



# Characteristic of Patients Attending Virtual Clinics and their Feedbacks during Covid-19 Pandemic: A Malaysian Urban Private Health Care Experience

Ong Wei Chi<sup>1</sup>; Edwin Tan<sup>1</sup>; Wong Sok Yee<sup>1</sup>; Wee Tong Ming<sup>2</sup>; Soo Chun Ian<sup>2</sup>; Nurul Yaqeen Mohd Esa<sup>2\*</sup>

<sup>1</sup>Department of Respiratory Medicine, Sunway Medical Centre-Velocity, 55100 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur.

<sup>2</sup>Department of Clinical Research Centre, Sunway Medical Centre, Bandar Sunway, 47500 Petaling Jaya, Selangor.

**\*Corresponding Author(s): Nurul Yaqeen Mohd Esa**

Department of Clinical Research Centre, Sunway Medical Centre, Bandar Sunway, 47500 Petaling Jaya, Selangor.  
 Email: n\_yaqeen@yahoo.com

Received: Jul 02, 2022

Accepted: Aug 29, 2022

Published Online: Aug 31, 2022

Journal: Annals of Community Medicine and Primary Health Care

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

Copyright: © Esa NYM (2022). *This Article is distributed under the terms of Creative Commons Attribution 4.0 International License*

**Keywords:** COVID 19; Pandemic; Satisfaction; Teleconsultation; Tele-health usability questionnaire (TUQ).

## Abstract

**Background:** Coronavirus disease 2019 (COVID-19) pandemic has profoundly increased utilization of tele-medicine worldwide, particularly virtual visit, also known as tele consultation to replace majority of traditional in-person visit to continue deliver care whilst reduce risk of transmission to both healthcare provider and patients. In Malaysia, tele consultation allowed continuous outpatient care and timely follow-up visit when movement control was employed against COVID 19 outbreak. As tele consultation was not popular in Malaysia before pandemic, this study aimed to determine demographic characteristic and feedback of patients attended teleconsultation through video conferencing using a tele-medicine satisfaction survey.

**Subjects and methods:** Online tele-medicine survey was sent to patients attended teleconsultation between March, 2020 to November, 2020 via WhatsApp. Tele-health usability questionnaire (TUQ) was used to assess patient satisfaction in term of 1) usefulness, 2) ease of use and learn ability, 3) interface quality, 4) interaction quality, 5) reliability, and 6) satisfaction and future use of teleconsultation. Patients gave their feedback based on 7-point Likert scale.

**Results:** In total, 150 responses were gathered. Average score of each aspects and total average score were higher than 5. Usefulness had the highest score whereas reliability had the lowest. According to the responses, teleconsultation system used in present study was easy to learn and use, patients agreed teleconsultation is an acceptable way of healthcare delivery, they were able to have satisfactory interaction and communication with healthcare provider and they liked using it.

**Conclusion:** Overall, patients showed positive response to virtual clinic visit and its utility as alternative healthcare delivery.



**Cite this article:** Esa NYM, Chi OW, Tan E, Yee WS, Ming WT, et al. Characteristic of Patients Attending Virtual Clinics and their Feedbacks during Covid-19 Pandemic: A Malaysian Urban Private Health Care Experience. *Ann Community Med Prim Health Care*. 2022; 1(1): 1004.

## Introduction

Tele-medicine is the use of Information and Communication Technologies (ICT) to facilitate exchange of medical information and increase access to healthcare by overcoming geographical barrier [1]. It has broad applications involving transfer of medical information, consultation, diagnosis and treatment, health monitoring as well as follow up visit, over a distance [2]. One of the main components of tele-medicine is teleconsultation, also known as virtual clinic visit, which enables remote communication between patient and healthcare providers or specialist, omits the need of long distance travelling and minimize associated risk of deterioration of health condition. Additionally, patients can have access to healthcare providers that would otherwise be inaccessible due to geographical barrier. Tele-medicine is also beneficial for exchange of new information, treatment and experience between health professionals from different sites [3]. Teleconsultation can be in asynchronous store-and-forward mode via email or synchronous mode via interactive real time video conferencing [4].

In Malaysia, tele-medicine was initiated by Ministry of Health (MOH) in 1997 to harness the power of ICT in developing equitable, accessible and affordable healthcare system to offer high quality of care for better health outcomes and wellness of nation [5]. As an early effort, a teleconsultation pilot study (March 2001-September 2002) was undertaken to install tele-communication equipments in 41 hospitals and health centers across Malaysia and established nationwide teleconsultation network [6,7]. This project helped in recognizing the potential of teleconsultation as an effective means of healthcare delivery by improving the access to healthcare service, especially in rural areas where medical resources are scarce. Through teleconsultation referral, patients were successfully referred to specialist of appropriate level of care for remote consultation, thereby eliminate geographical constraint and in most of the cases, the need to travel. It has been reported teleconsultation reduced the number of physical referral and unnecessary inter-hospital transfer of patients [7]. The number of hospitals interlinked within the network increased from 41 in 2000 to 52 in 2010 [5]. Other tele-medicine projects were attempted, yet, unestablished infrastructure and technology along with low acceptance at that time led to little achievement [8].

Emergence of COVID-19 has escalated use of tele-medicine around the world as it reduces risk of transmission to both patients and healthcare providers [9,10,11,12,13]. In Malaysia, the first case of COVID-19 was reported on 25<sup>th</sup> January, 2020. Subsequent outbreak in March 2020 forced Malaysian government to impose Movement Control Order (MCO) nationwide as an effort to contain the spread of coronavirus by restricting movements of nation and travels across states [14,15]. However, such movement control limited the accessibility to healthcare, especially those live in area with limited medical resources, and interrupted outpatient appointment and follow-up visit. In response to these challenges, private healthcare has invested in virtual clinic visit to ensure patients receive continuous care in the settings of pandemic and movement control.

Although COVID-19 pandemic has encouraged use of tele-medicine in Malaysia, challenges such as lack of experience and clear tele-medicine guidelines in private hospitals may have caused significant doubts for healthcare professionals and resulted in issues during virtual clinic visit. In addition, since teleconsultation in private clinic is at its early implementation, clinical characteristic of patients, patient acceptance and feedback

for virtual clinic are lacking. In view of this, present study aimed to determine the clinical characteristics and feedbacks of patients attending virtual clinic in Sunway Medical Centre Velocity (SMCV) and another Sunway Medical Centre located in Bandar Sunway (SUNMED) by the means of cross-sectional survey. We hope findings of present study could be useful for refining teleconsultation to encourage its adoption and acceptance in the following stage of pandemic and post pandemic.

## Materials and methods

### Sample population

In order to collect demographic characteristics and feedbacks of patients who attended virtual clinic in SUNMED and SMCV between March 2020 and November 2020, an institution-based cross-sectional survey was conducted. Patients who had virtual visit and with no life-threatening condition, cognitive issues and hearing impairment were invited to answer the tele-medicine satisfaction survey in Google Forms through WhatsApp message. Participation was voluntary and survey was anonymized. All data collected was treated as confidential.

### Study instrument

For the purpose of this study, tele-medicine is referred to virtual visit through video conference. Tele-medicine satisfaction survey consist of three parts, which are 1) consent form, 2) personal particular of respondents and 3) a questionnaire intended to gain insights into their feedbacks on tele-medicine visit. After patients consented their participation, they answered personal particulars pertaining to their sociodemographic characteristics, which involve age, gender, ethnicity, nationality, living arrangement, marital status, occupation, monthly income and education level. Tele-health Usability Questionnaire (TUQ) [16], which is a self-administered online questionnaire with strong content validity, was used as a reference to compose questionnaire of present study. It comprises 18 items to examine patient's satisfaction level in six aspects: (1) usefulness (items 1-3), (2) ease of use & learn ability (items 4-5), (3) interface quality (items 6-8), (4) interaction quality (items 9-12), (5) reliability (items 13-15), (6) satisfaction and future use (items 16-18). Respondents answered the questionnaire by rating each item based on a 7-point Likert scale, ranging from 1= "totally disagree" to 7= "totally agree".

### Data analysis

Data from the questionnaires was analyzed using the Statistical Package for Social Scientists (SPSS). For demographics characteristics, categorical variables were evaluated using counts and percentages. Meanwhile, mean, standard deviation, minimum, and maximum were measured for continuous variables. With respect to patient feedback on their virtual visit, average score for each items, each section in TUQ and total average score were calculated.

## Results

### Demographic analysis

A total of 150 patients who had attended virtual clinic visits in SUNMED and SMCV participated in the tele-medicine satisfaction survey. Demographic characteristics of respondent are shown in **Table 1**. Of 150 respondents, 106 (70.7%) are female and 44 (44%) are male. Majority of respondents are Malaysians (n=128, 80%), comprising 20 (13.3%) Malay, 89 (59.3%) Chinese, 8 (5.35%) Indian and 3 (2%) of other ethnicity (categorized as others as in Table 1). Remaining respondents (n=30, 20%) are

international patients (non-Malaysian) and their ethnicity are categorized as others (n=30; 20%). Among 150 respondents, 89 (59.3%) are married, 55 (36.67%) are single whereas 6 (4%) are divorced or widowed. Most of them live with their family (n=127, 84.67%), others live with friends (n=10, 6.67%) or live alone (n=13, 8.67%). Occupations of respondents are grouped into professional (n=77, 51.33%), freelancer (n=25, 16.67%), supervisors and manager (n=1, 0.67%), housewife (n=23, 15.33%), student (n=8, 5.3%), unemployed (n=8, 5.3%) and retired (n=8, 5.3%). Monthly income of respondents were gathered in a range of less than Rm 1200 (n=30, 20%), Rm 1200-Rm 5000 (n=62, 41.33%), Rm 5000-Rm 10000 (n=41, 27.33%) to more than Rm 10000 (n=17, 11.33%). Most of respondent have education level of Bachelor's Degree (n= 80, 53.33%), followed by diploma (n=30, 20%), Master's Degree or PhD or higher (n=21; 14%), and secondary school (n=19; 12.67%).

**Table 1:** Demographic characteristics of respondents (n=150).

Variables	Frequency (n)	Percentage (%)
Age	38(22) <sup>a</sup>	17-77 <sup>b</sup>
<b>Gender</b>		
Female	106	70.66667
Male	44	29.33333
<b>Ethnicity</b>		
Malay	20	13.33333
Chinese	89	59.33333
Indian	8	5.33333
Others <sup>c</sup>	33	22
<b>Nationality</b>		
Malaysian	120	80
Non-malaysian	30	20
<b>Marital status</b>		
Married	89	59.33333
Single	55	36.66667
Others <sup>d</sup>	6	4
<b>Living arrangement</b>		
With family	127	84.66667
With friends	10	6.66667
Alone	13	8.66667
<b>Occupation</b>		
Professional	77	51.33333
Freelancer	25	16.66667
Supervisor & manager	1	0.7
Housewife	23	15.33333
Student	8	5.3
Currently not working	8	5.3
Retirement	8	5.33333
<b>Monthly income</b>		
< RM 1200	30	20
RM1200 - RM5000	62	41.33333
RM 5000 - RM 10000	41	27.33333
> RM 10000	17	11.33333
<b>Education level</b>		
Did not attend formal education	0	0
Primary School	0	0
Secondary school	19	12.66667
Diploma	30	20
Bachelor's Degree	80	53.33333
Master's Degree or PhD or higher	21	14

<sup>a</sup>Median (Interquartile range) of age.

<sup>b</sup>Range of age of respondents.

<sup>c</sup>Malaysian who are of ethnicity other than Malay, Chinese or Indian, and all non-Malaysian.

<sup>d</sup>Divorced or widowed.

**Table 2:** Feedback of patients on tele-medicine based on TUQ (Frequency).

Question	Frequency for each scale (n)						
	1	2	3	4	5	6	7
<b>Usefulness</b>							
1. Tele-medicine improves my access to healthcare services	0	2	1	15	26	32	74
2. Tele-medicine saves me time traveling to a hospital or specialist clinic	0	1	2	5	10	31	101
3. Tele-medicine provides for my healthcare needs.	1	0	7	20	33	34	55
<b>Ease of use and learnability</b>							
4. It was simple to use this system	1	0	3	13	30	42	61
5. It was easy to learn to use the system.	1	0	0	17	24	43	65
<b>Interface quality</b>							
6. The way I interact with this system is pleasant	1	0	4	20	21	49	55
7. I like using this system	2	1	6	22	20	47	52
8. This system is simple and easy to understand	1	1	4	13	24	49	58
<b>Interaction Quality</b>							
9. I could easily talk to the clinician using the tele-health system	1	2	1	17	30	39	60
10. I could hear the clinician clearly using the tele-health system	0	2	6	16	26	39	61
11. I felt I was able to express myself effectively	0	3	9	17	25	46	50
12. Using the tele-medicine system, I can see the clinician as well as if we met in person	0	4	6	23	33	41	43
<b>Reliability</b>							
13. I think the visits provided over the tele-medicine system are the same as in-person visits	7	6	13	22	48	31	23
14. Whenever I made a mistake using the system, I could recover easily and quickly	2	2	6	33	33	45	29
15. The system gave error messages that clearly told me how to fix problems.	2	8	9	37	23	36	35
<b>Satisfaction and Future use</b>							
16. Tele-health is an acceptable way to receive healthcare services	3	0	2	23	34	41	47
17. I feel comfortable communicating with the clinician using the tele-medicine system	2	1	5	23	19	48	52
18. Tele-medicine is an acceptable way to receive healthcare services	3	1	3	20	33	37	53
19. Overall, I am satisfied with this tele-health system	2	3	3	19	25	43	55

\*Likert scale: 1: Totally Disagree; 2: Strongly Disagree; 3: Disagree; 4: Neither Disagree Nor Agree; 5: Agree; 6: Strongly Agree; 7: Totally Agree.

**Table 3:** Overall feedback of patients on tele-medicine based on TUQ (Mean).

Question	Mean(SD)	Median(Interquartile range)
<b>Usefulness</b>	6.08 (0.97)	6.33 (1.33)
1. Tele-medicine improves my access to healthcare services.	6.05 (1.61)	6 (2)
2. Tele-medicine saves me time traveling to a hospital or specialist clinic.	6.47 (0.94)	7 (1)
3. Tele-medicine provides for my healthcare needs.	5.71 (1.28)	6 (2)
<b>Ease of use and learnability</b>	5.98 (1.10)	6 (2)
4. It was simple to use this system	5.94 (1.14)	6 (2)
5. It was easy to learn to use the system	6.01 (1.11)	6 (2)
<b>Interface quality</b>	5.82 (1.15)	6 (2)
6. The way I interact with this system is pleasant	5.85 (1.20)	6 (2)
7. I like using this system	5.71 (1.34)	6 (2)
8. This system is simple and easy to understand.	5.91 (1.18)	6 (2)
<b>Interaction quality</b>	5.73 (1.12)	6 (1.75)
9. I could easily talk to the clinician using the tele-health system.	5.87 (1.22)	6 (2)
10. I could hear the clinician clearly using the tele-health system	5.85 (1.25)	6 (2)
11. I felt I was able to express myself effectively.	5.68 (1.31)	6 (2)
12. Using the tele-medicine system, I can see the clinician as well as if we met in person.	5.53 (1.30)	6 (2)
<b>Reliability</b>	5.10 (1.27)	5 (1.67)
13. I think the visits provided over the tele-medicine system are the same as in-person visits	4.89 (1.56)	5 (2)
14. Whenever I made a mistake using the system, I could recover easily and quickly.	5.29 (1.31)	5 (2)
15. The system gave error messages that clearly told me how to fix problems.	5.13 (1.53)	5 (2)
<b>Satisfaction and future use</b>	5.70 (1.21)	6 (2)
16. Tele-health is an acceptable way to receive healthcare services.	5.64 (1.29)	6 (2)
17. I feel comfortable communicating with the clinician using the tele-medicine system.	5.72 (1.33)	6 (2)
18. Overall, I am satisfied with this tele-health system.	5.74 (1.35)	6 (2)
Total average score	5.72 (0.95)	5.94 (1.5)

### Patient satisfaction on tele-medicine

Responses to TUQ questions and average scores are summarized in **Table 2 and 3** respectively. According to the responses, respondents were generally satisfied with tele-medicine visit, with average scores for all six aspects higher than 5 and overall average score of 5.72 (**Table 3**). Usefulness receive highest average score (average score of 6.08). Respondents agreed that tele-medicine provides for their healthcare needs (average score of 5.71), improve access to healthcare services (average score of 6.05) and save their time from travelling (average score of 6.47). Ease of use and learn ability (average score of 5.98), interface quality (overall average score of 5.82) and interaction quality (average score of 5.73) received good satisfaction. Reliability is the least satisfied aspect (average score of 5.10), mainly because visit provided over tele-medicine system is not similar to in-person visit. Nevertheless, tele-health system was perceived as an acceptable and satisfactory healthcare service (average score of 5.70).

### Discussion

Although tele-medicine has been employed in many countries, particularly in developed countries, it is not popular in Malaysia. As a result, studies about its implementation, acceptance and clinical impact are limiting. In the settings of COVID-19 pandemic where social distancing and movement restriction are key measures to curb transmission, teleconsultation has been

adopted worldwide, including Malaysia, by serving as safe alternative to in-person visit to provide continuous care. As implementation of virtual visit in Malaysia is still new, present study aimed to provide insight into patient feedback of virtual visit during pandemic and movement control as patient satisfaction is mandatory for its further adoption.

According to TUQ responses, all six aspects received high average score and total average score, indicating that respondents are generally satisfied with virtual visit (**Table 3**). This finding is consistent with previous studies showing high satisfaction for tele-medicine visits [17-20]. Among the six aspects, usefulness receive highest average score. It demonstrates that virtual visit was able to provide for their healthcare needs, improve access to healthcare services and it was time saving. In fact, time saved from travelling, waiting time, time away from work, and improved access to healthcare services have been frequently reported [21]. Besides, it is noteworthy that one of the contributing factors of positive responses is that COVID-19 pandemic has widely demonstrated usefulness of virtual visit [22].

It has been pointed out that technology itself acts as one major barrier to tele-medicine adoption [23,24]. To encourage acceptance and facilitate quick setup, the system should be easy to learn and use with good technical support when patients encounter technical difficulties [24]. Here, we show that the ease of use and learnability of teleconsultation system used in present study is high as majority of patients found it simple

to use (average score of 5.94) and easy to learn (average score of 6.01). Furthermore, interface quality also received positive responses, patients agreed they had pleasant interaction with system interface (average score of 5.82), they like to use it (average score of 5.71) and found it simple and easy to use (average score of 5.91). Other than having user-friendly system, resolution of video conference is an important factor of high patient satisfaction as low visual or audio resolution has been responded as key distraction by patients [19]. Additionally, patients responded high satisfaction with the interaction quality. They could talk to the clinician easily (average score of 5.87), hear clearly (average score of 5.85), able to express themselves effectively (average score of 5.68) and see the clinician clearly like in-person visit (average score of 5.53).

Among all aspects, reliability assess if tele-medicine is as reliable as in-person visit received lowest satisfaction. Although error occurred during virtual visit can be fixed easily (average score of 5.29) and solution was provided quickly (average score of 5.13), respondents expressed least agreement to item 13 (visits provided over the tele-medicine system are the same as in-person visits). One possible reason is lack of physical examination, which is one main limitation of tele-medicine frequently responded by patients even though they were generally satisfied with their visit [18]. Indeed, tele-medicine is more applicable for clinical management, diagnostic assessment, and medical decision-making, which require less face-to-face interaction [25]. In line with this, [26], underlined the necessity of in-person visit despite virtual visit rate increased during pandemic.

Overall, respondents agreed that tele-health is an acceptable way to receive healthcare services (average score of 5.70). They felt comfortable communicating with the clinician using the tele-medicine system (average score of 5.64) and they are generally satisfied with tele-health system used in present study (average score of 5.72). Therefore, virtual visit received favorable responses from patients.

### Conclusion

Overall, patients were satisfied with their virtual clinic visit and agreed it is an acceptable healthcare delivery. They expressed high satisfaction to usefulness of virtual clinic in improving access to healthcare delivery, provide their medical needs and save the time of travelling. Other than that, they did not experienced much difficulties in learning and using the system and able to have comfortable communication with clinician with good visual and audio quality. Patients reported least agreement that virtual visit provided similar care to in-person visit, but the satisfaction score remains positive.

### Future direction

Although present study demonstrated that patients were satisfied with virtual visit and had satisfactory interaction with clinician, patient-doctor relationship established without face-to-face interaction should be examined, as it is believed that tele-medicine would transform the relationship [27,28]. Moreover, perception of healthcare provider to tele-medicine is another determinant to prompt its integration into medical practice. Another focus of study is cost-effectiveness, as it is one main benefit of tele-medicine by reducing out-of-pocket expenses such as travel expenses, parking, food expenses and potential loss of pay [20,29,30]. In addition, future study should assess the quality of care and health outcome delivered by tele-medicine, whether it show no difference, improvement or neg-

ative impact given that different outcomes have been reported [31,32].

### Limitation

One limitation of present study is that present findings is from two private medical institutions, Sunmed and SMCV. It does not represent general view of all Malaysians toward teleconsultation. Another limitation is selection bias as only patients who are technological literate and have access to telecommunications technology and internet availability were able to perform tele-medicine visit. Nevertheless, present study showed that patients showed high satisfaction with teleconsultation and agreed that it is an acceptable healthcare service.

### Acknowledgments

We would like to acknowledge Dr. Eunice Pui Wan Wen for reviewing data analysis. We would also like to thank all participants for their feedbacks.

### Declarations

### Funding

This study was funded by [Sunway Medical Centre research grant SRB/F/20/002].

### Conflicts of interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

### Ethics approval

Ethical approvals were obtained from the Sunmed Independent Research Ethics Committee, Sunmed and SMCV

### Consent to participate

Informed consent was obtained from all individual participants included in the study.

### Consent for publication

The participants consented to the submission of the case report to the journal.

### Availability of data and material (data transparency)

Yes

### Code availability (software application or custom code)

Not applicable

### Authors' contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by NurulYaqeenMohdEsa, Edwin Tan, Wong Sok Yee and Soo Chun Ian. The first draft of the manuscript was written by Ong Wei Chi and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

### References

1. Chongmelaxme B, Lee S, Dhippayom T, Saokaew S, Chaiyakunapruk N, et al. The Effects of Telemedicine on Asthma Control and Patients' Quality of Life in Adults: A Systematic Review and Meta-analysis. *J Allergy Clin Immunol Pract.* 2019; 7: 199-216.

2. Schlachta-Fairchild L, Elfrink V, Deickman A, Hughes RG. Patient Safety, Telenursing, and Telehealth. Agency for Healthcare Research and Quality (US).2008.
3. Hjelm NM. Benefits and drawbacks of telemedicine. *J Telemed Telecare*. 2005; 11: 60-70
4. Maarop N, Win KT. Understanding the need of health care providers for teleconsultation and technological attributes in relation to the acceptance of teleconsultation in Malaysia: A mixed methods study. *J Med Syst*. 2012; 36: 2881-2892.
5. Mat Som MH, Norali AN, Megat Ali MSA. Telehealth in Malaysia - An overview. *ISIEA 2010 - 2010 IEEE Symp Ind Electron Appl*. 2010; 660-664.
6. Yusof K, Neoh KHB, bin Hashim MA, Ibrahim I. Role of teleconsultation in moving the healthcare system forward. *Asia Pac J Public Health*. 2002; 14: 29-34.
7. Maon SN, Edirippulige S. An overview of the national telehealth initiative in Malaysia. *Stud Health Technol Inform*. 2010; 161: 95-103.
8. Zailani S, Gilani MS, Nikbin D, Iranmanesh M. Determinants of telemedicine acceptance in selected public hospitals in Malaysia: Clinical perspective. *J Med Syst*. 2014; 38: 111.
9. Barr JR, D'Auria D, Persia F. Telemedicine, Homecare in the Era of COVID-19 & beyond. *Proc - 2020 3rd Int Conf Artif Intell Ind*. 2020; AI4I 2020; 48-51.
10. Bhargava S, McKeever C, Kroumpouzou G. Impact of COVID-19 pandemic on dermatology practices: Results of a web-based, global survey. *Int J Womens Dermatol*. 2021; 14: 337-339
11. Giunti G, Goossens R, de Bont A, Visser JJ, Mulder M, et al. The need for sustainable teleconsultation systems in the aftermath of the first COVID-19 Wave. *J Med Internet Res*. 2020; 22: 1-9.
12. Mann DM, Chen J, Chunara R, Testa PA, Nov O, et al. COVID-19 transforms health care through telemedicine: Evidence from the field. *J Am Med Inform Assoc*. 2020; 27:1132-1135.
13. Wu S, Wu D, Ye R, Li K, Lu Y, et al. Pilot Study of Robot-Assisted Teleultrasound Based on 5G Network: A New Feasible Strategy for Early Imaging Assessment during COVID-19 Pandemic. *IEEE Trans Ultrason Ferroelectr Freq Control*. 2020; 67: 2241-2248.
14. Ganasegeran K, Hock Ch'ng AS, Looi I. Covid-19 In Malaysia: Crucial Measures in Critical Times. *J Glob Health*. 2020; 10: 1-4.
15. Umaira A, Safri A, Thevadas R. Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID- 19 . The COVID-19 resource centre is hosted on Elsevier Connect , the company ' s public news and information. 2020.
16. Parmanto B, Lewis, Jr. AN, Graham KM, Bertolet MH. Development of the Telehealth Usability Questionnaire (TUQ). *Int J Telerehabilitation*. 2016; 8: 3-10.
17. Fatehi F, Martin-Khan M, Smith AC, Russell AW, Gray LC, et al. Patient Satisfaction with Video Teleconsultation in a Virtual Diabetes Outreach Clinic. *Diabetes Technol Ther*. 2015; 17: 43-48.
18. Layfield E, Triantafillou V, Prasad A, Deng J, Shanti RM, et al. Telemedicine for head and neck ambulatory visits during COVID-19: Evaluating usability and patient satisfaction. *Head Neck*. 2020; 42: 1681-1689.
19. Pearlman RL, Le PB, Brodell RT, Nahar VK. Evaluation of patient attitudes towards the technical experience of synchronous tele-dermatology in the era of COVID-19. *Arch Dermatol Res*. 2021; 1-4.
20. Yoon EJ, Tong D, Anton GM, Jasinski JM, Claus CF, et al. Patient Satisfaction with Neurosurgery Telemedicine Visits During the Coronavirus Disease 2019 Pandemic: A Prospective Cohort Study. *World Neurosurg*. 2021; 145: e184-e191.
21. Nguyen M, Waller M, Pandya A, Portnoy J. A Review of Patient and Provider Satisfaction with Telemedicine. *Curr Allergy Asthma*. 2020; Rep 20:1-7.
22. Shenoy P, Ahmed S, Paul A, Skaria TG, Joby J, et al. Switching to teleconsultation for rheumatology in the wake of the COVID-19 pandemic: feasibility and patient response in India. *Clin Rheumatol*. 2020; 39: 2757-2762.
23. Scott Kruse C, Karem P, Shifflett K, Vegi L, Ravi K, et al. Evaluating barriers to adopting telemedicine worldwide: A systematic review. *J Telemed Telecare*. 2018; 24: 4-12.
24. Lee JY, Chan CKY, Chua SS, Paraidathathu T, Kwing-Chin Lee K, et al. Using telemedicine to support care for people with type 2 diabetes mellitus: A qualitative analysis of patients' perspectives. *BMJ Open*. 2019; 9:e026575.
25. Appireddy R, Khan S, Leaver C, Martin C, Jin A, et al. Home virtual visits for outpatient follow-up stroke care: Cross-sectional study. *J Med Internet Res*. 2019; 21:e13734.
26. Dubin JM, Wyant WA, Balaji NC, Lk Ong W, Kettache RH, et al. Telemedicine Usage among Urologists during the COVID-19 Pandemic: Cross-Sectional Study. *J Med Internet Res*. 2020; 22: e21875.
27. Liu X, Sawada Y, Takizawa T, Sato H, Sato M, et al. Doctor-patient communication: A comparison between telemedicine consultation and face-to-face consultation. *Intern Med*. 2007; 46: 227-232.
28. van Gorp J, van Selm M, Vissers K, Leeuwen EV, Hasselaar J, et al. How outpatient palliative care teleconsultation facilitates empathic patient-professional relationships: A qualitative study. *PLoS One*. 2015; 10:e0124387.
29. Harrison R, MacFarlane A, Murray E, Wallace P. Patients' perceptions of joint teleconsultations: A qualitative evaluation. *Health Expect*. 2006; 9: 81-90.
30. Bradford NK, Armfield NR, Young J, Smith AC (2014) Paediatric palliative care by video consultation at home: a cost minimisation analysis. *BMC Health Serv Res*. 2014; 14: 328.
31. Ekeland AG, Bowes A, Flottorp S. Effectiveness of telemedicine: A systematic review of reviews. *Int J Med Inform*. 2010; 79: 736-771.
32. Flodgren G, Rachas A, Aj F, Inzitari M, Shepperd S, et al. Interactive telemedicine: Effects on professional practice and health care outcomes. *Cochrane Database Syst Rev Interact*. 2015; 9: CD002098.