

## Impact of COVID-19 Pandemic among Medical Students in a Public University: A Study Protocol

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### Abstract

The COVID-19 pandemic has caused a huge impact towards the teaching and learning activities in medical schools. Due to the outbreak, the curricular activities were shifted to a mainly digitised version of learning format. The purpose of this paper is to present the study design and methodology of a population-based survey on the impact of COVID-19 among medical students. The survey aims to investigate the level of knowledge, attitudes and practices (KAP) on the

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COVID-19 pandemic, the online learning readiness and psychological status among medical students in Universiti Sains Islam Malaysia (USIM). A universal sampling method will be used that involve 475 medical students from Year 1 to Year 6 in USIM. The data collection will be conducted through an online survey. The questionnaire consists of three components: the study of KAP on COVID-19, the online learning readiness and psychological impact of COVID-19 pandemic. Both of the KAP and online learning readiness questionnaire will be adopted, adapted and validated from previous research and will be based on a local study. As for the depression, anxiety and stress, the Depression, Anxiety and Stress Scale (DASS) questionnaire will be used. Duration of data collection is expected to be one month, and findings are expected to be ready by three months from the last data collection date. The exposure variables include sociodemographic factors and years of study, while the outcomes are the KAP scores, online learning readiness level, and DASS scores. Relationships between the outcomes and associated factors will be analysed once data collection is completed.

**Keywords:** COVID-19, medical students, online learning readiness, KAP, DASS

## 1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic is a global health concern approaching 54 million cases and 1.3 million deaths by early November of 2020 (Jaafar & Azzeri, 2020). The COVID-19 infection is very contagious and transmissible causing profound health implications that lead to social, economic, and political upheaval worldwide.

A variety of measures were deployed by governments and public health organizations worldwide to increase awareness, improve knowledge, and to strengthen the preventive measures to control COVID-19 transmission. However, the lack of knowledge about COVID-19 transmission, inadequate understanding of the population at risk, and not being attentive to preventive measures are still widespread among regions and populations. As a result, COVID-19 infections keep on spreading and cause profound morbidity and mortality around the world (Jaafar & Azzeri, 2020).

In the world of education, global academic calendar has been thrown into a state of disarray by the COVID-19 outbreak which cause all public and private institutions at all levels of education including higher learning to adjourn all classes and lectures. As an alternative, they were suggested to pursue classes and learning using any suitable online platforms beginning in April 2020 in order to reduce mass gathering of students (Yusuf, 2020). While this can help mitigate the spread of the virus so as to prevent the transmission of the disease, it is important to bear in mind that the abrupt changes were bound to cause some degree of psychological impact towards the population, medical students included. The mental health consequences that will be observed include depression, anxiety and stress. However, there is a lack of studies that report on online learning readiness and psychological impact especially among medical students. Based on this, we propose a study to determine the impact of COVID-19 among medical students and describe the study protocol here. The primary objective of this study is to determine the association between the sociodemographic factors with 1) the knowledge, attitudes and practices on COVID-19 pandemic, 2) the online learning readiness and 3) psychological well-being among medical students in USIM.

## **2. Methodology & Analysis**

### ***Study Background***

This is a cross-sectional study that will be conducted among Year 1 to Year 6 students studying Bachelor of Medicine and Surgery in USIM. This study will be conducted through an online survey. The study period will commence from the 1 June 2021 to 24 August 2021. A total of 475 medical students will be included in this study through a universal sampling method. This study has three components, which are: (1) knowledge, attitude and practice on COVID-19, (2) the online learning readiness and (3) psychological impact of COVID-19 pandemic towards USIM medical students.

### ***Exposure Variables and Outcomes***

In this study, the exposure variables include gender, educational level, year of study, household income and size, internet speed, history of contact, being tested for COVID-19 and reported COVID-19 symptoms. The outcome variables are knowledge, attitude and practice of USIM medical students on the COVID-19 pandemic, Online Learning Readiness Scale (OLRS), and Depression, Anxiety and Stress Scale (DASS-12).

### ***Study Tools/ Instruments***

This study will be using a questionnaire that consists of 6 sections (Section A, B, C, D, E and F) by which participants are required to answer every question from all the sections. This questionnaire is a combination of modified questionnaires from previous research that has been validated for use in Malaysia. Section A consists of sociodemographic and general information while Section B consists of a series of questions to test the knowledge of the participants on COVID-19. Section C consist of questions on the attitude of the participants towards COVID-19, while questions in Section D are on the practice applied by USIM medical students during COVID-19 pandemic. Section E will be focusing on the online learning components which consists of questions regarding internet access and the ORLS. The last section, Section F, contains the DASS-12 questionnaire for the study of the psychological impact of COVID-19 on USIM medical students.

### ***Data Collection***

Firstly, the questionnaires will be drafted in Word and converted into Google Form. A pilot study will be conducted to determine face validity and for quality improvement of the questions. The questionnaire will be tested among USIM dental students from Year 1 to Year 5 prior to the commencement of the primary survey. The Google Form will be equipped with feedback sections to identify any difficulties faced by respondents while answering the questionnaire. Participants will be encouraged to provide any suggestions in terms of questions or domains that may be important to be assessed as part of the study that might have been missed by the researchers. The questionnaire will be further refined and modified based on the feedbacks received.

For the primary study, the questionnaire will be distributed to each batch from year 1 until year 6 through WhatsApp message. The target participants will be informed on the study background and objectives in the participant information sheet at the beginning of the questionnaire. They will also

be informed on the risk of participating in this study. There are no risks anticipated from participating in this study and they may withdraw from this study at any time. The results from this study will be reported collectively and will not refer to a specific person in the results ensuring confidentiality. The participant will not be charged any fee and will not be compensated for participating in this study.

### ***Data Storage And Management***

All research data and records acquired from the Google Form will be arranged in an organised manner in the Excel spreadsheet before being input and stored in SPSS. The data will also be labelled with codes and a codebook will be prepared beforehand. Two copies of the file will be created and stored in cloud storage, such as Google Drive and Dropbox for backup purpose with password protection. The backups will be labelled and organised to facilitate any data restoration process. New data acquired will be updated daily and stored in both cloud storages. After the data collection period ends, the data will be distributed to fellow researchers for analysis in both Excel and SPSS.

### ***Data Analysis***

Fully completed questionnaires will be extracted from Google Forms and exported to Microsoft Excel 2016 (Microsoft Corporation) for cleaning and coding. All answers will be coded into numerical codes, in ascending form from 1 until the maximum number of answers available. Binary answers will be coded into 0 and 1. All the coding will be inserted in a table with their respective variable names and labels. The table then will be compiled in a codebook, for reference later during data analysis. Descriptive statistics will be used to describe all the variables in the study. Continuous data will be evaluated for normality distribution and will be presented as mean (SD) for normally distributed data or median (IQR) for skewed data. Categorical data will be presented as frequency (percentage). Bivariate and multivariate analysis will be conducted to determine the relationship between exposure variables and outcomes. Bivariate analysis will include chi-square test, independent t-test and correlation test, while multivariate analysis will include multiple linear and multiple logistic regression analysis, depending on the type of variables.

### ***Conceptual Framework***

The conceptual framework is presented in Figure 1. Socio-demographic factors that have been found to influence the knowledge, attitude and practice are gender, year of study and household income. Several studies have found that there was significant difference between practice and gender with female had a higher attitude towards COVID-19 than male (Azlan et al; 2020; Peng et al., 2020; Taghrir et al., 2020). The year of study is another factor influencing level of knowledge, attitude and practice of COVID-19. It has been found that students in higher years of study or clinical students were more likely to have good level of COVID-19 knowledge and practice as they have been exposed to clinical environment, and have better understanding on diseases and its management (Olum et al., 2020; Peng et al., 2020). In addition household income is also one of the factors that influence the level of KAP on COVID-19. Azlan et al. (2020) found that household income showed a positively significant relationship with knowledge level of COVID-19, whereby those who earn below RM3,000 per month had lower score. The same author also reported that household income was associated with practices towards COVID-19. People with income of less

than RM3,000 showed higher level of practices compared to those who earned more than RM12,000 monthly (Azlan et al., 2020). Knowing someone who has been infected by COVID-19 also can influence the level of knowledge, attitude and practice of COVID-19. As Gallè et al. (2020) showed, individuals who knew someone affected by COVID-19 had higher level of knowledge with more correct answers (Gallè et al., 2020). Therefore, these factors could influence the level of knowledge, attitude and practice of COVID-19 and, as such, could be included in the framework contributing to the outcomes.

Factors that could influence the level of online learning readiness among students are sociodemographic factors, which include gender, year of study and internet speed. One of the factors that can contribute to online learning readiness is year of study. A study by Chung et al., 2020 reported that the year of study among the respondents showed some significant differences in their readiness for online learning. Several researches also have found that students in higher year of study exhibited significantly greater level of readiness in the dimensions of self-directed learning, online communication, self-efficacy, motivation for learning, and learner control than students in the lower years of study (freshman and sophomore) (Hung et al., 2010; Ngampornchai & Adams, 2016). Chung et al. (2020) and Hung et al. (2010) found that there was no significant difference in terms of gender in online learning readiness. Another characteristic that could influence the student's readiness of online learning is the internet speed. Geographical area and household income were found to affect the internet speed. As reported by Adnan (2020) in his study among Pakistani higher education students, the majority of students struggled to follow online learning classes because they were unable to access the internet due to monetary and technical issues. Hence, online learning was found not effective in some underdeveloped country. Furthermore, most students preferred the face-to-face learning environment rather than online distance learning as they felt lack of motivation (Adnan, 2020; Nurshahidah et al., 2020).

The COVID-19 pandemic has resulted in many psychological effects. Factors that may contribute to psychological effects include sociodemographic factors (gender and year of study), social support, contact history of COVID-19 and reported COVID-19 symptoms. Several studies have found that females showed higher level of psychological distress (Al-Tammemi, Akour, & Alfalah, 2020; Li et al., 2020; Zhang et al., 2020). However, a research by Cao et al. (2020) reported that there was no significant difference between gender and anxiety level (Cao et al., 2020). Year of study was found to be associated with psychological effects of COVID-19 among students. Li et al. (2020) and Odriozola-gonzález et al. (2020) reported that there was significant difference between the year of study and levels of depression (Li et al., 2020; Odriozola-gonzález et al., 2020). Another factor that can affect psychological impact of COVID-19 among students is their social support. Students who lived alone were found to have significantly increased levels of anxiety (Cao et al. (2020). The same author also reported that student who have a relative or acquaintance that had been infected with COVID-19 was likely to be severely anxious. Hence, contact history is also associated with the psychological effects from COVID-19 among undergraduate students.

### **3. Results and Discussions**

#### ***Knowledge, Attitude and Practice of COVID-19***

Females will most likely score higher than males because female almost always make up the larger proportion of study subjects. Females also commonly take everything more seriously than males as they have more curiosity to know everything than males (Al-Hazmi et al., 2018). The

knowledge level on COVID-19 is expected to have a significant relationship with year of study as reported by Olum et al. (2020) where the highest score for knowledge was scored by fourth year students (Olum et al., 2020). This is also the same with studies by Taghrir et al. (2020) and Ikhlaq et al. (2020) (Ikhlaq et al., 2020; Taghrir et al., 2020). In this study, we also expect that practice to have a significant relationship with gender similar to what Azlan et al. (2020) reported; that females showed better practice score than males. This is because in facing an outbreak, females were proven to be more rational and have a more cautious attitude (Azlan et al., 2020). Presence of contact history is also expected to change the respondents attitude towards COVID-19, as observed in a study by Gallè et al. (2020).

For attitude, gender might have an influence on attitude because in a study by Peng et al. (2020), the researchers reported that females scored better in attitude than males. This may be due to the nature of females that always feel worried more than males, hence they express it in their attitude. The same author also reported that there was no significant relationship between attitude and year of study (Peng et al., 2020).

We believe that there will be a significant relationship between practice and year of study where the clinical students will show better practice because they have more exposure in clinical settings compared to preclinical students. This is similar to a study by Khasawneh et al. (2020). We anticipate that with higher year of study the practices on COVID-19 prevention will be better. In addition, a significant relationship between practice and contact history is also expected as an individual with history of contact with COVID-19 will be more cautious and show better practice in preventing infection (Wu et al., 2004).

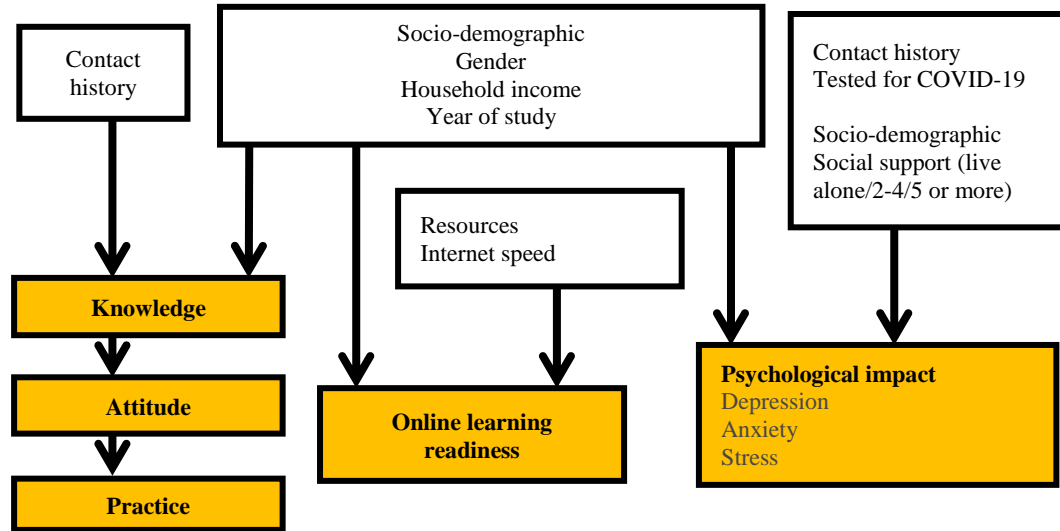


Figure 1: Conceptual Framework

### ***Online Learning Readiness***

In this research, we use Online Learning Readiness Score that was modified and validated by Hung et al. (2010) where it measures five dimensions: Computer/Internet Self-efficacy, Online Communication Self-Efficacy, Learner's control, Motivation in Learning and Self- Directed Learning (Hung et al., 2010). First of all, we expect that the students would have slightly disagree to moderately agree towards online learning. Between the five dimensions, highest level of readiness would be achieved in the dimension of computer/Internet self-efficacy. This can be attributed to the new generation of student nowadays who are exposed to technology from a young age. Hence, they are highly skilled in using technology for learning online. However, technology comes with its own problems, as it can become a distraction for students. The students can browse on the internet during an online class, and therefore it is expected that they will have the lowest score in learner control.

For gender, it is expected that the mean score of readiness for males would be higher than female. This is because males are more acceptable and efficient to receive information using graphics, and in the case of females, complex design of the software or websites would trigger anxiety to use the technology (Nurshahidah et al., 2020). In terms of year of study, it is expected that clinical year students would score higher in all five dimensions of OLRs as senior student are used to self-study and have better communication with their lecturers compared to their junior peers (Hung et al., 2010). As for internet speed, students with low internet connection are expected to be frustrated during online classes especially when they miss the content of the lectures or presentations due to sudden internet interruption. Multiple studies have shown that online learning cannot produce the desired results in developing countries, due to the majority of students inability to access the internet caused by technical as well as financial issues (Adnan, 2020). For household income, the score of OLRs is expected to be the higher in upper-income class students due to more exposure to technology as compared to others. This is because they face less challenges at home and are more likely to have a more conducive online learning space available for them to study (Basilaia & Kvavadze, 2020).

### ***Psychological Impact of COVID-19***

The outbreak of COVID-19 and the changes that comes with it may negatively affect the psychological health of the medical students. We expect that there will be a higher prevalence of depression, anxiety and stress among pre-clinical year student compared to clinical year student as reported by Odriozola-gonzález et al. (2020). This might be explained by the fact that pre-clinical students are still in process of adjusting to the course, while clinical year students have developed their skills in managing their study and have better coping skills for stress (Salam et al., 2013). It is expected that students with good social support will have significant negative association with depression, anxiety and stress. This is supported by a study that reported good family function is associated with lower DASS scores (Li et al., 2020). In terms of history of contact, students with a history of contact with COVID-19 patients and have suffered from COVID-19 symptoms are expected to have higher depression, anxiety and stress scores (Cao et al., 2020; Tang et al., 2020) due to higher levels of paranoia (Roy et al., 2020). This study focuses on factors associated with depression, anxiety and stress among USIM medical students. By observing the association of each factors, it may enhance our understanding of its mechanisms. In the case of high prevalence of depression, anxiety and stress, urgent attention by healthcare professionals may be needed. We hope that with the knowledge from this study university administrators would have a guide on

how to develop intervention plans to improve the mental health among students. Intervention activities such as support groups, yearly screening and early diagnosis to prevent further worsening of the psychological health of medical students would be especially beneficial during the time of COVID-19 pandemic.

#### 4. Conclusion

Overall, this is the first study that investigates the level of knowledge, attitude and practice on COVID-19 and its impact on online learning and psychological well-being among medical students in USIM. The study will be used to inform the medical faculty and the university board of governors on how to make online learning better even after the pandemic ends. Furthermore, the university can use this study to upgrade on its existing counselling service especially to medical students.

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