM by considering other factors such as health literacy, the intention and willingness of the individuals for their protective behaviour, and to further attempt on adding research evidence on the effectiveness of HBM in this COVID-19 pandemic setting. Since this study was conducted during the pre-epidemic of the new variant, Omicron period in Malaysia, the results of the current study can be a guideline to HBM on the current or future new variant pandemic. Besides, the current study provides insights for future researchers who are interested in studying disease-related settings to further consider on the culture role and external factors such as the countries' government prevention strategies in their research. The result of this study provides an understanding that risk perception impacts the protective behaviour of an individual, but the risk perception does not play a role in mediating the relationship between knowledge of COVID-19 and protective behaviour.

## **Limitation and Recommendation**

Throughout this research, several limitations need to be considered and addressed for future improvement. One of the limitations is that the questionnaire that was applied in this study is a self-report questionnaire that allows the participants to report their details themselves. However, it can have the possibility of providing invalid answers. Respondents might not answer honestly when answering the questionnaire, especially dealing with some sensitive questions. There are two questions regarding individuals and their surrounding people being infected with the virus. Some respondents might not answer the questions truthfully to avoid discrepancies with others. According to Demetriou et al. (2015), it

supported that the respondents might respond to those questions in a socially acceptable way based on the social desirability bias. Participants might be inclined to provide an answer that aligns with the socially desirable rather than choose responses that reflect their actual situation. Hence, other than questionnaires, an interview can be conducted as a preliminary study to provide a clearer understanding of knowledge, risk perception and protective behaviour as the COVID-19 pandemic is unpredictable and relatively novel with few research studies on this area.

Another limitation of our study is that we only examine knowledge and risk perception. Secondly, our study only examines the determinants of protective behaviour but did not consider other modifying factors and individual belief as listed in the Health Belief Model (HBM), which might also have either direct or indirect effect on protective behaviour in the COVID-19 setting. In this present study, we only investigate risk perception as the mediator for knowledge and protective behaviour; nevertheless, HBM suggest that the action we take to protect ourselves is affected by various of factors such as general health value, perceived susceptibility to illness, perceptions of illness severity, expectation of treatment success, self-efficacy, perceived barriers and benefits, and cues to action (Schneider et al., 2012). Hence, future studies are suggested to include more modifying factors, individuals' beliefs, and other potential variables in explaining or promoting health behaviour in a disease setting by applying with the HBM model.

Other than that, generalizability is also one of our limitations. Over three-quarters of our respondents are Chinese (81.7%); females (62.8%) have also weighed a higher percentage than males. In addition, most of our respondents are students (85.4%) from different education level. Overgeneralisation occurs as there is an imbalance of races, genders and education level in our present study. Although we put many efforts into collecting more samples (n = 323) to balance the race, gender and education level, there is also an imbalance

and less response rate from males and other races such as Malay and Indian. Most of the Malaysian young adults we recruited are students due to the environment we stayed in and we mainly distributed our survey to different universities in the process of collecting samples. Hence, the collected sample might not represent the general population of Malaysian young adults. Recommendation for this limitation in future studies could include more sample size, recruit more other races and young adults from different working status to balance and reduce the discrepancy, to minimise the selection bias, and ensure that the collected samples are more suitable to represent the whole Malaysian population.

Moreover, the SKAPCOV-19 scale we used to test respondents' knowledge was established in year 2020, which might consist of knowledge discrepancy as COVID-19 is a novel virus and much research is still in a clinical state. At the same time, COVID-19 information keeps on updating, and the new variants of COVID-19 may cause the participants to have difficulties in adjusting their current knowledge with the latest information. Hence, the individual level of knowledge regarding COVID-19 will keep changing regarding how much latest information that the individual perceives. Even though the scale is validated, with high reliability ( $\alpha = 0.98$ ), and the items able to reflect the general and basic knowledge on COVID-19, however, there is slight possibility that the SKAPCOV-19 scale that we used in this study may not reflect all the latest information that approved by WHO. Hence, it is recommended for future studies to apply with the latest knowledge scale approved by WHO to ensure the information is updated and able to represent respondents' knowledge in the current state. Other than that, future studies are suggested to consider testing both knowledge of COVID-19 and health literacy during COVID-19 pandemic to fully assess the individuals' understanding of the virus based on their knowledge and the information collected as the information regarding coronavirus keeps on updating and confusing individuals. Examining health literacy is being able to know the individual's ability to find, comprehend, and use information and services to help them and others make healthrelated decisions and actions. Testing health literacy in future studies is able to emphasise an individual's ability to use health information rather than just understand it, check whether the information they gathered is accurate and able to reflect their better understanding on this virus.

Risk perception we applied in our study consists of three questions regarding the possibility of getting infection in both individual and social aspects. Although the measurement we used indicated good validity and reliability ( $\alpha = .831$ ), it is not enough to discuss risk perception in the HBM. Hence, it is recommended to consider applying a risk perception scale which includes both perceived susceptibility and perceived seriousness in the further research on the relationship of knowledge, risk perception and protective behaviour guided by HBM.

## Conclusion

In a nutshell, these findings suggested that most Malaysian young adults' COVID-19 related knowledge and risk perception are average, and protective behaviour is beyond average. The current study shows no significant predicting effect of knowledge of COVID-19 on risk perception and protective behaviour. Also, this study shows there is no mediating effect of risk perception on the relation of knowledge of COVID-19 and protective behaviour among Malaysian young adults during COVID-19. However, only risk perception is a significant predictor of protective behaviour among Malaysian young adults during the COVID-19 pandemic.

Protective behaviour is considered a factor in preventing and decreasing the spreading of COVID-19 in Malaysia as well as other countries. However, although protective behaviour is highly performed among young adults in Malaysia, it is still essential to further investigate

the factors contributing to protective behaviour and some factors that can internalise the importance of protecting themselves from the disease in the future. In short, this study can contribute these findings as a reference for future researchers who are interested in investigating a similar research topic and can provide information to whom may concern for further practical implementations that contribute to society. Lastly, in the hope that there will soon explore and implement a specific recovery treatment to cure the COVID-19 disease.

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### Appendix A

### **Sample Size Calculation**

Monte Carlo Power Analysis for Written by Alexander M. Schoemann ( Contact ), Aaror	Indirect Effects J. Boulton, & Stephen D. Short	
Model One Mediator  Objective Set N, Find Power  Sample Size (N) 280  # of Replications 1000 Monte Carlo Draws per Rep 20000 Random Seed 1234	$X \xrightarrow{a} V$	Instructions To use this app, follow these steps: 1. Select Model. The user should first select the mediation model containing the indirect effect(s) of interest. Models may be selected in the drop down menu in the left-most column of the app. Note that when a different mediation model is selected. The model graphic and input-value sections in the middle column will be altered. 2. Select Objective. Once the desired model is chosen, the user should select the objective of the power analysis. Two
Confidence Level (%) 99	Input Method Correlations	Calculate Power Parameter N Power ab 280 0.85

## Appendix A1: Correlation of Knowledge (X) and Risk Perception (M)

Knowledge, attitudes, beliefs and perceived risk of acute coronary syndrome among Jordanian patients (Alfasfos et al., 2016). r = 0.545, p < 0.01

Variables	Knowledge	Attitudes	Beliefs	Perceived risk	Age	History
Knowledge	1					
Attitudes	0.549**	1				
Beliefs	0.563**	0.584**	1			
Perceived risk	0.545**	0.589**	0.562**	1		
Age	0.016	0.037	0.104	0.348**	1	
History	0.226**	0.304**	0.360**	0.387**	0.509**	1

COVID-19 knowledge, risk perception, and precautionary behaviour among Nigerians: A moderated mediation approach (Iorfa et al., 2020). r = 0.250, p < 0.01

behavior (r = 0.10, p < 0.01). Higher COVID-19 knowledge was related to greater risk perception (r = 0.250, p < 0.01) and higher precautionary behavior (r = 0.18, p < 0.01). Risk perception was not related significantly to precautionary behavior (r = 0.06, p > 0.05).

Knowledge, risk perception, preventive behaviour and emotional regulation regarding COVID-19 among nurses working in isolation hospitals (Ewees et al., 2020). r = 0.339, p < 0.01

Variables	knowledge	Preventive behavior	<b>Risk perception</b>	Emotional Regulation
Knowledge	1	.227*	.339**	.211*
Preventive behavior	.227*	1	.173*	.217*
Risk perception	.339**	.173*	1	.219*
Emotional Regulation	.211*	.217*	.219*	1

Average correlation of knowledge (X) and risk perception (M)

= 0.545 + 0.250 + 0.3393

= <u>0.38</u>

#### Appendix A2: Correlation of Risk Perception (M) and Protective Behaviour (Y)

COVID-19 knowledge, risk perception, and precautionary behaviour among Nigerians: A moderated mediation approach (Iorfa et al., 2020). r = 0.23, p < 0.01

0.01). Higher risk perception was related to greater precautionary behavior (r = 0.23, p < 0.01) (Table 2).

Middle east respiratory syndrome-related knowledge, preventive behaviours and risk

perception among nursing students during outbreak (Kim & Choi, 2016). r = 0.29, p < 0.01

```
p < 0.05), and level of preventive behaviours was significantly correlated with risk perception (r = 0.29; p < 0.01) and age (r = 0.14; p < 0.05; Table 4).
```

Accident history, risk perception and traffic safe behaviour (Ngueutsa & Kouabenan,

2016). <u>*r* = 0.33, *p* < 0.01</u>

Perception of risk was positively correlated with safe behaviour (r = .33, p < .01). A imple linear regression model with perceived risk score as an independent variable and safe

#### Average correlation of Risk Perception (M) and Protective Behaviour (Y)

= 0.23+0.29+0.33 3

= <u>0.28</u>

#### Appendix A3: Correlation of Knowledge (X) and Protective Behaviour (Y)

Knowledge, protective behaviors and risk perception of COVID-19 among dental students

in India: A cross-sectional analysis (Batra et al., 2021). r = 0.18, p < 0.01

regarding COVID-19. The COVID-19 related risk perception was higher among females as c related knowledge was significantly correlated with preventive behaviors (r = 0.18; p < 0.01)

Middle east respiratory syndrome-related knowledge, preventive behaviours and risk

perception among nursing students during outbreak (Kim & Choi, 2016). r = 0.27, p < 0.01

Middle Eas	t respiratory	syndrome	-related kno	wledge was
significantly	correlated	with	preventive	behaviours
(r = 0.27;	p < 0.01)	and risk	perception	(r = 0.13;

Knowledge, attitudes and preventive behaviors toward COVID-19: A study among higher

education students in Portugal (Alves et al., 2021). r = 0.241, p < 0.01

between the preventive behaviors and knowledge related to COVID-19 (r = 0.241, p < 0.01), the attitudes toward preventive

#### Average correlation of Risk Perception (M) and Protective Behaviour (Y)

= 0.18+0.27+0.241 3

= <u>0.23</u>

# Appendix B

# **Boxplot for Pilot Study**

Figure B1: Boxplot of "Knowledge of COVID-19" with outliers.



Figure B2: Boxplot of "Risk Perception" with outliers.



Figure B3: Boxplot of "Protective Behaviour" with outliers.



Figure B4: Boxplot of "Knowledge of COVID-19" after clearing the outliers from the study.



Figure B5: Boxplot of "Risk Perceptions" after clearing the outliers from the study.



Figure B6: Boxplot of "Protective Behaviour" after clearing the outliers from the study.



#### Appendix C

# **Reliability Test for Pilot Study**

## Reliability

#### Scale: Knowledge\_Reliability

# Scale: RP\_Reliability

#### **Case Processing Summary**

		Ν	%
Cases	Valid	31	100.0
	Excluded <sup>a</sup>	0	.0
	Total	31	100.0

a. Listwise deletion based on all variables in the procedure.

#### **Reliability Statistics**

	Cronbach's	
	Alpha Based	
	on	
Cronbach's	Standardized	
Alpha	Items	N of Items
.600	.587	14

Case Processing Summary		
	N	%

Cases Valid 31 100.0 Excluded<sup>a</sup> 0 .0 Total 31 100.0

a. Listwise deletion based on all variables in the procedure.

**Reliability Statistics** 

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.567	.595	3

#### Scale: PB\_Reliability

#### **Case Processing Summary**

		Ν	%
Cases	Valid	31	100.0
	Excluded <sup>a</sup>	0	.0
	Total	31	100.0

a. Listwise deletion based on all variables in the procedure.

#### **Reliability Statistics**

	Cronbach's Alpha Based	
Cronbach's Alpha	on Standardized Items	N of Items
.620	.661	4

Note. K = Knowledge of COVID-19, RP = Risk Perceptions, PB = Protective Behaviour

#### **Appendix D**

# **Reliability Test for Actual Study**

Г

#### Scale: Realiability\_K

# Scale: Realiability\_RP

#### **Case Processing Summary**

		Ν	%
Cases	Valid	339	100.0
	Excluded <sup>a</sup>	0	.0
	Total	339	100.0

 a. Listwise deletion based on all variables in the procedure.

#### **Reliability Statistics**

	Cronbach's Alpha Based	
Cronbach's Alpha	on Standardized Items	N of Items
.725	.759	18

Reliability Statistics				
	Cronbach's Alpha Based			
Granhashia	on			
Alpha	Items	N of Items		
.744	.746	3		

# Scale: Realiability\_PB

#### **Case Processing Summary**

		Ν	%
Cases	Valid	338	99.7
	Excluded <sup>a</sup>	1	.3
	Total	339	100.0

 a. Listwise deletion based on all variables in the procedure.

#### **Reliability Statistics**

	Cronbach's Alpha Based	
Cronbach's Alpha	on Standardized Items	N of Items
.691	.713	4

#### *Note.* K = Knowledge of COVID-19, RP = Risk Perceptions, PB = Protective Behaviour

Cases	Valid	339	100.0
	Excluded <sup>a</sup>	0	.0
	Total	339	100.0

**Case Processing Summary** 

Ν

%

٦

 Listwise deletion based on all variables in the procedure.

# Appendix E

# **Boxplot for Actual Study**

Figure E1: Boxplot of "Knowledge of COVID-19" with outliers.



Figure E2: Boxplot of "Risk Perception" with outliers.



Figure E3: Boxplot of "Protective Behaviour" with outliers.



Figure E4: Boxplot of "Knowledge of COVID-19" after clearing the outliers from the study.



Figure E5: Boxplot of "Risk Perception" after clearing the outliers from the study.



Figure E6: Boxplot of "Protective Behaviour" after clearing the outliers from the study.



# Appendix F

# **Normality Tests**

# **Appendix F1: Histogram**

Figure F1.1: Histogram for the variable of "Knowledge of COVID-19".



Figure F1.2: Histogram for the variable of "Risk Perception".





Figure F1.3: Histogram for the variable of "Protective Behaviour".

# Appendix F2: Q-Q Plot





Figure F2.2: Q-Q plot for the variable of "Risk Perception".



Figure F2.3: Q-Q plot for the variable of "Protective Behaviour".



**Appendix F3: Skewness and Kurtosis** 

Figure F3.1: Skewness and Kurtosis for the variable of "Knowledge of COVID-19".

	Descriptives						
			Statistic	Std. Error			
Total_K	Mean		12.39	.111			
	95% Confidence Interval for Mean	Lower Bound	12.17				
		Upper Bound	12.61				
	5% Trimmed Mean		12.43				
	Median		13.00				
	Variance		3.978				
	Std. Deviation		1.994				
	Minimum		7				
	Maximum		18				
	Range		11				
	Interquartile Range		3				
	Skewness		<mark>269</mark>	<mark>.136</mark>			
	Kurtosis		<mark>.009</mark>	<mark>.271</mark>			

Figure F3.2: Skewness and Kurtosis for the variable of "Risk Perception".

Descriptives						
		Statistic	Std. Error			
Total_RP	Mean	8.11	.134			
	95% Confidence Interval for Mean Lower Bound	1 7.85				
	Upper Bound	8.38				
	5% Trimmed Mean	8.13				
	Median	8.00				
	Variance	5.841				
	Std. Deviation	2.417				
	Minimum	3				
	Maximum	14				
	Range	11				
	Interquartile Range	3				
	Skewness	<mark>074</mark>	<mark>.136</mark>			
	Kurtosis	<mark>233</mark>	<mark>.271</mark>			

Figure F3.3: Skewness and Kurtosis for the variable of "Protective Behaviour".

	Descriptives						
			Statistic	Std. Error			
Total_PB	Mean		17.31	.113			
	95% Confidence Interval for Mean	Lower Bound	17.08				
		Upper Bound	17.53				
	5% Trimmed Mean		17.42				
	Median		17.00				
	Variance		4.151				
	Std. Deviation		2.037				
	Minimum		12				
	Maximum		20				
	Range		8				
	Interquartile Range		3				
	Skewness		<mark>419</mark>	<mark>.136</mark>			
	Kurtosis		<mark>283</mark>	<mark>.271</mark>			

# Appendix F4: Kolmogorov-Smirnov and Shapiro-Wilk Tests (K-S Test)

# Table 2

Kolmogorov-Smirnov and Shapiro-Wilk Tests (K-S Test)

Tests of Normality							
	Kolmog	<mark>orov-S</mark> r	nirnov <sup>a</sup>	Sha	piro-Wi	lk	
	Statistic	df	Sig.	Statistic	df	Sig.	
Knowledge	.122	323	<mark>.000</mark>	.971	323	.000	
<b>Risk Perception</b>	.096	323	<mark>.000</mark>	.975	323	.000	
Protective Behaviour	.117	323	<mark>.000</mark>	.928	323	.000	

a. Lilliefors Significance Correction

*Note*. K = Knowledge of COVID-19

# Appendix G

# **Inferential Analyses**

# Appendix G1: Correlation and simple linear regression analyses of study variables.

Correlations								
	Total_K Total_RP Total_PB							
Total_K	Pearson Correlation	1	.026	.079				
	Sig. (2-tailed)		.640	.157				
	Ν	323	323	323				
Total_RP	Pearson Correlation	.026	1	110 <sup>.</sup>				
	Sig. (2-tailed)	.640		.048				
	Ν	323	323	323				
Total_PB	Pearson Correlation	.079	110 <sup>.</sup>	1				
	Sig. (2-tailed)	.157	.048					
	Ν	323	323	323				

\*. Correlation is significant at the 0.05 level (2-tailed).

*Note.* K = Knowledge of COVID-19, RP = Risk Perception, PB = Protective Behaviour.

# Appendix G2: Simple linear regression analyses of study variables $(H_I)$ .

Model Summary <sup>b</sup>					
Adjusted R Std. Error of the					
Model	R	R Square	Square	Estimate	
1	.026ª	.001	002	2.420	

a. Predictors: (Constant), Total\_K

b. Dependent Variable: Total\_RP

*Note.* K = Knowledge of COVID-19, RP = Risk Perception, PB = Protective Behaviour.

	ANOVAª							
Model		Sum of Squares	df	Mean Square	F	Sig.		
1	Regression	1.285	1	1.285	.219	.640 <sup>b</sup>		
	Residual	1879.477	321	5.855				
	Total	1880.762	322					

a. Dependent Variable: Total\_RP

b. Predictors: (Constant), Total\_K

*Note.* K = Knowledge of COVID-19, RP = Risk Perception, PB = Protective Behaviour.

**Coefficients**<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	7.722	.848		9.101	.000
	Total_K	.032	.068	.026	.468	.640

a. Dependent Variable: Total\_RP

*Note.* K = Knowledge of COVID-19, RP = Risk Perception, PB = Protective Behaviour.

#### Appendix G3: Multiple linear regression analyses of study variables.

Model Summary										
						Change S	Statis	tics		
		R	Adjusted R	Std. Error of	R Square	F			Sig. F	Durbin-
Model	R	Square	Square	the Estimate	Change	Change	df1	df2	Change	Watson
1	.137ª	.019	.013	2.024	.019	3.066	2	320	.048	1.976

a. Predictors: (Constant), Total\_RP, Total\_K

b. Dependent Variable: Total\_PB

*Note.* K = Knowledge of COVID-19, RP = Risk Perception, PB = Protective Behaviour.

	ANOVA <sup>a</sup>											
M	odel	Sum of Squares	df	Mean Square	F	Sig.						
1	Regression	25.129	2	12.565	3.066	.048						
	Residual	1311.527	320	4.099								
	Total	1336.656	322									

a. Dependent Variable: Total\_PB

b. Predictors: (Constant), Total\_RP, Total\_K

*Note.* K = Knowledge of COVID-19, RP = Risk Perception, PB = Protective Behaviour.

	Unstandardised Coefficients		Standardised Coefficients			Collinearity S	Statistics
Model	В	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	17.036	.796		21.397	.000		
Total_K	.084	.057	.082	1.479	.140	.999	1.001
Total_RP	095	.047	112	-2.024	.044	.999	1.001

**Coefficients**<sup>a</sup>

a. Dependent Variable: Total\_PB

*Note*. K = Knowledge of COVID-19, RP = Risk Perception, PB = Protective Behaviour.

#### **Appendix H**

#### **Mediation Analyses**

Run MATRIX procedure: Written by Andrew F. Hayes, Ph.D. www.afhayes.com Documentation available in Hayes (2022). www.guilford.com/p/hayes3 Model : 4 Y : Total PB X : Total\_K M : Total RP Sample Size: 323 OUTCOME VARIABLE: Total RP Model Summary R R-F df1 df2 MSE sq р .0261 .0007 5.8551 .2194 1.0000 321.0000 .63 98 Model coeff LLCI se t р ULCI .8485 .0000 7.7221 9.1014 6.0529 constant 9.3914 Total K .0317 .0676 .4684 .6398 -.1013 .1647

Standardised coefficients

coeff
-------

Total\_K .0261

OUTCOME VARIABLE:

Total\_PB

Model Summary

sq	R MSE	R <b>-</b> F	df1	df2	l	0	
80	.1371	.0188	4.0985	3.0656	2.0000	320.0000	.04

Model

	coeff	se	t	р	LLCI	ULCI
constant	17.0362	.7962	21.3967	.0000	15.4698	18.6027
Total_K	<mark>.</mark> 0837	.0566	1.4793	.1401	0276	.1950
Total_RP	<mark>0945</mark>	.0467	-2.0237	.0438	1864	0026

Standardised coefficients

	coeff
Total_K	.0819
Total_RP	1121

Test(s) of X by M interaction:

F	df1	df2	р
.0276	1.0000	319.0000	.8681

Total\_PB

Model Summary

	R	R-					
sq	MSE	F	df1	df2	l	2	
	.0790	.0062	4.1380	2.0164	1.0000	321.0000	.15
66							

Model						
	coeff	se	t	р	LLCI	ULCI
constant	16.3065	.7133	22.8612	.0000	14.9032	17.7098
Total_K	.0807	.0568	1.4200	.1566	0311	.1925
Standardise	ed coefficien	ts				
	coeff					
Total_K	.0790					
********	****** CORF	ELATIONS BE	ETWEEN MODE	L RESIDUALS	* * * * * * * * * * *	*****
	Total RP I	'otal PB				
Total RP	_ 1.0000	-				
- Total PB	.0000	1.0000				
_						
****	**** <sup>™</sup> \™\⊺ Г	אדסביריי אאס	דאוחדסדריי ע	ידדרמים מד ע	∩N V *****	* * * * * * * * * *
	101111, 1		INDIALCI	ITLICID OF A		
matal offa						
Total elled		+	~			2
cs	L Se	L	ł		OTCI	C_
.080	.0568	1.4200	.1566	0311	.1925	.07
90						
Direct effe	ect of X on Y					
Effect	t se	t	P	D LLCI	ULCI	c'_
.083	7.0566	1.4793	.1401	0276	.1950	.08
19						
Indirect et	ffect(s) of X	on Y:				
	Effect	BootSE B	BootLLCI	BootULCI		
Total_RP	0030	.0080	0213	.0121		
Completely	standardized	l indirect e	effect(s) c	of X on Y:		
	Effect	BootSE B	BootLLCI	BootULCI		

Total\_RP -.0029 .0079 -.0211 .0118

Level of confidence for all confidence intervals in output: 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

----- END MATRIX -----

## **Appendix I**

#### Questionnaire



#### UNIVERSITI TUNKU ABDUL RAHMAN

#### FACULTY OF ARTS AND SOCIAL SCIENCE

Research Topic: Knowledge, Risk Perception and Protective Behaviour among Malaysian Young Adults during COVID-19 Pandemic.

#### PARTICIPANT INFORMATION SHEET

A Study of the Knowledge, Risk Perception and Protective Behaviour among Malaysian Young Adults during COVID-19 Pandemic. You are invited to participate in a research study. Before you determine whether or not to participate in the research study, it is important for you to know and understand why the research is being conducted and what will be involved. Please spare some time to read through the following information carefully and decide whether if you want to participate in this study. Please feel free to contact us anytime if there is anything unclear or if you would like to have further enquiries.

#### **Purpose of Study**

We are Year 3 Trimester 3 undergraduate students from Bachelor of Social Science (Hons) Psychology at Universiti Tunku Abdul Rahman, Kampar campus. We are currently undertaking the course UAPZ3023 Final Year Project II and are working on a research project about Knowledge, Risk Perception and Protective Behaviour. Hence, you are cordially invited to take part in this online survey.

#### Procedures

Within this survey, you will be asked to answer a set of questionnaires about the topics of Knowledge, Risk Perception and Protective Behaviour. This survey could take up to 15 minutes to be completed.

#### Confidentiality

Your personal information and responses will be kept confidential and private. Responses will be reported as group data, and it will only be used for academic purposes which only the researchers and the supervisor have access to.

#### Participation

Your participation in this study is voluntary in nature. You always have the right to withdraw from this study anytime without receiving any penalties.

#### **Risk and Discomfort**

Throughout this survey, you will be asked questions about topics including Knowledge, Risk Perception and Protective Behaviour. We anticipate that discomfort might arise, however it will to be greater than what you will normally undergo throughput your daily life.

## **Contact Information**

If you have any further enquiries or concern about this study, please feel free to contact the researchers:

Gan Hui Min (ganhuimin88@1utar.my),

Jeanette Elena Tan (elenatan@lutar.my), &

Swi Zi Qing (ziqingswi01@1utar.my).

#### PERSONAL DATA PROTECTION NOTICE

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

1. Personal data refers to any information which may directly or indirectly identify a person which could include sensitive personal data and expression of opinion. Among others it includes:

a) Name

b) Identity card

c) Place of Birth

d) Address

e) Education History

f) Employment History

g) Medical History

h) Blood type

i) Race

j) Religion

k) Photo

1) Personal Information and Associated Research Data

- 2. The purposes for which your personal data may be used are inclusive but not limited to:
  - a) For assessment of any application to UTAR
  - b) For processing any benefits and services
  - c) For communication purposes
  - d) For advertorial and news
  - e) For general administration and record purposes
  - f) For enhancing the value of education

g) For educational and related purposes consequential to UTAR h) For replying any responds to complaints and enquiries

- i) For the purpose of our corporate governance
- j) For the purposes of conducting research/ collaboration

3. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

4. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

5. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to

ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

### **CONSENT:**

6. By submitting or providing your personal data to UTAR, you had consented and agreed for your personal data to be used in accordance to the terms and conditions in the Notice and our relevant policy.

7. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

8. You may access and update your personal data by writing email to us at Gan Hui Min (<u>ganhuimin88@1utar.my</u>), Jeanette Elena Tan (<u>elenatan@1utar.my</u>) and Swi Zi Qing (<u>ziqingswi01@1utar.my</u>). Final Year Project supervisor Dr. Gan Su Wan (<u>swgan@utar.edu.my</u>).

#### **Acknowledgement of Notice**

I have been notified by you and that I hereby understood, consented and agreed per UTAR above notice.

- o I agree.
- o I disagree.

Are you UTAR (Kampar) Year 3 Semester 3 Psychology Student in January 2022 trimester?

o Yes

o No

# Participation

I am a Malaysian.

- o Yes
- o No

I am aged between 18 to 25 years old.

o Yes

o No

# **Section A: Demographic Information**

1. Age: \_\_\_\_\_

2. Gender:

- o Male
- o Female
- 3. Race:
  - o Malay
  - o Chinese
  - o Indian
  - Others, Please specify: \_\_\_\_\_
- 4. Your highest education levels:
  - Primary school

- Secondary school/SPM
- Foundation/A-Level/STPM
- Bachelor's degree
- Master's degree
- o PhD
- Others, Please specify: \_\_\_\_\_

# 5. Working status:

- o Student.
- Unemployed.
- Full time employed.

# 6. Current residential area:

- o Rural area
- o City area

# 7. Self-rated health condition:





## 9. Have you taken the COVID-19 vaccine?

- Yes. (first dose)
- Yes. (both doses)
- Yes. (both doses and the booster dose)
- o No.

# 10. How often do you go out per week?

- Never (zero time/week)
- $\circ$  1 day a week
- o 2-3 days a week
- 4-5 days a week
- o 6 days a week
- o Everyday
- 11. Have you been infected and diagnosed with COVID-19?
  - Yes.
  - o No.
- 12. Has someone you know been infected and diagnosed with COVID-19? (e.g., family member)
  - o Yes.
  - o No.

# Section B: Knowledge of COVID-19

Item	Statement	Yes	No	Not sure
COVI	D-19 is a disease	I	I	
1.	Caused by coronavirus.	0	0	0
2.	With main clinical symptoms are fever and	0	0	0
	dry cough.			
3.	Also show no symptoms.	0	0	0
The fo	llowing persons are at an increased risk of COV	ID-19:	I	
4.	Senior citizens aged 65 and older.	0	0	0
5.	Have chronic diseases or cormobid.	0	0	0
6.	Except children and teenagers.	0	0	0
7.	Have a weak immune system.	0	0	0
COVI	D-19 are spread by:	I	I	
8.	Infected person without symptoms.	0	0	0
9.	Respiratory droplets of infected person.	0	0	0
10.	The dead bodies of infected person.	0	0	0
11.	The buried dead bodies of infected person.	0	0	0
12.	Can not penetrate cloth masks.	0	0	0
13.	Through objects, it is not airborne.	0	0	0
The fo	llowing practices can help protect you from COV	VID19:	I	
14.	There is no effective drug for COVID-19.	0	0	0
15.	Avoid going to crowded places.	0	0	0
16.	Avoid travel across cities.	0	0	0
17.	Not touching the face.	0	0	0
18.	Isolation and treatment of infected person.	0	0	0

Instruction: For each item, please choose the best answer to indicate your answer.

# Section C: Risk Perception

Instruction: For each item, please choose the best answer to indicate the degree to which you feel the statement.

Strongly disagree	Disagree	General	Agree	Strongly agree
1	2	3	4	5

Risk Perception	Strongly	Disagree	General	Agree	Strongly
	disagree	(2)	(3)	(4)	agree
	(1)				(5)
1) I think I may be likely to get	0	0	0	0	0
infected with COVID-19.					
2) I think I may be more susceptible	0	0	0	0	0
to COVID-19.					
3) I think someone around me may	0	0	0	0	0
be infected with COVID-19.					

# Section D: Protective Behaviour

Instruction: For each item, please choose the best answer to indicate the degree to which you feel the statement.

Not at all	Once in a while	Sometimes	Often	Very much
1	2	3	4	5

Protective behaviour	Not	Once in a	Sometimes	Often	Very
	at all	while	(3)	(4)	much
	(1)	(2)			(5)
1) Wash my hands regularly and	0	0	0	0	0
maintain hand hygiene.					
2) Cover myself when I cough or	0	0	0	0	0
sneeze.					
3) Wear masks correctly in	0	0	0	0	0
confined spaces/crowded areas.					
4) Clean/disinfect frequently	0	0	0	0	0
touched surfaces such as door					
handles, railings.					

----- We thank you for your time spent taking this survey. ------

Your response has been recorded.

## Appendix J

#### **Ethical Approval for Research Project**



Re: U/SERC/299/2021

30 December 2021

Dr Pung Pit Wan Head, Department of Psychology and Counselling Faculty of Arts and Social Science Universiti Tunku Abdul Rahman Jalan Universiti, Bandar Baru Barat 31900 Kampar, Perak.

Dear Dr Pung,

#### Ethical Approval For Research Project/Protocol

We refer to the application for ethical approval for your students' research projects from Bachelor of Social Science (Hons) Psychology programme enrolled in course UAPZ3013/UAPZ3023. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Social Loafing Behaviour in Collaborative Group Work Among University Students in Malaysia: Self-Efficacy, Group Cohesion and Task Interdependence	<ol> <li>Dheenosheeni a/p Maganthrin Kumar</li> <li>Khoo Jing Wen</li> <li>Kishuvan a/l Marimuthu</li> </ol>		
2,	Examining the Kole of Materialism, Perceived Stress and Gender Difference in Compulsive Buying Behavior Among Young Adults in Malaysia	<ol> <li>Looi Ke Xin</li> <li>Tan Kai Ni</li> <li>Tee Geok Hong</li> </ol>	Dr Chie Qiu Ting	
3.	The Mediating role of Social Anxiety on Perceived Stress and Internet Addiction Among Undergraduate Students in Malaysia	<ol> <li>Chong Khai-Juen</li> <li>Lai Ming Han</li> <li>Len Wan Qi</li> </ol>		
4.	The Association of Psychological Distress and Burnout on Job Satisfaction Among Frontliners in The Healthcare Industry During the Pandemic COVID-19 in Makaysia	<ol> <li>Loochan a a/p Krishna Rao</li> <li>Adrianna a/l P Silvarajah</li> <li>Visshan a/l Miyanthan</li> </ol>		
5.	Perceived Stress and Emotional Intelligence as Predictors of Life Satisfaction Among Undergraduates in Malavsia	<ol> <li>Ooi Yu Jie</li> <li>Lim Syi Wei</li> <li>Cham Han Tein</li> </ol>	Dr Nurul Iman binti Abdul Jalil	30 December 2021 - 29 December 2022
6.	The Mediating Role of Money Desire in Death Anxiety Toward Materialism Among Young Adults in Malaysia	<ol> <li>Britney Bong Sue Fun</li> <li>Jemimah Choong Giet Hee</li> <li>Kwok Koh Yee</li> </ol>		
7.	Social Anxiety, Perceived Stress Level and Perceived Social Support as Predictors of Smartphone Addiction Among Undergraduate Students in Malaysia	<ol> <li>Chua Pei Yi</li> <li>Chuah Yi Ting</li> <li>See Jie Sheng</li> </ol>		
8.	The Relationship Between Intrinsic Motivation, Extrinsic Motivation on Job Performance and Job Satisfaction Among Academic Staff in Malaysia	<ol> <li>Chen Chi Shan</li> <li>Ishwinder Kaur a/p Jasper Singh</li> <li>Jessica Teoh Wan Jie</li> </ol>	Mr Tay Kok Wai	
9.	Cognitive Behavioral Therapy Informed Workshop on Sleep: A Preliminary Randomized Controlled Trial	<ol> <li>Joanna Eileen Chan</li> <li>Michele Chu Hiew Mun</li> <li>Sanjeetra a/p Ravindharan</li> </ol>		

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia

Tet (605) 468 8888 Fax: (605) 466 1313 Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Chenas, 43000 Kajang, Selangor Darul Ehsan, Malaysia Tet (603) 9086 0288 Fax: (603) 9019 8868 Website: www.utar.edu.my



No	Research Title	Student's Name	Supervisor's Name	Approval Validity
10.	Cognitive Behavioral Therapy Informed Workshop on Procrastination: A Preliminary Randomized Controlled Trial	<ol> <li>Phuah Wai Hong</li> <li>Wong Weng Han</li> </ol>	Mr Tay Kok Wai	
11,	Relationship Between Self-Esteem, Fear of Covid-19 and Instagram Addiction Among Undergraduates in Malaysia	<ol> <li>Lee Jia Jie</li> <li>Loon Ling Lee</li> <li>Thio Kai Qi</li> </ol>		
12,	The Relationship Between Perfectionism, Cognitive Flexibility and Suicide Ideation Among Malaysian Undergraduates	<ol> <li>Zoe Chng Woon Chin</li> <li>Liew Kee Yee</li> <li>Tiong Wei Jie</li> </ol>	Ms Evelyn Toh Kheng Lin	
13.	The Relationship Between Depression, Anxiety, Perceived Social Support and Suicidal Intention Among Gay and Lesbian Young Adults' Community	<ol> <li>Fo Han Sien</li> <li>Gabriel Chai Yeet Jher</li> <li>Beh Jin Ying</li> </ol>	o Han Sien iabriel Chai Yeet Jher ieh Jin Ying	
14.	Knowledge, Risk Perception and Protective Behaviour Among Malaysian Young Adults During COVID-19 Pandemic	I. Gan Hui Min     Z. Jeanette Elena Tan     Swi Zi Qing		30 December 2021 - 29 December 2022
15.	Online Social Support, Offline Social Support and Academic Readiness as Predictors of Academic Resilience Among Undergraduates in Malaysia	<ol> <li>Kenny Ng Kai Feng</li> <li>Ng In Yan</li> <li>Karthiyaini a/p Sathiyaseelan</li> </ol>	Dr Gan Su Wan	
16.	Big 5 Personality Traits as the Predictors of Psychological Well-being Among Adults Working from Home (WFH) in Malaysia During COVID-19 Pandemic	<ol> <li>Liew Qian Qi</li> <li>Lim Yee Wen</li> </ol>	Ms Sanggari a/p	
17.	Impact of Psychological Distress, Fear, Changes in Lifestyle-Related Behavior and Life Satisfaction Among Working Adults During Movement Control Order (MCO) in Malaysia	<ol> <li>Chua Wan Yi</li> <li>Koo Yu Wen</li> <li>Ng Pui Ye</li> </ol>	Krishnan	

The conduct of this research is subject to the following:

- (1) The participants' informed consent be obtained prior to the commencement of the research;
- (2) Confidentiality of participants' personal data must be maintained; and
- (3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.
- (4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,

Professor Ts Dr Faidz bin Abd Rahman Chairman UTAR Scientific and Ethical Review Committee

c.c Dean, Faculty of Arts and Social Science Director, Institute of Postgraduate Studies and Research

Kampar Campus: Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia Tel: (605) 468 8888 Fax: (605) 466 1313 Sungai Long Campus: Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia Tel: (603) 9086 0288 Fax: (603) 9019 8868 Website: www.atar.edu.my



# Appendix K

# **Approval of Questionnaire from Authors**

# Figure K1: Knowledge of COVID-19 Questionnaire

	Permission to use SKAPCOV-19 Questionnaire External Index ×	×	ē	ß
•	Muhammad Saefi <msaefi34@yahoo.com> Mon, Nov 8, 2021, 1:35 PM to me *</msaefi34@yahoo.com>	☆	*	:
	Dear, Jeanette Elena Tan Universiti Tunku Abdul Rahman, Malaysia			
	Thank you for your letter I really appreciate your action to ask permission from us to use the instrument we have developed. Of course, we are happy to allow you and your team to use it for the benefit of community, especially to prevent the spread of Covid-19 in your country. However, we hope that you use them appropriately and give us credit or citations when they are written is reports and articles. We hope you and your team are safe from Covid-19 while doing this work.	í the wi in scier	ider ntific	
	Best Regards, Muhammad Saefi			
	Malang, Indonesia			
	Dikirim dari Yahoo Mail untuk iPhone			
	Pada Senin, November 8, 2021, 12:33 PM, JEANETTE ELENA TAN < <u>elenatan@1utar.my</u> > menulis:			
	Dear Mr. Muhammad Saefi,			
	I am Jeanette Elena Tan, an undergraduate from Universiti Tunku Abdul Rahman, Malaysia. My group and I had come across your published article "Validating of Knowledg Attiludes, and Practices Questionnaire for Prevention of COVID-19 infections among Undergraduate Students: A RASCH and Factor Analysis", and we found that your artic very interesting. We noticed that the instrument, SKAPCOV-19 questionnaire's knowledge domain that you had adapted might be relevant to our study of interest.	je, :le was	5	
	As such, we wish to request for your permission to allow us the use of this scale for our undergraduate final year research project. We would be grateful if you could provide the complete scale of the SKAPCOV-19 questionnaire, its scoring interpretation and any information relevant to our study.	) us wi	th	
	Besides, we would like to ask if the SKAPCOV-19 Questionnaire is applicable for young adults (18 years old - 24 years old) as our target respondents will be young adults i Malaysia during this COVID-19 pandemic.	n		
	Thank you.			
	Wishing you a great year ahead, Jeanette Elena Tan			

# Figure K2: Risk Perception Questionnaire

Permission to use COVID-19 Risk Perception Questionnaire 征用同意使用COVID-19风险感知问卷(COVID-19 Risk Perception Questionnaire) (External)	Inbox ×		0	ē	
钟晓妮 <zhongxiaoni@cqmu.edu.cn> to me, xyb ▼</zhongxiaoni@cqmu.edu.cn>	Nov 16, 2021, 4:07 PM	☆	+		:
Dear Jeanette Elena Tan,					
The COVID-19 Risk Perception questionnaire had attached with the COVID-19 Protective Behavior questionnaire can be used.					
Best regards					
Sincerely Yours,					
Xiaoni Zhong					
E-mail: <u>zhongxiaoni@cqmu.edu.cn</u>					
Original					
From: "JEANETTE ELENA TAN" <elenatan@1utar.my>; Date: Mon, Nov 15, 2021 04:04 PM To: "xyb"&lt;<u>xyb@cgmu.edu.cn</u>&gt;; "zhongxiaoni@cgmu.edu.cn&gt;; Ce: "HUI Mis GAN*&lt;<u>ganhumini88@1utar.my</u>&gt;; "J QING SWI"&lt;<u>zqingsw01@1utar.my</u>&gt;; Subject: 征用同意使用COVID-19风险感知问卷(COVID-19 Risk Perception Questionnaire)</elenatan@1utar.my>					

尊敬的钟晓妮教授
教授您好。我是陈颖乐,我和我的组员非常荣幸得到您允许让我们使用COVID-19防护行为问卷以及您为我们的毕业论文提供的所有相关信息。
此外,我们还想通过这电子邮件征用您的同意使用您在邮件所附的COVID-19风险感知相关的题目(COVID-19 Risk Perception items) 即我们的毕业论文将会使用您问卷里的 Protective Behavior 和 Risk Perception的问题(items)。
真挚地感谢您,愿您有个美好的一天!
陈颖乐 本科生 马来西亚拉曼大学
Dear Prof Dr Xiaoni Zhong ,
My group and I are happy and grateful to have your permission in using the COVID-19 protective Behavior measure and for all the information you provided for our undergraduate final year research project.
Besides, we wish to request for your permission to use the COVID-19 Risk Perception questionnaire which you have attached with the COVID-19 Protective Behavior questionnaire.
Thank you.
Wishing you a great year ahead, Jeanetle Elena Tan Undergraduates Universiti Tunku Abdul Rahman, Melaysia

# Figure K3: Protective Behaviour Questionnaire

	Permission to use COVID-19 Protective Behavior Questionnaire 征用同意使用COVID-19防护行为问卷(COVID-19 Protective Behavior Questionnaire) (Extend) Interx 0 毫 亿
-	钟晓妮 <zhongxiaoni@cqmu.edu.cn></zhongxiaoni@cqmu.edu.cn>
	Dear Jeanette Elena Tan,
	Thank for your appreciation of our article. Relevant documents have been attached. I hope it will be of some help to you.
	For your research group, due to the influence of different cultures and people in different regions, we suggest that you can try to do some exploration. Maybe you will have new findings.
	Best regards
	Sincerely Yours,
	Xiaoni Zhong
	E-mail: zhongxiaoni@cqmu.edu.cn
	Orional
	From: "JEANETTE ELENA TAN <sup>*</sup> selenatan@1utar.my>; Date: Sun, Nov 14, 2021 01:27 PM To: "xyb <sup>*</sup> syb <u>@cqmu.edu.cn</u> >; "ahongxiaon"< <u>zhongxiaon@cqmu.edu.cn</u> >; C: "HUI MIN GAN <sup>*</sup> sgahnlumin83@1utar.my>; "21 QING SWI <sup>*</sup> zujangsw01@1utar.my>; Subject: 征用同意使用COVID-19筋护行为问卷(COVID-19 Protective Behavior Questionnaire)
	m
	尊敬的Xiaoni Zhong 教授:
	教授您好。我是陈颖乐,一名来自马来西亚拉曼大学的心理学专业本科生,我和我小组的本科的毕业论文研究新冠赫炎的防范措施,我们发现您发表的其中一篇文章"Factors Influencing Post- COVID-19 protection behavior in China: A cross-sectional Study" 非常有趣并且您修改的COVID-19防护行为问卷与我们按撰写的毕业论文相关且将为我们提供一个很好的方向帮助我们完成毕业论 文。
	因此我们想通过这电子邮件征用您的同意使用COVID-19防护行为问卷(COVID-19 Protective Behavior Questionnaire)。如果不冒犯,我们恳切希望如果您能向我们提供完整的COVID-19防护行为问 卷量表、评分解释以与研究相关的任何信息。
	此外,我们想了解这个问卷是否适用于年轻人(18 - 24岁),因为我们的目标受访者将是本次COVID-19大流行期间的马来西亚年轻人。
	非常感谢您并愿你有美好的一天。
	陈颖乐
	本科生
	与米西亚拉曼大学
	Dear Prof Dr Xiaoni Zhong,
	I am Jeanette Elena Tan, an undergraduate from Universiti Tunku Abdul Rahman, Malaysia. My group and I had come across your published article "Factors Influencing Protective Behavior in the Post-COVID-19 Period in China: A Cross-sectional Study", and we found that your article was very interesting. We noticed that the instrument, COVID-19 Protective Behavior Questionnaire that you had adapted might be relevant to our study of interest.
	As such, we wish to request for your permission to allow us the use of this scale for our undergraduate final year research project. We would be grateful if you could provide us with the complete scale of the COVID-19 Protective Behavior Questionnaire, its scoring interpretation, and any information relevant to our study.
	Besides, we would like to ask if the COVID-19 Protective Behavior Questionnaire is applicable for young adults (18 years old - 24 years old) as our target respondents will be young adults in Malaysia during this COVID-19 pandemic.
Wishing you a great year ahead, Jeanette Elena Tan Undergraduates Universiti Tunku Abdul Rahman, Malaysia

#### Appendix L

#### Turnitin Original Report for FYP I

Knowledge, Risk Perception and Protective Behaviour among Malaysian Young Adults during COVID-19 Pandemic

ORIGINA	ALITY REPORT			
	1% ARITY INDEX	<b>3%</b> INTERNET SOURCES	9% PUBLICATIONS	2% STUDENT PAPERS
PRIMAR	Y SOURCES			
1	Petra Ra Domans Lothar H "Differe and pro by educ German Snapsho ONE, 20 Publication	attay, Niels Mich ska, Anna Kaltwa H. Wieler, Susan nces in risk pero tective behavior ation level amor by. Results from of Monitoring (C	alski, Olga Ma asser, Freia De ne Jordan. ception, knowl ur regarding C ng women and the COVID-19 COSMO) study"	aria Bock, edge OVID-19 d men in ', PLOS
2	WWW.NC	bi.nlm.nih.gov		1 %
3	Hongfei Meijun I Yang Wa Resilien Populat COVID-1 Researc	Ma, Minghui Liu Long, Yucong Di ang. "The Effect ce on Sleep Qua ion During the N 19 Pandemic Pre h Square Platfo	u, Shuang Zha ao, Ziyi Feng, I of Stress, Wor ality of Chinese Normalization evention and C rm LLC, 2021	o, <b>1</b> % Hui Wu, rries and e of Control",

4	Fei Wang, Jiuchang Wei, Xing Shi. "Compliance with recommended protective actions during an H7N9 emergency: a risk perception perspective", Disasters, 2018 Publication	1%
5	Submitted to University of Greenwich Student Paper	<1%
6	Petros A Galanis, Ioannis Moisoglou, Irene Vraka, Olga Siskou, Olympia Konstantakopoulou, Aglaia Katsiroumpa, Daphne Kaitelidou. "Predictors of COVID-19 vaccine uptake in healthcare workers: a cross- sectional study in Greece", Cold Spring Harbor Laboratory, 2021 Publication	<1%
7	Daniel Slunge, Anders Boman. "Learning to live with ticks? The role of exposure and risk perceptions in protective behaviour against tick-borne diseases", PLOS ONE, 2018 Publication	<1%
8	Submitted to Northern Arizona University Student Paper	<1%
9	Estriana Murni Setiawati. "Public Knowledge, Attitude, and Practice toward COVID-19 Prevention: a Literature Review", International Journal of Health Science and Technology, 2021 Publication	<1%

10	journals.plos.org	<1%
11	Submitted to Universiti Teknologi MARA Student Paper	<1%
12	Murat Yıldırım, Abdurrahim Güler. "COVID-19 severity, self-efficacy, knowledge, preventive behaviors, and mental health in Turkey", Death Studies, 2020 Publication	<1%
13	Evans Muchiri, Clifford Odimegwu, Nicole De Wet. "HIV risk perception and consistency in condom use among adolescents and young adults in urban Cape Town, South Africa: a cumulative risk analysis", Southern African Journal of Infectious Diseases, 2017 Publication	<1%
14	Submitted to University of Hong Kong Student Paper	<1%
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18	Internet Source	<1%
19	Sarah Dryhurst, Claudia R. Schneider, John Kerr, Alexandra L. J. Freeman et al. "Risk perceptions of COVID-19 around the world", Journal of Risk Research, 2020 Publication	<1%
20	Wakgari Deressa, Alemayehu Worku, Workeabeba Abebe, Muluken Gizaw, Wondwosson Amogne. "Risk perceptions and preventive practices of COVID-19 among healthcare professionals in public hospitals in Ethiopia", Cold Spring Harbor Laboratory, 2020 Publication	<1%
21	pesquisa.bvsalud.org	<1%
22	Akshaya Srikanth Bhagavathula, Wafa Ali Aldhaleei, Jamal Rahmani, Jagdish Khubchandani. "Knowledge, Attitude, Perceptions and Practice towards COVID-19: A systematic review and Meta-analysis", Cold Spring Harbor Laboratory, 2020 Publication	<1%
23	Andika Wahab. "The outbreak of Covid-19 in Malaysia: Pushing migrant workers at the	<1%

		margin", Social Sciences & Humanities Open, 2020 Publication	
	24	Devon J. Hensel, Molly Rosenberg, Maya Luetke, Tsung-chieh Fu, Debby Herbenick. "Changes in Solo and Partnered Sexual Behaviors during the COVID-19 Pandemic: Findings from a U.S. Probability Survey", Cold Spring Harbor Laboratory, 2020 Publication	<1%
	25	Sinué Salgado, Dorthe Berntsen. ""It Won't Happen to Us": Unrealistic Optimism Affects COVID-19 Risk Assessments and Attitudes Regarding Protective Behaviour", Journal of Applied Research in Memory and Cognition, 2021 Publication	<1%
-	26	Submitted to University of East London Student Paper	<1%
	27	Wladimir Gramacho, Mathieu Turgeon, John Kennedy, Max Stabile, Pedro Santos Mundim. "Political Preferences, Knowledge, and Misinformation About COVID-19: The Case of Brazil", Frontiers in Political Science, 2021 Publication	<1%
-	28	Xinyi Jiang. "The virtual SARS epidemic in Europe 2002–2003 and its effects on	<1%

# European Chinese", Health, Risk & Society, 2009

Publication

29	www.gov.il Internet Source	<1%
30	"KYN325 EBL1 Global public health in everyday life WEB106187 ", Open University Publication	<1%
31	Addisu Dabi Wake. " Knowledge, Attitude, Practice, and Associated Factors Regarding the Novel Coronavirus Disease 2019 (COVID-19) Pandemic ", Infection and Drug Resistance, 2020 Publication	<1%
32	Hafso Mohamed Abdulle, Moses Muia Masika, Julius Oyugi. "COVID-19: Knowledge, Perception of Risk, Preparedness and Vaccine Acceptability among Healthcare Workers in Kenya", Cold Spring Harbor Laboratory, 2021 Publication	<1%
33	Nguyen Ngoc Long, Bui Huy Khoi. "an- empirical-study-about-the-intention-to-hoard- food-during-covid-19-pandemic", Eurasia Journal of Mathematics, Science and Technology Education, 2020 Publication	<1%

34	Steven Kator Iorfa, Iboro F.A. Ottu, Rotimi Oguntayo, Olusola Ayandele et al. "COVID-19 knowledge, risk perception and precautionary behaviour among Nigerians: A moderated mediation approach", Cold Spring Harbor Laboratory, 2020 Publication	<1%
35	Suhang Song, Shujie Zang, Liubing Gong, Cuilin Xu, Leesa Lin, Mark R. Francis, Zhiyuan Hou. "Willingness and Uptake of the COVID-19 Testing and Vaccination in Urban China: An Online Cross-Sectional Survey at Early 2021", Research Square Platform LLC, 2021 Publication	<1%
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36	Internet Source	<1%
36	Casey M Zipfel, Shweta Bansal. "Assessing the interactions between COVID-19 and influenza in the United States", Cold Spring Harbor Laboratory, 2020 Publication	<1% <1%

39Tosin Philip Oyetunji, Olusegun Ayomikun<br/>Ogunmola, Timothy Tomiwa Oyelakin,<br/>Olorunyomi Felix Olorunsogbon, Foluso O.<br/>Ajayi. "COVID-19-related risk perception,<br/>anxiety and protective behaviours among<br/>Nigerian adults: a cross-sectional study",<br/>Journal of Public Health, 2021<br/>Publication<1 %</th>

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### Appendix M

#### **Turnitin Original Report for FYP II**

Prot	ective Beh	aviour_fyp2			
ORIGINA	LITY REPORT				
1 SIMILA	0%	4% INTERNET SOURCES	8% PUBLICATIONS	4% STUDENT PA	PERS
PRIMAR	SOURCES				
1	Submitte Student Paper	ed to University	of the West l	ndies	1%
2	Lok Eng Reshma Jayaprab physical during C study", F	Yao, Rajkumar I Praveen, Ali Mo ha Surendran. activity among OVID-19 pande Revista Pesquisa	Krishnan Vasa d Nadzalan, Pr "Perceived ba Malaysian ad mic- a cross-s a em Fisiotera	anthi, raveen urriers to ults ectional pia, 2021	1 %
3	Petra Ra Domans Lothar H "Differer and prot by educa Germany Snapsho ONE, 202 Publication	ttay, Niels Mich ka, Anna Kaltwa I. Wieler, Susan nces in risk perc ective behaviou ation level amor y. Results from of Monitoring (C 21	alski, Olga Ma asser, Freia De ne Jordan. eption, knowl ur regarding C ng women and the COVID-19 OSMO) study'	aria e Bock, edge OVID-19 d men in ', PLOS	1 %
4	Farah De Masoum	elfiyan, Masoud 1eh Forouzani, J	Yazdanpanał afar Yaghobi.	٦,	<1%

#### "Farmers' adaptation to drought risk through farm-level decisions: the case of farmers in Dehloran county, Southwest of Iran", Climate and Development, 2020 Publication

5	Submitted to Universiti Tunku Abdul Rahman Student Paper	<1%
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7	trepo.tuni.fi Internet Source	<1%
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12	Peng Cheng, Jiuchang Wei, Yue Ge. "Who should be blamed? The attribution of responsibility for a city smog event in China", Natural Hazards, 2016 Publication	<1%
13	essay.utwente.nl	<1%

14	Leodoro J. Labrague. "Psychological resilience, coping behaviours, and social support among healthcare workers during the COVID-19 pandemic: a systematic review of quantitative studies", Cold Spring Harbor Laboratory, 2020 Publication	<1%
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16	sherlock.bibl.ulaval.ca	<1%
17	Fei Wang, Jiuchang Wei, Xing Shi. "Compliance with recommended protective actions during an H7N9 emergency: a risk perception perspective", Disasters, 2018 Publication	<1%
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20	ijci.wcci-international.org	<1%

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22	Trishnika Chakraborty, Gireesh Kumar Subbiah, Rohit Kulshrestha, Krithika Subbiah, Gadadasu Swathi, Yogesh Damade. "Impact of the COVID 19 Infodemic on Knowledge, Attitude and Social Behavior in India: A Mixed Method Survey", The International Journal of Intelligence, Security, and Public Affairs, 2021 Publication	<1%
23	www.ncbi.nlm.nih.gov Internet Source	<1%
24	Muhammad Saefi, Ahmad Fauzi, Evi Kristiana, Widi Cahya Adi et al. "Validating of Knowledge, Attitudes, and Practices Questionnaire for Prevention of COVID-19 infections among Undergraduate Students: A RASCH and Factor Analysis", Eurasia Journal of Mathematics, Science and Technology Education, 2020 Publication	<1%
25	www.astellas.com	<1%
26	Basema Saddik, Iffat Elbarazi, Mohamad-Hani Temsah, Fatemeh Saheb Sharif-Askari et al. "Psychological Distress and Anxiety Levels Among Health Care Workers at the Height of	<1%

	the COVID-19 Pandemic in the United Arab Emirates", International Journal of Public Health, 2021 Publication	
27	Ning Qin, Shuangjiao Shi, Guiyue Ma, Xiao Li, Yinglong Duan, Zhiying Shen, Aijing Luo, Zhuqing Zhong. "Associations of COVID-19 Risk Perception, eHealth Literacy, and Protective Behaviors Among Chinese College Students Following Vaccination: A Cross- Sectional Study", Frontiers in Public Health Internet Source	<1%
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31	Xiaowei Li, Tiezhong Liu. "Community participation effects on preparedness behaviour through risk perception: Empirical data of hazardous chemicals from China", International Journal of Disaster Risk Reduction, 2020 Publication	<1%
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36	Christine Barrett, Kei Long Cheung. "Knowledge, socio-cognitive perceptions and the practice of hand hygiene and social distancing during the COVID-19 pandemic: A cross-sectional study of UK university students", Research Square, 2020 Publication	<1%
37	Evans Muchiri, Clifford Odimegwu, Nicole De Wet. "HIV risk perception and consistency in condom use among adolescents and young adults in urban Cape Town, South Africa: a cumulative risk analysis", Southern African Journal of Infectious Diseases, 2017 Publication	<1%
38	Francesca Coppola, Lorenzo Faggioni, Emanuele Neri, Roberto Grassi, Vittorio Miele. "Impact of the COVID-19 outbreak on the profession and psychological wellbeing of	<1%

	radiologists: a nationwide online survey", Insights into Imaging, 2021 Publication	
39	Ksenia Podoynitsyna. "The Role of Mixed Emotions in the Risk Perception of Novice and Serial Entrepreneurs", Entrepreneurship Theory and Practice, 01/2012 Publication	<1%
40	Latefa Ali Dardas, Inaam Khalaf, Manar Nabolsi, Omayyah Nassar, Suhaila Halasa. "Developing an Understanding of Adolescents' Knowledge, Attitudes, and Practices Toward COVID-19", The Journal of School Nursing, 2020 Publication	<1%
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45	www.ub.edu Internet Source	<1%

### Ranjit Singh. "Risk Perception of Investors in Initial Public Offer of Shares: A Psychometric Study", Asia-Pacific Journal of Risk and Insurance, 2012 Publication

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#### UNIVERSITI TUNKU ABDUL RAHMAN FACULTY OF ARTS AND SOCIAL SCIENCE DEPARTMENT OF PSYCHOLOGY AND COUNSELLING

#### UAPZ 3023 Final Year Project II

#### **Quantitative Research Project Evaluation Form**

<u>TURNITIN</u>: 'In assessing this work you are agreeing that it has been submitted to the University-recognised originality checking service which is Turnitin. The report generated by Turnitin is used as evidence to show that the students' final report contains the similarity level below 20%.'

Project Title: Knowledge, Risk Perception and Protective Behaviour among Malaysian						
Young Adults during COVID-19 Pandemic.						
Supervisor: Dr. Gan Su Wan						
Student's Name:	Student's ID					
1 Gan Hui Min	1 18AAB04383					
2. Joanatta Elana Tan	2 10A A P02677					
	2. 19AAD03077					
3. Swi Zi Qing	3. 19AAB02755					

#### **INSTRUCTIONS:**

Please score each descriptor based on the scale provided below:

- **1.** Please award 0 mark for no attempt.
- 2. For criteria 7: Please retrieve the marks from "Oral Presentation Evaluation Form".

1. ABSTRACT (5%)	Max Score	Score
a. State the main hypotheses/research objectives.	5%	
b. Describe the methodology:	5%	
Research design		
• Sampling method		
• Sample size		
• Location of study		
• Instruments/apparatus/outcome measures		
• Data gathering procedures		
c. Describe the characteristics of participants.	5%	
d. Highlight the outcomes of the study.	5%	
e. Conclusions, implications, and applications.	5%	
Sum	25%	/25%
Subtotal (Sum/5)	5%	/5%
Remark:		
2. METHODOLOGY (25%)	Max Score	Score
a. Research design/framework:	5%	
• For experiment, report experimental manipulation, participant flow, treatment fidelity, baseline data, adverse events and side effects		

	assignment method and implementation masking		
	(*if applicable with the study design)		
	• For non-experiment, describe the design of the study and data used.		
b.	Sampling procedures:	5%	
	• Justification of sampling method/technique used.		
	• Description of location of study.		
	• Procedures of ethical clearance approval.		
	(Provide reference number of approval letter)		
c.	Sample size, power, and precision:	5%	
	• Justification of sample size.		
	• Achieved actual sample size and response rate.		
	• Power analysis or other methods (if applicable).		
d.	Clear explanation of data collection procedures:	5%	
	• Inclusion and exclusion criteria		
	Procedures of obtaining consent		
	• Description of data collection procedures		
	• Provide dates/duration of recruitment repeated		
	measures or follow-up.		
	• Agreement and payment (if any)		
e.	Explanation of instruments/questionnaire used:	5%	
	• Description of instruments		
	Scoring system		
	Meaning of scores		

Reliability and validity		
Subtotal	25%	/25%
Remark:		
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
3. <b>RESULTS</b> (20%)	Max	Score
a Descriptive statistics	Score	
a. Descriptive statistics:	5%	
<ul> <li>Demographic characteristics</li> <li>Topic specific characteristics</li> </ul>		
<ul> <li>Topic-specific characteristics</li> <li>b. Data diagnostic and missing data;</li> </ul>	504	
<ul> <li>Data diagnostic and missing data.</li> <li>Frequency and percentages of missing data. (if</li> </ul>	J 70	
• Frequency and percentages of missing data. (if applicable)		
<ul> <li>Methods employed for addressing missing data</li> </ul>		
(if applicable)		
<ul> <li>Criteria for post data-collection exclusion of</li> </ul>		
participants.		
<ul> <li>Criteria for imputation of missing data.</li> </ul>		
• Defining and processing of statistical outliers.		
• Analyses of data distributions.		
• Data transformation (if applicable).		
c. Appropriate data analysis for each hypothesis or	5%	
research objective.		
d. Accurate interpretation of statistical analyses:	5%	
• Accurate report and interpretation of confidence		
intervals or statistical significance.		
• Report of <i>p</i> values and minimally sufficient sets		
of statistics (e.g., dfs, MS, MS error).		
• Accurate report and interpretation of effect sizes.		
• Report any problems with statistical assumptions.		
Subtotal	20%	/20%
Remark:		
4. DISCUSSION AND CONCLUSION (20%)	Max	Score
	Score	Score
a. Constructive discussion of findings:	8%	
• Provide statement of support or nonsupport for all		
hypotheses.		
• Analyze similar and/or dissimilar results.		
• Rational justifications for statistical results.		
b. Implication of the study:	4%	
• Theoretical implication for future research.		
• Practical implication for programs and policies.		
c. Relevant limitations of the study.	4%	

d. Recommendations for future research.	4%			
Subtotal	20%			/20%
Remark:				
5. LANGUAGE AND ORGANIZATION (5%)	Max		S	core
	Score			
a. Language proficiency	3%			
b. Content organization	1%			
c. Complete documentation (e.g., action plan,	1%			
originality report)				
Subtotal	5%			/5%
Remark:				
6. APA STYLE AND REFERENCING (5%)	Max		S	core
	Score			
a. 7 <sup>th</sup> Edition APA Style	5%			/5%
Remark:				
*ORAL PRESENTATION (20%)		Sc	ore	
	Student	Stu	dent	Student
	1		2	3
Subtotal	1.0.0			
	/20%	/.	20%	/20%
Remark:				
PENALTY	Max		S	core
	Score			
Maximum of 10 marks for LATE SUBMISSION (within	10%			
with supervisor.				
*Late submission after 24hours will not be graded				
	Student 1	Stu	dent 2	Student 3

#### **\*\*\*Overall Comments:**

Signat	ure:	Date:
5-5		
Notes:		
1.	Subtotal:	The sum of scores for each assessment criterion
2.	FINAL MARK/TOTAL:	The summation of all subtotal score
3.	Plagiarism is NOT ACCEPTAI	<b>BLE</b> . Parameters of originality required and limits approved by UTAR
	are as follows:	
	(i) <b>Overall similarity ind</b>	ex is 20% or below, and
	(ii) Matching of individua	I sources listed must be less than 3% each, and

- (iii) Matching texts in continuous block must not exceed 8 words
- Note: Parameters (i) (ii) shall exclude quotes, references and text matches which are less than 8 words.

Any works violate the above originality requirements will NOT be accepted. Students have to redo the report and meet the requirements in **SEVEN** (7) days.

\*The marks of "Oral Presentation" are to be retrieved from "**Oral Presentation Evaluation Form**". \*\*It is compulsory for the supervisor/examiner to give the overall comments for the research projects with Aand above or F grading.

Action P	an of UAPZ 3023 (group-based)	Final Year P	roject II for Jan & May trimester				1		1
Supervisee	's Name:	Gan Hui Mi	n, Jeanette Elena Tan, Swi Zi Qing						
Supervisor	's Name	Dr. Gan Si	Wan						
5000111301	s Name.	DI. Gall St	Wall						
	Task Description	Duration	Date/Time	Sup	ervisee's	Signature	Supervisor's Signature	Supervisor's Remarks	Next Appointment Date/Time
Methodo Analysis	logy, Data Collection & Data	W1-W2	26/1/2022, 11am	- SAD	¥	£	gansuwan	Finalised the questionnaires.	26/1/2022
-				10 · · ·	<i>An L</i>	0			
Finding & A	Analysis	W3-W6	26/1/2022, 11am	- AN	Ħ	£	gansuwan	Checking reliability test and EDA.	11/2/2022
	Discuss Findings & Analysis with Supervisor		11/2/2022, 3pm	- SAD	भ	£	gansuwan	Checking chapter 3 and 4.	17/3/2022
	Amending Findings & Analysis								
Discussion	& Conclusion	W7-W9	17/03/2022	- SAR	भ	£	gansuwan	Checking chapter 4 and chapter 5.	24/3/2022
	Discuss Discussion & Conclusion with Supervisor		24/03/2022	\$M	對	£	gansuwan	Checking chapter 4 and chapter 5.	
	Amending Discussion & Conclusion								
Submissior	n of first draft*	Monday of Week 10			su	Ibmit the first dra	ft to Turnitin.com to check similarity ra	ate	
Amendme	nt	W10							
Submission	n of final FYP (FYP I + FYP II)*	Monday of W11				fina	l submission to supervisor		
Oral Preser	ntation		Oral Presentation Schedule will be released and yo	our superviso	or will inf	orm you			
Notes:	1. The listed duration is for reference	only, supervi	sors can adjust the period according to the topics and	d content of	the proje	ects.			
	2. *Deadline for submission can not b	e changed, on	e mark will be deducted per day for late submission	1.					
	Source of the supervisers and supervisers s	hould keen a	copy of this record	5 This reco	rd is to be	e submitted toge	ther with the submission of the FYP II		

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Form Number : FM-IAD-004 Rev No: 0 Effective Date: 21 June 2011 Page No: 1 of 1						

FACULTY OF <u>ARTS AND SOCIAL SCIENCE</u> UNIVERSITI TUNKU ABDUL RAHMAN						
Date:4 <sup>th</sup> April 2022						
SUBMISSION OF FINAL YEAR PROJECT /DISSERTATION/THESIS						
It is hereby certified that <u>Gan Hui Min</u> (ID No: <u>18AAB04383</u> ) has completed this final year project entitled <u>"Knowledge, Risk Perception and</u> <u>Protective Behaviour among Malaysian Young Adults during COVID-19 Pandemic"</u> under the supervision of <u>Dr. Gan Su Wan</u> (Supervisor) from the Department of <u>Psychology and Counseling</u> , Faculty of <u>Arts and Social Science</u> .						
I understand that University will upload softcopy of my final year project in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.						
Yours truly,						
Name: Gan Hui Min						

Universiti Tunku Abdul Rahman						
Form Title : Sample of Submission Sheet for FYP/Dissertation/Thesis						
Form Number : FM-IAD-004 Rev No: 0 Effective Date: 21 June 2011 Page No: 1 of 1						

FACULTY OF <u>ARTS AND SOCIAL SCIENCE</u> UNIVERSITI TUNKU ABDUL RAHMAN
Date:4 <sup>th</sup> April 2022
SUBMISSION OF FINAL YEAR PROJECT /DISSERTATION/THESIS
It is hereby certified that <u>Jeanette Elena Tan</u> (ID No: <u>19AAB03677</u> ) has completed this final year project entitled <u>"Knowledge, Risk Perception and</u> <u>Protective Behaviour among Malaysian Young Adults during COVID-19 Pandemic</u> " under the supervision of <u>Dr. Gan Su Wan</u> (Supervisor) from the Department of <u>Psychology and Counseling</u> , Faculty of <u>Arts and Social Science</u> .
I understand that University will upload softcopy of my final year project in pdf format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.
Yours truly,
Name: Jeanette Elena Tan

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Form Title : Sample of Submission Sheet for FYP/Dissertation/Thesis			
Form Number : FM-IAD-004	Rev No: 0	Effective Date: 21 June 2011	Page No: 1 of 1
			0

FACULTY OF <u>ARTS AND SOCIAL SCIENCE</u> UNIVERSITI TUNKU ABDUL RAHMAN
Date: 4 <sup>th</sup> April 2022
SUBMISSION OF FINAL YEAR PROJECT /DISSERTATION/THESIS
It is hereby certified that
I understand that University will upload softcopy of my final year project in per- format into UTAR Institutional Repository, which may be made accessible to UTAR community and public.
Yours truly,
Z
Name: Swi Zi Qing

#### Supervisor's comments on originality report FYP I

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#### FACULTY OF \_ ARTS AND SOCIAL SCIENCE

Full Name(s) of Candidate(s)	Gan Hui Min, Jeanette Elena Tan, and Swi Zi Qing.
ID Number(s)	18AAB04383, 19AAB03677, 19AAB02755
Programme / Course	BACHELOR OF SOCIAL SCIENCE (HONOURS) PSYCHOLOGY
Title of Final Year Project	KNOWLEDGE, RISK PERCEPTION AND PROTECTIVE BEHAVIOUR AMONG MALAYSIAN YOUNG ADULTS DURING COVID-19 PANDEMIC

Similarity	Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)
Overall similarity index: %	
Similarity by sourceInternet Sources:3Publications:9Student Papers:2%	
Number of individual sources listed of more than 3% similarity: <u>N/A</u>	

Parameters of originality required and limits approved by UTAR are as follows:

(i) Overall similarity index is 20% and below, and

(ii) Matching of individual sources listed must be less than 3% each, and

(iii) Matching texts in continuous block must not exceed 8 words

Note: Parameters (i) - (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Signature of Supervisor

Signature of Co-Supervisor

Name:

Name:

Date:

Date: \_\_\_\_\_

#### Supervisor's comments on originality report FYP II

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## FACULTY OF \_\_\_\_\_ ARTS AND SOCIAL SCIENCE

Full Name(s) of	
Candidate(s)	Gan Hui Min, Jeanette Elena Tan, and Swi Zi Qing.
ID Number(s)	
	18AAB04383, 19AAB03677, 19AAB02755
Programme / Course	
_	BACHELOR OF SOCIAL SCIENCE (HONOURS) PSYCHOLOGY
Title of Final Year Project	KNOWLEDGE, RISK PERCEPTION, AND PROTECTIVE BEHAVIOUR AMONG MALAYSIAN YOUNG ADULTS DURING COVID-19 PANDEMIC

Similarity	Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved by UTAR)	
Overall similarity index: <u>10</u> %		
Similarity by source         Internet Sources:       4       %         Publications:       8       %         Student Papers:       4       %		
Number of individual sources listed of more than 3% similarity: <u>N/A</u>		
<ul> <li>Parameters of originality required and limits approved by UTAR are as follows:</li> <li>(i) Overall similarity index is 20% and below, and</li> <li>(ii) Matching of individual sources listed must be less than 3% each, and</li> <li>(iii) Matching texts in continuous block must not exceed 8 words</li> <li>Note: Parameters (i) - (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.</li> </ul>		

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.

Signature of Supervisor

Signature of Co-Supervisor

Name:

Name:

Date:

Date: