A Review and Conceptual Development of Factors Influencing Patients' Satisfaction of Telemedicine and Their Preference Post the Pandemic Era

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1. Introduction

The term Telemedicine is no longer foreign to most people. Computers being at the center of modern communication since the advancement of the internet, has played a key role in the development of network technology. As the internet expands its capabilities along with digitalisation, computerised machines and devices (e.g., mobile phones, wearables, etc.) are becoming more accessible and can be operated (e.g., through mobile applications) by anyone. This has namely allowed the development of telemedicine(1). In the broadest sense, telemedicine refers to the overcoming of temporal and/or spatial distances of medical situations in the interests of improving the health of individuals and their communities(2).

Mentioned often in conjunction with the development of Information and Communication Technology (ICT) in healthcare, telemedicine is a form of healthcare delivery under the Telehealth umbrella (see Fig. 1) that offers remote clinical services in the areas of diagnostics, treatment, prevention and rehabilitation as well as medical decision-making advice(3, 4). This mainly involves the measurement, collection, and transmission of information or the application of medical procedures by means of ICT between doctors or between doctors and patients(5).
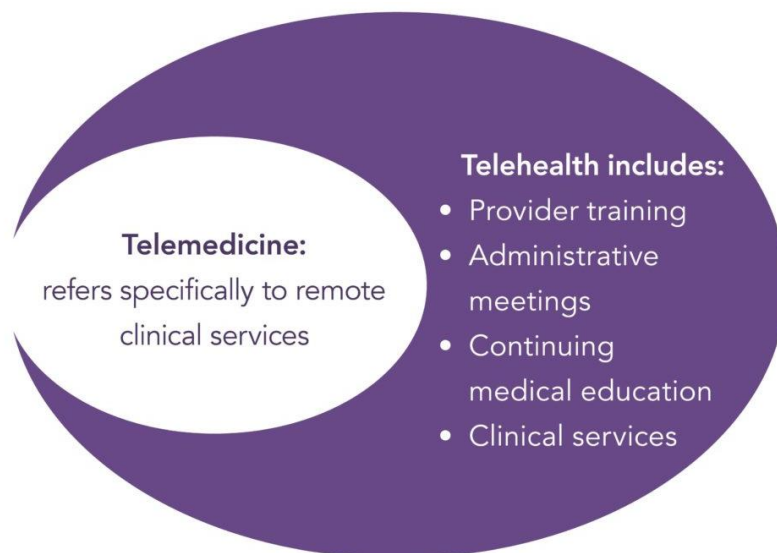
Figure 1 Telehealth-Telemedicine Definition
SOURCE: Health Resources and Services Administration, courtesy of Texas Health Improvement Network.

The groundwork for current telemedicine was actually set in the 1960s and 1970s through steady development of medical imaging technology and continued funding for initiatives to provide remote healthcare to rural communities. Then this had a giant leap due to the development of the internet and digital society in the late 1990s and early 2000s(2). So, the infrastructure for telemedicine has been around for a while and the need to adopt telemedicine has been stressed by industry players for years, but because of lack of awareness and infrastructure the progress and implementation has been put stagnant. However, the urgency that emerged, when the World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-19) outbreak as a pandemic on March 11th, 2020, has accelerated the development and implementation of telemedicine internationally(6-8).

Before COVID-19, telemedicine was offered on a limited basis, mostly for patients who lived in rural areas and had trouble going to medical facilities. And it has started showing growing interest and has proven helpful. Still, many people didn't know about this option until the pandemic came and the strict measure of movement control was placed. People are forced to look for another way to contact their doctors. Thus, new, different approaches are crucial in the new normal situation and on a large scale, healthcare providers rapidly started implementing telemedicine and digital health.

This was found very helpful and the effect it gives to the healthcare providers and the patients are immensely big. The convenience of telemedicine gives not just patients but also doctors a more efficient time and cost management, and during the pandemic condition, safety. They were able to continue having medical appointments while being kept safe within their homes. For ones infected and doing quarantine was it also a big help, as they didn't have to rely on others and were able to e.g., drive them to the hospital to get their health checked or get medicines. Some private hospitals, private companies, also government-funded healthcare providers started applying the technology of telemedicine and provided their patients with a more accessible way to get in touch with the doctors during the very strict contact restriction. The form of telemedicine used for primary care is usually given via phone or video calls or even chat, doctors could give patients guidance for non-emergency medical issues that don't require them to see the patients in person.

The Malaysian Government has envisioned implementing Telehealth in the country healthcare system by developing the Malaysia's Telemedicine Blueprint in 1997. It was

restructured and reorganized in 2000 and 2007 respectively, and some work was started to look at the regulations of online health service, but it hasn't been revised to today's standard of telemedicine(9, 10). In order to stop the spread of the virus, telemedicine is the best method for minimising patient transfer to hospitals and allocating hospital resources to situations that are more critical. It offers the alternative for providing healthcare to patients during the pandemic and bridging the gap between people, doctors, and healthcare systems. The Malaysian government also has made the MySejahtera and MyTrace apps available as an attempt to battle the spread of the virus through contact tracing.

After struggling to gain attraction prior to the pandemic, Malaysian private healthcare providers discovered a new potential for growth of telemedicine. The Sunway Medical Centre Velocity (SMCV) established a teleconsultation service to enable patients to get health advice from specialists or medical officers. Parkway Pantai of IHH Berhad Group also launched a teleconsultation called eHealth Video Consultation at its hospitals in Malaysia. All the while telemedicine service providers such as SpeedyDoc, DoctorOnCall, and Doc2Us have already leave their marks in the digital healthcare scene before telemedicine gained this massive interest amid the pandemic(6). In February 2020 Malaysia's Ministry of Health teamed up with DoctorOnCall to develop a customised virtual health advisory platform from both the public and healthcare professionals to address public concerns and panic about Covid-19(1, 11).

2. Problem Statement

Since many patients postponed and/or were declined in-person visits due to the COVID-19 pandemic's rapid spread, there was a marked increase in the demand for telemedicine solutions. For consultations to discuss diagnoses and treatment options with patients in non-critical cases, hospitals and clinics all around the world have moved to videoconferencing. The United State of America's Department of Health and Human Services said that a 63-fold increase was made in the number of telehealth visits, from 840,000 in 2019 to 52.7 million in 2020(12, 13). Numerous telehealth businesses noticed an increase in demand for their services as a result of the travel limitations brought on by the pandemic. For instance, Halodoc, an Indonesian telemedicine service provider, discovered a ten-fold rise in active users in 2020(14). The daily teleconsultations for Doc2Us, a Malaysian telemedicine service

provider, averaged 300 calls per day before the pandemic and noted between 1,000 and 1,500 teleconsultations each day since the lockdown(15).

However, now that the pandemic urgency is almost over, the world opens again. People can now almost go back to the previous ways of doing things. But the economy began to recover, the growth rate has begun to slow down in 2022. Doc2Us founder, Dr Choy, claims that Doc2Us is not witnessing an exponential increase in the number of consultations, the number of teleconsultations in 2022 has stayed constant at between 1,000 and 1,500 calls daily(15). Although there is little question that telehealth has been extremely helpful in addressing the COVID-19 issue, the future of telehealth is still largely unknown. There are differing views regarding the usage of telehealth after COVID-19. Therefore, a constant review, in-depth look into patients' perception of telemedicine, evaluation, and innovation is crucial and should be conducted in order to the quality and accessibility of remote healthcare service post the pandemic era.

Most of previous studies have resulted high satisfaction rate of the use of telemedicine during COVID-19, both patients' and doctors'(16-20). There are plenty of articles studying patients' satisfaction and preference on telemedicine, but most were conducted in America, the UK, European countries, and other Asian countries, where telemedicine has been around longer and progressed more. They are also more specific on the usage of telemedicine on different medical specialties. There is, however, a limited number of studies on telemedicine in general in Malaysia as telemedicine is relatively new in the country.

The telemedicine market was overall positively impacted by the COVID-19 pandemic. It raised awareness of telemedicine options, showed the capability of people in adapting to the new technology, and it raised market investment activity. So, noticing the slowing down of telemedicine market growth in 2022, it is essential for the continuity of it, to monitor the trend of health care through the patients' satisfaction level and preference, and to discover what factors affect them.

3. Research Questions and Objective

As Telemedicine became very convenient and was highly used during COVID-19 worst phase when it wasn't recommended to go outside because of the diseases, the continuation of

telemedicine usage past the pandemic is questioned. The paper is going to be conceptualizing the study on the satisfaction rate of patients of their experience with telemedicine and to see whether they have the intention to use this form of healthcare service in the future, post the pandemic phase in Malaysia. The research questions would be:

- Were patients satisfied with the current telemedicine service in Malaysia during COVID-19?
- And now after the pandemic, would prefer it over in-person service?
- Which factors affect the satisfaction and preference of telemedicine?

The objective of this conceptual paper would be to determine the most used factors and methods in studying patients' satisfaction and preference of telemedicine and develop hypotheses and a conceptual framework for the empirical study.

4. Research Significance

Telemedicine service providers and other healthcare providers need to keep track of the health care trend and figure out whether the patients that have used telemedicine during COVID-19 were satisfied with the service and whether they'd prefer it over in-person consultations. Knowing which factors affect their satisfaction and preference could help in customizing the telemedicine management more accordingly in order to maintain the market that was boosted by the virus' spread.

5. Literature Review

Review of literatures of studies and articles related and relevant to the topic of this paper was conducted in order to gain insights of current situation and knowledge. This is a process of screening published articles on a specific subject with the objective to fully understand the topic and find the gap within those articles.

A high satisfaction level of telemedicine is associated with usefulness, ease to learn how to operate the virtual visit platform. Though there is very few agreement on virtual visit providing similar care to in-person visit(21). Some studies suggest that patients' high

satisfaction rate is the result of decreased cost for health service through telemedicine and that they'd prefer in-person care when they have to pay out-of-pocket cost(18, 22).

Telemedicine is undoubtedly a very convenient tool that has helped maintain the progression of medical care during the pandemic. Convenience, efficiency, privacy, and comfort are described as important to consider when deciding between video visits and in-person visits(19, 22, 23). Those with stable internet connection had significantly higher satisfaction rates(16, 19), and technical problems are constantly mentioned in previous studies(24, 25).

Expectation Disconfirmation Theory (EDT)

The EDT model has also been applied to studies of patient satisfaction in the healthcare industry, including those involving medication-related services, surgical treatment outcomes, waiting times for surgery, emergency department services, and eHealth Website user, including telemedicine(26). According to EDT, satisfaction is characterised as a consumer's assessment that a product or service delivered a satisfying level of consumption-related fulfilment. Satisfaction is also characterized by consumers' preconsumption expectations of a product or service and expectation disconfirmation.

Telehealth Usability Questionnaire (TUQ)

This questionnaire is used the most in articles for researching satisfaction on telemedicine(27). Parmanto et al. in 2016(28), formally introduced TUQ. The TUQ was created as a thorough questionnaire that addresses every aspect of usability, including usefulness, ease of use, effectiveness, reliability, and satisfaction. The term "usefulness" relates to how users believe a telehealth system operates in order to deliver a healthcare interaction or service that is comparable to a conventional in-person encounter(29). To encourage quick task completion, the system should be simple to learn and use. Interaction between the patient and the computer system or telemedicine technology is measured as interface quality. This covers the graphical user interface's quality, navigation's simplicity, and the patient's overall experience using the telehealth system. The level of audio and visual quality as well as how closely the telehealth connection between the patient and the doctor resembles an in-person interaction are all considered to be aspects of interaction quality(30). Reliability refers to how easily the user can recover from an error and how the system

provides guidance to revert this error. Last factor covers the overall satisfaction of the user with the telehealth system and how willing the user would be to use the system in the future.

Technology Acceptance Model (TAM)

This model was presented by Davis in 1989(31). The primary factors influencing an individual's intention to use a new technology are perceived ease of use and perceived usefulness. This model's emphasis on the perceptions of the potential user is its defining characteristic. That is to say, even while a technology product's inventor may think it is practical and user-friendly, the product won't be accepted by potential customers until those consumers also have the same opinions. "Perceived usefulness" is defined as the extent to which a person believes that using a given technology or innovation will increase labour productivity and, as a result, performance within their organisation. The term "perceived ease of use" describes how much a person feels that utilising a new technology doesn't involve a lot of physical and mental effort. Thus, if he believes he's not going to exert too much effort, he will be more willing to use the technology(32).

SERVQUAL

The SERVQUAL model is one of the best and most popular models for assessing service quality in the healthcare industry. The SERVQUAL technique seeks to comprehend how clients view service quality.
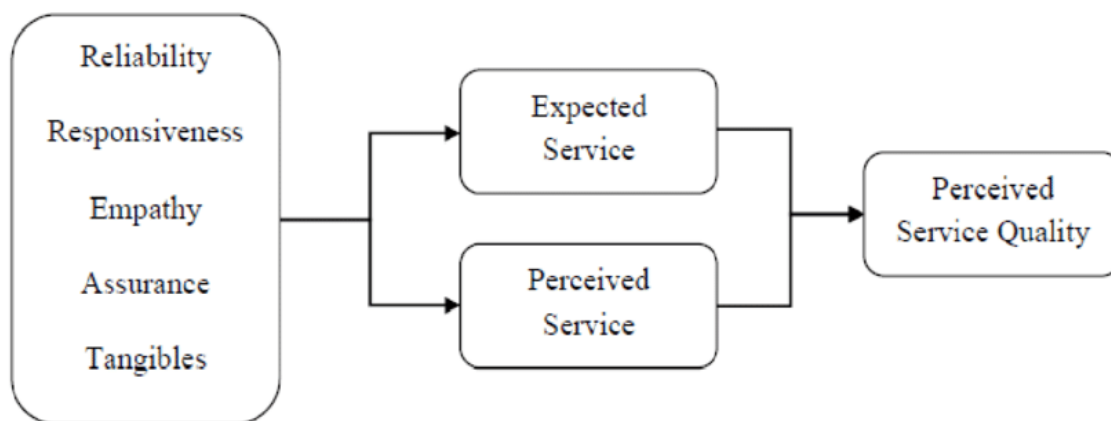

Figure 2 SERVQUAL Model (Parasuraman et al., 1988)

The level of expectation and performance of service quality is measured by five dimensions; tangibles, reliability, responsiveness, assurance, and empathy(33). Tangibles account for

physical facilities in the clinics, the equipment, and the appearance of the personnel. Reliability means the ability to deliver the treatment dependably and accurately. Responsiveness is where healthcare workers are willing to attend to all patients and give prompt service. Assurance is reflected from employee's knowledge and courtesy, as well as their ability to convey trust. And lastly, empathy is seen as a caring and individualized attention a hospital provides to its patients(33, 34).

6. Research Methodology

Review of previous literatures was done to determine the factors affecting and associated with patients' satisfaction and preference of telemedicine. Keywords used to search for the articles were telemedicine, satisfaction, preference, perception, COVID-19, and combinations of the words. The 24 articles were collected from PubMed, Elsevier, Research Gate, JAMA, and Google Scholar. The studies gathered were conducted between 2017 to 2022, but mostly were 2021 and 2022. Most of these studies took place in the United States of America, but also South America, European countries, Saudi Arabia, Malaysia, and other Asian countries. Information from these articles was tabulated and organized in order to categorize the dependent, independent, moderating, and mediating variables. Method, data analysis, conclusion, limitation, and recommendation were included in the table. Three articles were excluded for irrelevance and other two because these don't observe patients' satisfaction as the dependent variable, resulting in 19 articles in total. The variables from the 19 articles were then sorted per frequency for the most frequent used factors in researching patients' satisfaction and preference. Another table was then made to further sort the categories.

7. Findings and Conceptual Model Development

The finding of this paper is the frequency analysis on the variables relevant and associated with patients' satisfaction and preference on telemedicine.

Variables	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	sum
Patient Satisfaction	x	x	x		x	x		x	x		x	x	x	x	x	x		x	x	x	x	x		x	19
Convenience		x				x		x	x	x		x	x	x	x			x		x	x	x	x	x	15
Technical Aspect								x		x	x	x	x	x	x			x	x	x		x	x	x	13
Patient Preference		x				x		x			x	x		x		x		x			x				9
Service Quality		x	x		x			x				x							x		x			x	8
Accessibility		x						x	x	x				x				x			x				7
Similarity to f2f Interaction					x			x										x			x			x	5
Perceived Usefulness	x		x					x						x											4
Intention of Use			x			x						x											x		4
Interaction Quality	x													x		x									3
Privacy Concern		x					x						x												3
Scheduling									x	x						x									3
Reliability	x													x											2
Ease of Use	x		x																						2
Patient-Physician Relationship													x			x									2
Type of Telemedicine					x				x																2
Internet Connection					x																		x		2
Education on Technology		x								x															2
Safety															x					x					2
Attitude									x																1
Availability																			x						1
Efficiency																				x					1
Usability												x													1
Interface Quality	x																								1
Confidentiality Concern		x																							1
Device Cost		x																							1
Communication bw. Staff		x																							1
Flexibility		x																							1
Job			x																						1
Usage Behaviour			x																						1
Gender					x																				1
Age						x																			1
Income						x																			1
Race						x																			1
Education Level						x																			1
Ease of Med. Report Transfer									x																1
Urgency										x															1
Physician Contribution											x														1
Missed Appointment Rate												x													1
Logistics																x									1

Table 1 Frequency Analysis
A= Article, f2f= Face-to-face

Out of the 24 articles screened, three articles were removed as they were deemed irrelevant to the topic, and thus, out of the remaining 21 articles, 40 variables were identified. Out of the 40, nine variables are highlighted as they each have a frequency of minimum four, therefore they are considered significant, as these were repeatedly found in the articles and thus indicate the importance of these factors in affecting the patients' satisfaction and preference (see Tab. 1).

All nine variables were then categorized per its' position in the respective articles; patients' satisfaction, preference, convenience, technical aspect, service quality, accessibility, similarity to face-to-face interaction, perceived usefulness, and intention of use. As a result, two more articles were removed as these articles didn't focus their studies on patients' satisfaction and preference on telemedicine as the dependent variables, which made one of the seven variables insignificant; intention of use (see Tab. 2).

	A1	A2	A3	A5	A6	A8	A9	A11	A12	A13	A14	A15	A16	A18	A19	A20	A21	A22	A24	I	Mo	Me
Patient Satisfaction	D	D	D	D	D	Me	D	D	D	D	Me	D	D	D	Me	D	D	D	D			3
Convenience		I		I	I	I			I	I	Mo	I		I		I	I	I	Mo	11	2	0
Technical Aspect					I		I	I	I	I		I		I	Mo	Mo		I	Mo	8	3	0
Patient Preference		D			D	D		D	D		D		D	D			D					
Service Quality		Mo	I	I			I			I						I		I	I	7	1	0
Accessibility		I					I	I			Mo			I			I			5	1	0
Similarity To F2F Interaction			I		I									I			I		I	5	0	0
Perceived Usefulness	I		I				I				I									4	0	0

Table 2 Significant Variables
A= Article, f2f= Face-to-face, D= Dependant variable, I= Independent variable, Mo= Moderating variable, Me= Mediating variable

And all the other six variables were deemed significant for the conceptual framework as independent variables: convenience, technical aspect, service quality, accessibility, similarity to face-to-face interaction, perceived usefulness, as more than four articles mentioned these variables. No moderating and mediating variable is incorporated as none is considered significant for the study. From these variables a conceptual framework is created, to visualize the connection between each of them and to develop hypotheses. (see Fig. 2)

a. Patient satisfaction and patient preference

Patients' satisfaction is a variable used to measure a patient's perception of the quality of the care they received via telemedicine and patient perceptions of telemedicine are typically assessed as patient satisfaction in the literature.

Since COVID-19, the option of telemedicine is acknowledged by most of the population, unlike before. Those who had good experience using the service would typically choose virtual visits over in-visits for the convenience they found in it.
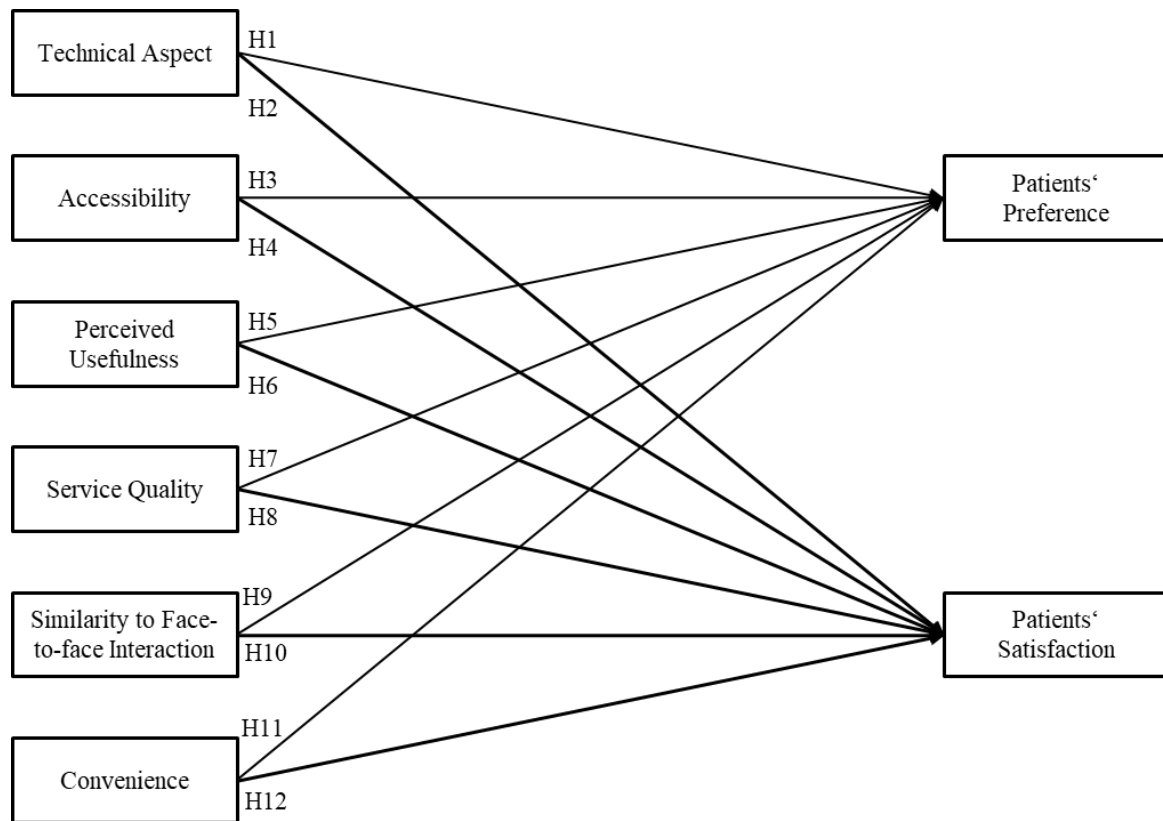
Figure 3 Conceptual Framework
H= Hypothesis

b. Technological aspect

Under this term is the technological view from both sides of the system; clinicians and patients. Quality of interface, audio quality, and video quality are included in this factor. Internet connectivity, digital literacy, availability of devices, and knowledge to use the technology are also part of it.

Internet access, stability, and speed is a common issue and concern that revolves around telemedicine. Confusion on managing digital medical data, prescription, etc. is not rare either(16, 19, 23, 38). Multiple studies show that people who are technologically literate and comfortable in using smartphones, laptops etc. are more willing and prefer to use telemedicine, they find it easy to learn and operate it(25).

H1: technological aspect influences patients' satisfaction on telemedicine
H2: technological aspect influences patients' preference of telemedicine

c. Accessibility

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How easy it is to get access to medical advice, diagnosis, and medicine from different medical specialties from different healthcare providers is what accessibility refers to. During the pandemic, healthcare providers tried hard to deliver medical service to the mass amid the chaos in the hospitals because of the overwhelming number of infected patients. Telemedicine enabled this through mobile applications, website, even phone calls(37, 39). Patients don't have to go the distance to get the care they need and those in a more rural area also have the easy access to healthcare(24, 38), and this was shown to have effect on patients experience and their preference.

H3: Accessibility influences the patients' satisfaction on telemedicine
H4: Accessibility influences patients' preference of telemedicine

d. Perceived Usefulness

This term refers to how useful and helpful has telemedicine been for the patients. This factor is used and observed in TAM and TUQ. Patients perceive telemedicine as useful when they feel it has provided them with the care they need in a timely manner(21). This has shown to influence patients satisfaction(37) but not necessarily for everyone, as a study shows that patients think telemedicine is only useful for people in rural area(40).

H5: Perceived usefulness positively influences the patients' satisfaction on telemedicine
H6: Perceived usefulness positively influences the patients' preference of telemedicine

e. Service Quality

There are many factors that are important to observe in how patients determine the quality of service they get. In articles studying hospital service quality, the SERVQUAL model is quite common in these studies. This term is a more general factor leaning towards the care and output quality patients get through telemedicine. Studies have compared the perceived service quality of in-person visits and video visits to identify the level patients' satisfaction and preference between the two services(16, 41, 42).

H7: Service quality influences patients' satisfaction on telemedicine
H8: Service quality influences patients' preference of telemedicine

f. Similarity to Face-to-Face Interaction

The most that came up in this regard in previous articles is how telemedicine lacks personal feel. Some patients didn't feel comfortable talking with their doctors through the screen, while some other found it completely unproblematic(17). Some didn't feel connected with their doctors during consultations via telemedicine as they would face to face(19). Concerns about not being adequately examined because through telemedicine one lacks the physical interaction were prevalent(39).

H9: Similarity to face-to-face interaction influences the patients' satisfaction on telemedicine

H10: Similarity to face-to-face interaction influences the patients' preference of telemedicine

g. Convenience

This plays a virtual role for telemedicine. Convenience is the main reason telemedicine was utilized when the pandemic hit, telemedicine is capable of delivering healthcare to the people conveniently in their homes. Time patients spend in the waiting room to meet the doctors could sometimes be very long, especially when the hospital is overwhelmingly crowded. Also, some patients have to spend a great deal of time on the road to go to the hospital. Additionally, administration process takes time and those who got prescriptions would need to spend even longer in the waiting room to get their medicines. Convenience also includes the minimum cost it'd need to receive healthcare service through telemedicine. Even without prior experience of telemedicine, there are many that are open to use the service for its convenience(18, 43-45).

H11: Convenience influences the patients' satisfaction on telemedicine
H12: Convenience influences the patients' preference of telemedicine

8. Conclusion

A literature review of previous studies was carried out and gave result, out of 24 initial articles, to six most used independent variables in investigating patients' satisfaction and

preference of telemedicine. And that patients' satisfaction of previous experience of using telemedicine has a moderating effect on their preference.

To test this conceptual paper, an empirical study is intended. By conducting a cross-sectional study, adopting a quantitative method. By sending out questionnaires to patients in Malaysia who have experienced using telemedicine during COVID-19 period, to collect data on their perception and level of satisfaction of the telemedicine service they received, and what their preference is after the movement control measure is lifted and the virus is no longer jeopardizing anyone's health. The random sampling method could be used to reduce sampling bias.

And so, the hope is that the intended study can help healthcare service providers get a glance of how patients perceive the telemedicine service, so that they could manage their business, allocate the resources more efficiently and accordingly. Ultimately this is so that people are comfortable in choosing either delivery of healthcare service, directly from the hospital or from the comfort of their own homes, knowing they would receive the same quality of health advice and treatment despite the lower cost and less physical interaction.

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