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FACTORS INFLUENCING THE ADOPTION OF COVID-19 CONTACT TRACING APPLICATION: MYSEJAHTERA IN MALAYSIA 2021

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ABSTRACT

Objectives: The objective of the study is to determine the behavioural intention in using MySejahtera app among the population in Malaysia and to determine the public perceptions according to susceptibility, severity, benefits and barriers in using MySejahtera app among the population in Malaysia during 2021. **Methods**: A cross-sectional online survey was conducted by enrolling Malaysian adults. An online questionnaire was distributed via google form for data collection. Data were analysed using SPSS statistical software. Descriptive statistics was used to summarize the respondents' sociodemographic factors. A Pearson correlation analysis was used to analyse the result of behavioural intention as a dependent variable and other HBM constructs and socio-demographic factors as independent factors. **Results**: Between 80% and 90% in all construct's items were either agree or strongly agree with the items in the behavioural intention and self-efficacy constructs which clearly indicates that participants are clearly eager and highly willing to use the MySejahtera application. Behavioural intentions have positive correlation with perceived severity, cues to action, perceived benefits and self-efficacy. Whereas, the behavioural intention has a negative association with age and perceived barriers. **Conclusion**: In conclusion, our study shows that a significant majority of Malaysians are willing to download and use the MySejahtera app as a step towards eradicating the COVID 19 pandemic. All of the health belief model constructs should be given attention based on our results as they are somewhat associated with the adoption of MySejahtera application among citizens.

KEYWORDS: COVID-19, Contact tracing, MySejahtera app, Behavioural intention, Malaysia.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is defined as illness that is caused by a novel coronavirus also known as severe respiratory syndrome coronavirus 2 (SARS-CoV-2) which was first identified in Wuhan City, Hubei Province, China. This newly found zoonotic virus is affecting people all over the world causing major health crisis globally.[1] With more than 20 million active cases globally and claiming the lives of more than 2 million people worldwide. Many countries have relied on an extrapolation of classic infection-control and public-health measures to contain the COVID-19 pandemic, similar to those used for SARS in 2003. These range from extreme quarantine measures in China (e.g., locking down over 60 million people in Hubei province) to painstaking detailed contact tracing with hundreds of contact tracers (e.g., Singapore, Hong Kong, South Korea).[2,27] Researchers have used both machine learning and deep learning models to study, diagnose and treat COVID-19. Machine learning tools enable the study of large datasets of viral genomes and can therefore increase our foundational knowledge of COVID-19.[3,25] The ubiquity of smartphones and their ability to keep track of their location (e.g., via GPS and WiFi), along with their in-built Bluetooth interface allowing communication and proximity detection with nearby smartphones, makes them ideal devices for automated and reliable contact tracing.[4,20] Contact tracing is a

crucial strategy for reducing the effect of infections like COVID-19 on health care systems and public health in general, and it is expected to slow the spread of infectious diseases as a result.[5] Because COVID-19 symptoms are generic, asymptomatic, and often undetectable in many people, testing alone will not stop the virus from spreading. Instead, contact tracing will speed up the detection of an affected person's contacts, allowing for the prevention of further transmission.[6,19] Optimising testing and tracing coverage and minimising tracing delays, for instance with app-based technology, enhances contact tracing effectiveness, with the potential to prevent up to 80% of all transmissions.[7,28] Contact tracing techniques play an important role in containing the spread of infection especially to avoid longer periods of lockdown which impacts the economic status of many countries. Initially manual contact tracing was used which was proven to be less effective than digital contact tracing. Digital contact tracing is known as a method of contact tracing relying on tracking systems, most often based on mobile devices, to determine contact between an infected patient and a user and is proven to be more effective. DCT gives a diligent and far-reaching method to record and analyze data on people's proximity, location, movement and health status.[8,20] The total efficiency of digital contact tracing apps is determined by the structure of the users' contact networks and mixing behaviour. App users, for example, may engage in more social distance and hence have fewer social interactions than non-users, which would negatively link app usage to exposure and transmission risk.[9,24] The digital contact tracing app that is currently being used in Malaysia is MySejahtera app. MySejahtera, a smartphone application meant to track and trace infections was launched on 10 April 2020 by the Ministry of Health (Othman & Babulal) to confine and isolate afflicted people.[10,17] The government's MySejahtera app has recorded 24.5 million users, this amounts to about 70 percent of Malaysia's estimated 33.5 million population this year. MySejahtera helps the users to perform a self-assessment and monitor progress, as well as allows the MOH to provide any immediate interventions when it is required.[11,1]

The challenge in launching the app is that the effectiveness of the app depends highly on the uptake by the general population. The establishment of the app raised doubts about their design, data handling, effectiveness, privacy and security among the users.[12,21] The factors that influence the citizens' uptake of COVID-19 contact tracing apps still remain a question to many.[13] The app was created recently by the government to contain the infection, however, the citizens condemn this as there are trust issues between the government and the citizens. For example, Israeli legislation has allowed government officials to monitor the mobile phone data of people suspected of infection.[14,22] Concerns and questions on the privacy and ethics of this digital approach have been raised worldwide, which may hamper app downloads and decrease app effectiveness. For example, currently in Australia, the app downloads 40% of the proposed target for it to be considered effective.[15] To date, there is no specific legislation on privacy law that protects the privacy of citizens in Malaysia. The only legislation related to privacy in Malaysia is the Personal Data Protection Act 2010 [Act 709] ("PDPA"), which regulates the processing of personal data in commercial transactions.[16] Furthermore, while safety and effectiveness are important issues, increased regulation for COVID-19 tracing technology did not address other important ethical challenges such as privacy and informed consent.[17] Based on the health belief model, the current study investigates the validity and reliability of the MySejahtera application by examining the factors that influence app use intention (behavioural).[18]

The aim of the research is to study the factors that may influence the acceptance of MySejahtera app. The objective of the study is to determine the behavioural intention in using MySejahtera app among the population in Malaysia and to determine the public perceptions according to susceptibility, severity, benefits and barriers in using MySejahtera app among the population in Malaysia. The purpose of this research is also to determine the level of self-efficacy in using MySejahtera app among the population in Malaysia. It is expected that perceived benefits and self-efficacy such as higher knowledge on how to use the app, the information gained from the app, to protect people from getting infected and perceived susceptibility or perceived risk of getting infected by COVID-19 have a positive effect on the acceptance of the app. Perceived barriers such as privacy concerns have a negative effect on the acceptance of the app.

The importance of this research is to increase the awareness of the importance of using that app by distributing the knowledge on benefits of using the app. It will also encourage many people to install the app and get benefits from it. This research contributes to identifying what is really preventing people from installing the app and clarify or seek solutions for it. The research will also be a great contribution for researchers and practitioners in the field of health promotion and education. It will also contribute more information for the app developers and policy makers.

MATERIALS AND METHODS

Data collection

Our research was carried out in Malaysia, which was one of the top 50 countries with the most total reported COVID-19 cases at the time. Contact tracing technology had been introduced in Malaysia at the time of this report. My Sejahtera is a Malaysian government application designed to aid in the management of Covid-19 outbreaks in the region. Respondents of all ages were asked to take part in the survey. The Asia Metropolitan University provided its approval to the research. The

information was gathered between December 2020 and January 2021.

Sample size calculation

Using the statistical program Raosoft, the calculation of the sample size with the margin error of 5%, confidence level of 95%, response distribution of 50% and population size of Malaysian citizens which is 32.7 million. Thus, the recommended minimum sample size is 385 respondents. A sample of 1025 respondents were recruited. Those participants who were Malaysian and currently residing in Malaysia and aged above 18 years old adults were included in our study. Those who were not Malaysian, currently not residing in Malaysia and those aged below 18 years old were excluded in our study. The study's aims were explained to the participants, and they were asked to give their informed consent. They were then given a quick rundown of the main features of the MySejahtera app, which include proximity detection, anonymous disclosure of positive COVID-19 cases in their vicinity, access to supplementary information, and COVID-19 advice.[3]

Research questionnaires

We used Champion's guidelines to measure Health Belief Model constructs. All responses ranged from disagree to accept on a 5-point Likert scale. Behavioural intention of the respondents was measured with 3 items assessing their willingness on using MySejahtera app. Perceived susceptibility was measured with three to determine respondents' opinions about how likely would COVID-19 disease would impact them. Next, Perceived severity was assessed with 3 items investigating how severe respondents think a COVID-19 infection would be for their wellbeing. Five items were measured in perceived benefits to find the benefits respondents get in using My Sejahtera app. The fifth element is perceived barriers where two things were accessed; the app's privacy concerns and how they could lead to tensions between people with different COVID-19 statuses. The cues that initiated the respondents' usage and adoption of the app were categorised under article, website or shared news through social media. Finally, three components were created to measure self-efficacy, on how convenient the app would be for the respondents to use.[3]

Data Analysis

The data captured in the online google form were examined for errors then cleaned and exported into SPSS statistical software version 25.0. Descriptive statistics were used to summarize the respondents' sociodemographic factors. Descriptive statistics was used to summarize the respondents' sociodemographic factors. Pearson correlation analysis is done between continuous variables of HBM constructs and age of respondents. Correlation coefficients whose magnitude more than 0.5 indicate variables which can be considered highly correlated while less than 0.5 is considered moderate correlated.

Based on all these data analysis, we have chosen Pearson correlation analysis as our main data analysis because it provides a sample correlation coefficient, r, which measures the strength and direction of linear relationships between the pairs of continuous variables. The Pearson correlation determines whether two continuous variables have a statistically important linear relationship. The power of a linear relationship comes next. Finally, it shows whether a linear relationship is increasing or decreasing.

RESULTS

A total of 1025 respondents participated in this survey, who ranged from 18 to 74 years old. According to table 1,The mean age of the respondents was 28.73 with standard deviation (SD) ±12.10. Among those who participated, the percentage of females (63.32%) are relatively higher than males (36.68%). As shown in table 2, Between 80% and 90% in all construct's items were either agree or strongly agree with the items in the behavioural intention and Self-efficacy constructs which clearly indicates that participants are clearly eager and highly willing to use the MySejahtera application. Majority of those who took part in the survey has a high perceived susceptibility to being infected by the COVID 19 virus (N=453, 44.20%). According to table 3, 648 people (63.22%) have a high perceived severity of the health complications that may occur if they were to be infected by the COVID 19 virus. Most people (N= 886, 86.44%) believe that Malaysia's MySejahtera app has many benefits such as it would contribute to knowledge about the spread of the virus, one may be able to be more on guard and take more precautions not to spread the virus and collaborate and help public authorities to combat the pandemic spread. Many people (N=538, 52.49%) have a 50:50 thought of the possible barriers to the usage of MySejahtera app such as it may reduce the user's privacy, and it may give a false positive and increase tensions between individuals who are infected and those who are not. Last but not least, most people (N=918, 89.56%) believe that they have the knowledge and the necessary resources to use MySejahtera app. Even if it is otherwise, they believe that they could get help form others whenever they face difficulties.

Based on the Pearson Correlation test as shown in table 4, behavioural Intentions have mild positive correlation with perceived severity and cues to action with a Pearson Correlation value of 0.16 and 0.17 respectively. On the other hand, the Behavioural Intention has a moderate positive correlation of 0.46 and 0.40 with perceived benefits and self-efficacy. Furthermore, perceived benefits and self-efficacy seem to have a strong positive correlation value of 0.56, which indicates that when the perceived benefits seem to be high it positively affects the public's self-efficacy to being able to use the app. On the contrary, the behavioral intention has a negative association with age and perceived barriers. As in, the behavioral intention is low as the age and perceived barriers increases.

APPENDICES (TABLES)

Table 1: Distribution of study participants based on socio-demographic factors among respondents. (N=1025)

Characteristics	Frequency	N (%)
Age		
Mean & SD	28.73±12.10	
Range	18 - 74	
Gender		
Male	376	36.68
Female	649	63.32
Race		
Chinese	159	15.51
Indian	607	59.22
Malay	239	23.32
Others	20	1.95
Educational status		
No formal education	1	0.10
Primary school	3	0.30
Secondary school	100	9.76
Pre university (Matriculation/A-levels/Diploma)	225	21.95
Tertiary education (Degree/ Masters/PHD)	696	67.90
Occupation		
Full-time	367	35.80
Part-time	39	3.80
Student	545	53.18
Unemployed / homemaker	74	7.22
Marital status		
Single	734	71.61
Married	280	27.32
Divorced	11	1.07
Residency		
Urban	899	87.71
Rural	126	12.29
Monthly income		
<RM4849	727	70.93
RM4850-RM10959	233	22.73
>RM10960	65	6.34

Table 2: Distribution of all individual items of HBM constructs among study participants and their responses among respondents. (N=1025)

HBMB constructs	Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
	Frequency (percentage)				
Behavioral Intention					
I would be willing to use the MySejahtera app	9 (0.88%)	4 (0.39%)	79 (7.71%)	357 (34.83%)	576 (65.20%)
I plan to use the MySejahtera app	9 (0.88%)	21 (2.05%)	132 (12.88%)	315 (30.73%)	548 (53.46%)
I want to use the MySejahtera app in the future	22 (2.15%)	45 (4.39%)	104 (10.15%)	350 (34.15%)	504 (49.17%)
Perceived susceptibility					
I am at risk of being infected by the COVID 19 virus	168 (16.39%)	136 (13.27%)	252 (24.59%)	282 (27.51%)	187 (18.24%)
It is likely that I would suffer from the COVID 19 virus	171 (16.68%)	180 (17.56%)	328 (32%)	228 (22.24%)	118 (11.51%)
It is possible that I could be infected by the COVID 19 virus	132 (12.88%)	118 (11.51%)	275 (26.83%)	315 (30.73%)	185 (18.05%)
Perceived severity					
If I were infected by the COVID	43	72 (7.02%)	237 (23.12%)	378	295 (28.78%)

19 virus, it would have important health complications for me	(4.20%)			(36.88%)	
If I were infected by COVID 19 virus, my health would be severely affected	41 (4%)	85 (8.29%)	297 (28.98%)	351 (34.24%)	251 (24.49%)
If I were infected by COVID 19 virus, my health would be significantly reduced	44 (4.29%)	84 (8.20%)	259 (25.27%)	360 (35.12%)	278 (27.12%)
Perceived benefits					
The MySejahtera app will offer me the opportunity to contribute to better knowledge about the spread of the virus.	10 (0.98%)	20 (1.95%)	143 (13.95%)	404 (39.41%)	448 (43.71%)
With the MySejahtera app, I will collaborate to reduce the spread of COVID 19 virus	8 (0.78%)	31 (3.02%)	163 (15.90%)	367 (35.80%)	456 (44.9%)
Thanks to MySejahtera app, I will be more on my guard when I have face- face contact	11 (1.07%)	28 (2.73%)	173 (16.88%)	365 (35.61%)	448 (43.71%)
Thanks to the MySejahtera app, I will take more precautions not to spread the COVID 19 virus myself	6 (0.59%)	31 (3.02%)	142 (13.85%)	393 (38.34%)	453 (44.20%)
By using MySejahtera app, I will help the public authorities to combat the COVID 19 virus	8 (0.78%)	32 (3.12%)	125 (12.20%)	375 (36.59%)	485 (47.32%)
Perceived barriers					
The MySejahtera app will reduce users privacy	92 (8.98%)	134 (13.07%)	244 (23.80%)	323 (31.51%)	232 (22.63%)
The MySejahtera app will create tensions between individuals who are infected by the COVID 19 virus and those who are not.	118 (11.51%)	177 (17.27%)	338 (32.98%)	266 (25.95%)	126 (12.29%)
Cues to action					
I read an article on the MySejahtera app in a newspaper, or magazine.	164 (16%)	170 (16.59%)	172 (16.78%)	333 (32.49%)	186 (18.15%)
I got to know about the MySejahtera app via the website/app of a newspaper, TV or radio station, or magazine.	85 (8.29%)	85 (8.29%)	185 (18.05%)	344 (33.56%)	326 (31.80%)
I learnt about MySejahtera app through news shared on social media (Facebook, YouTube, Twitter, Instagram, etc).	34 (3.32%)	61 (5.95%)	152 (14.83%)	390 (38.05%)	388 (37.85%)
I learnt about MySejahtera app through news shared through messaging apps (personal messages through WhatsApp, Messenger, etc).	49 (4.78%)	102 (9.95%)	186 (18.15%)	353 (34.44%)	335 (32.68%)
Self efficacy					
I have the knowledge needed to use the MySejahtera app.	8 (0.78%)	8 (0.78%)	79 (7.71%)	352 (34.34%)	578 (56.39%)
I have the necessary resources to use the MySejahtera app.	5 (0.49%)	25 (2.44%)	127 (12.39%)	354 (34.54%)	514 (50.15%)
I can get help from others if I experience difficulties using the MySejahtera app.	14 (1.37%)	39 (3.80%)	173 (16.88%)	321 (31.32%)	478 (46.63%)

Table 3: Distribution of HBM constructs with their respective categories among respondents. (N=1025).

HBM constructs	Frequency (percentage)		
	Low	*Medium*	*High*
Behavioral Intention	9 (0.88%)	118 (11.51%)	898 (87.61)
Perceived Susceptibility	163 (15.90%)	409 (39.90%)	453 (44.20%)
Perceived Severity	42 (4.10%)	335 (32.68%)	648 (63.22%)
Perceived Benefits	6 (0.59%)	133 (12.98%)	886 (86.44%)
Perceived Barriers	98 (9.56%)	538 (52.49%)	389 (37.95%)
Cues to action	12 (1.17%)	319 (31.12%)	694 (67.71)
Self-efficacy	4 (0.39%)	10.05 (10.05%)	918 (89.56%)

The five-point likert scale scoring is added for each construct and categorized as per the three divisions 'low', 'high' and 'medium' accordingly.

Table 4: Pearson correlation analysis between continuous variables of HBM constructs, age among respondents. (N=1025)

Pearson Correlation Coefficients, N = 1025 Prob > |r| under H0: Rho=0								
	Age	**Behavioural intention**	**Perceived Susceptibility**	**Perceived Severity**	**Perceived Benefits**	**Perceived Barriers**	**Cues to action**	**Self-efficacy**
Age	1.00000							
Behavioral intention	-0.15286 <.0001	1.00000						
Perceived Susceptibility	0.12981 <.0001	0.00292 0.9256	1.00000					
Perceived Severity	0.12508 <.0001	0.16080 <.0001	0.43427 <.0001	1.00000				
Perceived Benefits	-0.12552 <.0001	0.45857 <.0001	-0.00727 0.8162	0.14209 <.0001	1.00000			
Perceived Barriers	-0.01842 0.5557	-0.09999 0.0013	0.31808 <.0001	0.25976 <.0001	0.19033	1.00000		
Cues to action	-0.08241 0.0083	0.17490 <.0001	0.10246 0.0010	0.18548 <.0001	0.32660 <.0001	- 0.021140. 30474	1.00000	
Self-efficacy	-0.19375 <.0001	0.40127 <.0001	-0.01088 0.7280	0.08452 0.0068	0.56699 <.0001	0.4990 <.0001		1.00000

Note: Correlation coefficients whose magnitude more than 0.5 indicate variables which can be considered highly correlated while less than 0.5 is considered moderate correlated.

DISCUSSION

Several countries have launched a COVID-19 contact tracing app since the emergence of COVID-19 pandemic. Just like Malaysia, about 50 countries like Ireland, France, Germany, Brazil, Japan and India have launched a contact tracing app. A contact tracing app is an effective public health measure for containing the COVID-19 virus transmission.[6] In this regard, the Malaysian government developed MySejahtera, a mobile application, in collaboration with the National Security Council, the Health Ministry, the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), and the Malaysian Communications and Multimedia Commission (MCMC), to aid contact tracing efforts in the country during the COVID19 pandemic.[14] Our study aimed to investigate the factors influencing the adoption of MySejahtera in Malaysia and to explore the reasons why Malaysians choose to utilise the app and why some choose not to. Experts have agreed that contact tracing apps are essential in curbing COVID-19 as they have the possibility to slow down the spread of the virus, allowing users to perform health self-assessment on themselves and their families and also monitor their health progress throughout the COVID-19 pandemic. Jeffrey Klausner, a professor of infectious diseases at the David Geffen School of Medicine at the University of California, Los

Angeles has stated that the apps could be “another tool in the prevention toolbox”.[6]

Out of 1025 respondents, most of them were females (63.32%) compared to males (36.68%). However, gender did not affect the outcome of the adoption of the MySejahtera application. This can be due to the fact that the online survey was spread to close acquaintances who were females and unexpectedly our research caught the attention of more females compared to males. Similarly a study conducted in Ireland stated that there was heavily skewed toward female participants because their survey invitation gained traction with the online “followers" of a popular female Irish general practitioner who encouraged completion of the survey but did not significantly change the primary outcome measure of willingness to download the App.[7]

In the 1950s, the Health Belief Model (HBM) was proposed to explain preventative health behaviour.[15] Preventive health behaviour refers to the actions performed by a person to avoid getting an illness or to diagnose a disease at an early stage.[16] As one of the most widely used theories of health behavior, the Health Belief Model (HBM) postulates six constructs that predict health behavior: risk sensitivity, risk severity, action benefit, action disorder, self-efficacy, and action cues.[13]

Based on our health belief model, all the constructs such as the behavioural intention, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy were associated with the adoption of MySejahtera application among Malaysians. (87.6%, N=898) of respondents has high behavioural intention. A survey conducted in the Republic of Ireland also showed that the Irish citizens surveyed expressed high level of willingness to download a public health-backed app to augment contact tracing.[7] More than half of the population should use a contact tracing app for it to become effective, says few epidemiologists.[6] According to K.Kathirugan a journalist from Free Malaysia Today, MySejahtera has been downloaded by almost 60% of all mobile phone users in Malaysia as of August 2020 – one of the highest adoption rates in the world (Free Malaysia Today, 2020). Our study sample shows about 87% of respondents intend to use it. So, the adoption of MySejahtera app will be efficient in the eradication of the virus. High percentage of participants (44.20%, N=453) has high perceived susceptibility. Public are aware of the risk of contracting COVID-19. Individuals who have a high perception of susceptibility are more likely to take appropriate measures to reduce their risk of contracting diseases. As the level of protective behaviour in response to COVID-19 rises, so does the level of perceived vulnerability. According to Prati et al.q, those who rate the risk of pandemic infectious diseases as more likely, more severe, or having a greater personal impact evaluate the risk as more likely, more severe, or more dangerous.[8] For example, after examining the community’s psychological and behavioural responses during the early phase of Hong Kong’s COVID-19 pandemic, Kwok et al. found that perceived susceptibility (89%) and perceived severity (97%) are both high.[9,10]

Our results showed that (63.22%, N=648) have high perceived severity. Perceived severity refers to a subjective assessment of the severity of a health problem and its potential consequences. So, our participants are aware of the seriousness of being infected with COVID-19. The more seriously one takes a given health problem, the more one tries to reduce its likelihood of occurrence. Conversely, an individual who underestimates the risk of a disease will engage in less healthy behaviour. As perceived severity increases, preventive behaviour in response to COVID-19 increases. According to Duan et al., risk identification is strongly linked to the public's acceptance of recommended preventive measures.[11,12] Respondents with higher risk thresholds were more likely to take robust precautionary measures against infection during the 2003 SARS outbreak in Hong Kong.[10,13] Among our respondents, (86.44%, N=886) has a high perceived benefit. Perceived benefits mean the sense of efficacy that arises when engaging in health-promoting behaviours to reduce disease risk. Greater perceived benefits increase the level of compliant behaviour in response to COVID-19. People are high likely to adopt the MySejahtera application as they are well aware of the functions and the benefits that the application can provide them. According to Jose et al., 36.9% of respondents felt that they were less likely to benefit from health behaviours because no one has a clear understanding of the pathophysiology and epidemiology of COVID-19.[11,14] Thus, it means that a previous study done also showed that the majority of the respondents have a high perceived benefit. It is proven that Mysejahtera application has an immeasurable number of benefits and the understanding of the severity of the infection has a huge impact on the adoption of the MySejahtera application.[15,16]

When we analysed perceived barriers, we found a percentage of (52.49%, N=538) of respondents having a 50:50 opinion. It shows that people are facing barriers such as privacy issues and conflicting issues on who is infected and who is not when using the MySejahtera application. Greater perceived barriers decrease the level of preventive behaviour.[17,18] A cross- sectional survey study in Australia shows that responses, 25% of participants in their study who did not download the COVID Safe app were concerned about privacy and it was the main reason for the hesitation in downloading the application.[4,19] Since issues of privacy are significant obstacles for application approval, it remains that the privacy design of an application influences its adoption. For example, Singapore’s and Alberta’s DCT protocols need the users to register with a central server, with each phone broadcasting temporary identifiers and

storing the identifiers broadcasted from nearby phones.[20,23] For contact tracing to function, the application should access and analyse confidential information. A citizen's decision to install an app would rely on how the app's privacy is designed based on the sensitivity and monitoring.[21,22]

Our study showed that cues to action have a percentage of (67.71%, N=694). This shows that many people are aware of the existence of the app. As we know, the print media (newspapers, magazines), broadcast media (television, radio) and internet have been reporting extensively on the pandemic since the emergence of COVID-19.[24] They have also been talking a lot about the importance of MySejahtera application. This eventually helped in promoting many people to adopt the usage of MySejahtera application. According to a study in Belgium, cues to action (ie, individuals' exposure to [digital] media content) were positively associated with app use intention. Although a COVID-19 app was not implemented in the country where this study was conducted, several techniques such as conventional contact tracing (via a call centre) or a contact tracing app were discussed in the media and on social media.[25] They found a positive relationship between exposure to (online) information and intention to adopt the app.[3] (89.56%, N=918) respondents have a high self-efficacy which is a majority of them. Self-efficacy indicates that people are highly willing to use the MySejahtera application. Self-efficacy refers to an individual's perception of his/her ability to successfully carry out a behaviour. People who believe they can control the outbreak of COVID-19 pandemic will adopt the MySejahtera application. As self-efficacy increases, preventive behaviour in response to COVID-19 increases. A study conducted in Belgium showed that self-efficacy was the second most important factor in the adoption of MySejahtera application.[3,26]

Behavioural intention has a mild positive correlation with perceived severity and cues to action with a Pearson correlation of 0.16 and 0.17 respectively. Therefore, when the perceived severity and cues to action increases, the behavioural intention to use the MySejahtera application increases to but mildly. Furthermore, behavioural intention has a moderate positive association with perceived benefits and self-efficacy with a Pearson correlation of 0.45 and 0.40 respectively.[27] A study conducted in Korea had stated that perceived severity, perceived barriers, perceived benefit, self-efficacy, poor family health, and media exposure had positive effects on COVID-19 preventive behaviours.[12] This explains why these four health belief model constructs have a positive Pearson correlation. Perceived benefits and self-efficacy have the strongest Pearson correlation of 0.56. This indicates that when the perceived benefits increase, people's self-efficacy increases as they know that the application has a lot to offer them so they tend to make sure that they are able to adopt the MySejahtera application in order to combat the COVID-19 pandemic.

Behavioural intention has a negative correlation with perceived barriers and age. The higher the age and the perceived barriers, the lower the behavioural intention in acceptance of MySejahtera application. Usually as people age, their health weakens, and it is natural that older people's chances of defensively pursuing health-related behaviours are greater. Similarly, a study in Korea also showed that people in their 40s exhibited less preventive behaviour than did people in their 30s.[12,28] Our study also shows that older people have a low behavioural intention compared to younger age groups.

Digital contact tracing is a sustainable measure that can reduce levels of COVID-19 transmission. A rigorous assessment of its effectiveness allows public-health benefits to be weighed against unwanted effects for individual people and society. Stringent evaluation is needed to develop contact-tracing apps into an accepted and ethical tool for future outbreaks of other infectious diseases.[26] The effectiveness of contact tracing apps depends on the general public's uptake. Therefore, to improve the percentage of uptake of MySejahtera application, health belief factors should be considered. To spread awareness of COVID-19, public relations efforts are required; health promotion initiatives must be developed within the local community, and a human network of support must be created.

STRENGTHS AND LIMITATIONS

The sample study was obtained only from the public in Malaysia using an online questionnaire. Even though our sample size was only 385, we managed to obtain a larger sample (N=1025). However, our sample compromised smartphone users who eventually have the application and those people who have access to Internet and there was a selection bias effect as we would not have really obtained the perception of people who don't own a smartphone and those who don't have the facility of Internet on MySejahtera application. If those taking part in this study are more or less likely to download the contact tracing application compared with those who did not take part, then willingness to download at a population level may be different to this study's estimates. In the online surveys, there is uncertainty over the validity of the data collected and sampling. Moreover, the opinions of illiterate people or those who had no internet cannot be cast. Furthermore, some of the terms used in the questionnaire might not have been understood by all our respondents as the level of education varies and some people might have not participated due to this reason. Moreover, this online survey was not multilingual. Since we used vignettes to describe several concrete options and their combinations to assess how respondents would be willing to adopt the app based on specific characteristics, potential researchers might use vignettes to describe several concrete options and their combinations to assess how respondents would be willing to adopt the app based on specific characteristics.

CONCLUSION

Our study indicates a significant majority of Malaysians express a willingness to download MySejahtera application which aims to augment our existing contact tracing process. The more the people who utilize the MySejahtera application, the more effective it will be in the eradication of the COVID-19 pandemic. It is very crucial to encourage the public to use the MySejahtera application. All of the health belief model constructs should be given attention based on our results as they are associated with the adoption of MySejahtera application among citizens. When the public understands the public health benefits of the MySejahtera application then it will help in maintaining the public health benefits of this application.

AUTHORS CONTRIBUTIONS

TMK: Conceptualization, Methodology, Software, Analysis and Manuscript Write up. HRV: Data curation, Writing- Original draft preparation. MGS: Visualization, Investigation. KSR: Supervision: KC: Software, Validation.: Sun Qi: Writing- Reviewing and Editing. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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CONFLICT OF INTEREST

There was no conflict of interest.

ETHICAL APPROVAL

The ethical approval was acquired from the Centre of Research and Development, Asia metropolitan University (No. AMU-CRD-FRM006; REV: 00), which is in accordance with the Declaration of Helsinki. Participants undergone informed consent prior to enrolment of the study.

CONSENT

All the participants were provided with informed consent before commencement of the survey.

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