


Factors affecting telepractice use in COVID-19

Proceedings of Singapore Healthcare
Volume 31: 1–10
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/20101058221074120
journals.sagepub.com/home/psh


Christine H Chua¹ , Ferlin CL Seow¹, Florence MA Tang¹, and Li Mei Lim²

Abstract

Background: The use of telepractice as an alternate method of delivering healthcare to people increased significantly after COVID-19 became a global pandemic.

Objectives: This study aimed to identify factors contributing to the accelerated adoption of telepractice during COVID-19 in Singapore. It also sought to examine whether there are differences in the perspectives of staff in nursing facilities and caregivers in personal homes towards telepractice.

Methods: A cross-sectional mixed method design was used. A survey with 20 items was adapted from the Telehealth Usability Questionnaire and translated into Mandarin. Anonymous responses were obtained from 70 patients and caregivers who had received speech therapy services via telepractice from a restructured hospital before and/or during Singapore's Circuit Breaker period. Analyses were conducted using descriptive statistics and content analysis.

Results: Sociodemographic variables of age, gender, education level and language preference did not impact user satisfaction and the likelihood of using telepractice again. Service-related factors were more influential. Participants chose to use telepractice as it saved travelling time (24.0%), was easy to use (19.3%), improved healthcare access (17.5%) and reduced waiting time (17.5%). Although all respondents expressed satisfaction in telepractice, 35.5% from personal homes and 37.5% from nursing facilities were not keen to use it again. Amongst caregivers, 26.7% from personal homes and 37.5% from nursing facilities preferred not to continue telepractice use. Technical and logistical disruptions and the lack of 'personal touch' were contributing factors.

Conclusion: Improving technological infrastructure, providing training for users and developing guidelines would help sustain telepractice as a form of service delivery beyond COVID-19.

Keywords

telehealth, telemedicine, telerehabilitation, nursing homes, community

Introduction

Telepractice refers to the provision of speech therapy services remotely, predominantly over the Internet via video-conferencing platforms.¹ Speech therapy services are uniquely suited to telepractice delivery because of the audio-visual nature of clinical interactions and techniques.² The American Speech-Language-Hearing Association recognised telepractice as an appropriate form of service delivery in year 2005,¹ with the service shown to have similar efficacy to conventional in-clinic sessions.³ However, the adoption of telepractice as an alternative to physical consultations pre-COVID-19 has been limited, particularly in Asia.

Although a conference and cross-institutional discussions were held in year 2019 in Singapore to encourage the development of telepractice, there was no strong push for services to be delivered online. So telepractice remained

provided by a handful of therapists for selected clients. Convenience sampling of 114 speech therapists in Singapore from May to July 2020 revealed 78.4% of therapists believed in-person therapy is of better quality than telepractice.⁴ Survey findings perceived therapists to lack resources to support telepractice while clients might lack access to technology. A similar study in Hong Kong also showed

¹Speech Therapy Department, Tan Tock Seng Hospital, Singapore, Singapore

²Rehabilitation Centre, Tan Tock Seng Hospital, Singapore, Singapore

Corresponding Author:

Christine H Chua, Tan Tock Seng Hospital, 11 Jalan Tan Tock Seng, Singapore 308433.

Email: christine_chua@ttsh.com.sg



telepractice being regarded as less effective than face-to-face sessions.⁵

The coronavirus disease (COVID-19) proved to be a formidable disruptor impacting healthcare and economic systems worldwide. Governments' directives to limit virus transmission inadvertently restricted many from accessing services in healthcare facilities. In Singapore, the government implemented a 'Circuit Breaker' period from 7 April to 1 June 2020, followed by a graduated re-opening plan. During this period, safe-distancing measures and work-from-home policies were implemented.⁶ Non-essential face-to-face services such as outpatient appointments for non-life-threatening health conditions were deferred. To enable continuity of care, many healthcare providers including speech therapists started offering video-conferencing services online.

Sociodemographic factors

The first aim of this study was to investigate the influence of sociodemographic factors on the adoption of telepractice in Singapore. The impact of these factors on digital health services have been inconsistent. Some studies report no consistent nor strong impact of age, gender, education level and preferred language on the uptake of telepractice.⁷ Others indicate that older persons might be less receptive to telepractice than younger persons. Older persons, defined as people aged 60 or 65 and above,⁸ tended to value service attitudes and 'personal touch' which are more easily experienced in face-to-face sessions.^{9,10} In contrast, younger and more highly educated respondents were more receptive to adopting telepractice due to the perceived ease of use and language or technological literacy.^{9,10} A 'gender gap' was also identified where females, especially in low- and middle-income countries in South-East Asia, were less inclined to adopt new technology.^{11,12} Other studies, however, showed women in developed countries being willing to use telehealth¹³ with high satisfaction rates reported,¹⁴ possibly because access to healthcare was maintained whilst they juggle multiple responsibilities like work, household and childcare.¹⁵ To date, no study has investigated how sociodemographic factors influence the adoption of telepractice in a cosmopolitan country in Asia like Singapore.

Service-related factors

The second aim of the study was to evaluate the impact of service-related factors on telepractice use. According to the Unified Theory of Acceptance and Use of Technology (UTAUT),¹⁶ adoption and end-user acceptance of technology are influenced by four factors: 1. Performance expectancy, meaning how the technology enhances the quality of life performance; 2. Effort expectancy, which refers to the ease of use and convenience of the technology; 3. Social influence, which includes the views of important others towards the use of technology and 4. Facilitating conditions, which refers to an individual's belief that organisational and technical infrastructure exists. Given that treatment effectiveness, convenience, accessibility and cost-effectiveness correlated strongly with the satisfaction and use of digital health services in Korea and China,^{17, 9} this study also sought to establish if service-related factors were influential in Singapore.

Caregiver perspectives

The third aim of the study was to compare the perspectives of staff caregivers at nursing facilities towards telepractice to that of caregivers from personal homes. COVID-19 has been found to cause a significant increase in associated mortality in nursing home residents compared to the surrounding communities.¹⁸ During Singapore's Circuit Breaker, nursing home residents and staff could not leave the home while external therapists could not enter to provide services. Many nursing homes began supporting video calls between residents and families, and some participated in telepractice sessions. A pre-COVID-19 survey suggested that telehealth usage amongst nursing staff may be impacted by reduced confidence, or lack of knowledge and skills.^{19,20} It is not clear if the physical constraints imposed by COVID-19 and the push to telehealth services have changed the perceptions of nursing staff.

In all, this study aimed to:

1. Investigate the impact of sociodemographic factors (i.e. age, gender, education level and language preference) on the adoption of telepractice
2. Evaluate the impact of service-related factors on users' attitudes towards telepractice
3. Assess if there are differences in the perspectives of staff in nursing facilities and caregivers in personal homes towards telepractice

Methods

Study design

A cross-sectional mixed methods design was used. This retrospective study was recognised by the Institutional Review Board as a quality improvement project which did not require ethics approval.

Setting and participants

Tan Tock Seng Hospital is a multi-disciplinary tertiary hospital, serving a resident population of 1.4 million persons in Singapore.²¹ Telepractice services were started in December 2018 by a few speech therapists for patients with Parkinson's Disease to conveniently access Lee Silverman Voice Treatment LOUD (LSVT-LOUD) programme. LSVT-LOUD is an evidence-based protocol that aims to make a person's voice loud and speech clear. To achieve optimal therapeutic intensity, patients attend hourly sessions, 4 days a week, for 4 weeks.²² Such schedules can be challenging for patients with Parkinson's disease, as they may face reduced mobility and have difficulty making frequent hospital visits. The initial platform used for telepractice was Vidyo, before moving on to Zoom.

With the constraints imposed by the COVID-19 outbreak, telepractice became an obvious method for continuing therapy. The speech therapy department at Tan Tock Seng Hospital redesigned processes and provided training so all speech therapists could deliver telepractice services. The suitability criteria for patients were expanded with the creation of a risk stratification matrix to help therapists determine patients' suitability. These efforts resulted in the percentage of outpatients seen via

telepractice increasing from less than 5% pre-COVID-19 to 48% in April 2020 and 89% in May 2020.

The study was conducted from April 2020 to September 2020. Patients and caregivers who received outpatient communication and swallowing services at the acute hospital and an offsite rehabilitation centre via telepractice before and/or during the Circuit Breaker period were recruited. The first patient had used the service in September 2019 while the last patient was seen on 1 June 2020. A subset of these participants were patients and staff from nursing facilities in Singapore. There was no difference in the recruitment process for participants from personal homes and nursing facilities.

All participants provided consent for telepractice and had an internet-enabled electronic device with Zoom Application downloaded. Participants also had a stable internet connection and food, drinks and utensils prepared if the session was meant to be a swallow review. Caregivers were present if patients could not manage the session independently. All sessions were encrypted by the Integrated Health Information Systems, Singapore's HealthTech agency.

Development of questionnaire

An online questionnaire (Appendix A) containing 20 items was developed via Google Forms. Google Forms was used as it is familiar to most internet users in Singapore. The questionnaire was adapted from the Telehealth Usability Questionnaire (TUQ, 23) by including 7-point Likert scales and tailoring the questions to suit the local pandemic context. The adapted questionnaire was also translated into Mandarin, a language commonly used in Singapore. Six domains, namely usefulness, ease of use, interface quality, interaction quality, reliability and satisfaction, were used to measure usability in the TUQ and the adapted questionnaire.

The definitions of each domain are:

1. Usefulness – the effectiveness and efficacy of the telehealth system in delivering clinical outcomes comparable to in-person healthcare service
2. Ease of use – the amount of effort it takes to learn and use the telehealth system
3. Interface quality – the quality of the user interface, ease of navigation and an overall impression of the interaction between the user and the technology system
4. Interaction quality – the subjective perception users have when interacting with the clinician via the telehealth system, including audio-visual quality
5. Reliability – how easily a user can recover from technical errors while using the telehealth system
6. Satisfaction – the level of comfort, satisfaction and willingness of caregivers and patients to continue using the telehealth system

Administration of questionnaire

Online survey links were created and included in appointment emails to patients and/or their caregivers. Phone calls, conducted in English or Mandarin, were done by a therapy assistant after telepractice sessions to remind participants to complete the

questionnaire. If participants expressed difficulties completing the questionnaire online, the survey would be administered via the call where the therapy assistant would read the questions and options aloud before recording participants' responses. Participation was voluntary and the data collected was anonymous.

Data/statistical analyses

Participants' responses were organised using Excel 2016 software and data analyses focused on specific questions in the questionnaire. The primary analyses for patient satisfaction and continued use of telepractice were derived from Q8 and Q17, respectively. Responses of 'strongly dissatisfied', 'dissatisfied', 'somewhat dissatisfied' were grouped wholly as *dissatisfied*, while 'strongly satisfied', 'satisfied', and 'somewhat satisfied' were grouped wholly as *satisfied*. 'Neutral' was regarded as neither satisfied nor dissatisfied. The quantitative responses and sociodemographic data collected were analysed using chi-square tests. Where the assumptions for chi-square were not met, the Fisher's exact test with *p* value calculated by Monte Carlo simulation was used. A *p* value of 0.05 was considered statistically significant.

Content analyses were performed on Q15 and Q18. Categories for service-related factors such as 'COVID-19 restrictions, safety concerns, ease of use, improved access to healthcare, lack of 'personal touch', 'technical and logistical disruptions' were identified. These categories were coded and analysed using the IBM Statistical Package for Social Sciences Statistics software version 27.0.²⁴

Results

Sociodemographic characteristics of participants

84 patients were seen via telepractice from September 2019 to 1st June 2020. Of these, 2 declined, 2 passed away, 2 were overseas and 4 were uncontactable. Another 4 were not contacted as challenging interactions were noted between healthcare professionals and the patients and/or their caregivers. Of the 70 respondents who completed the questionnaire, 47 were patients and 23 were caregivers who were either family members, helpers, or staff nurses from nursing facilities.

11 respondents from personal homes had used the service *before* the Circuit Breaker period while 51 respondents from personal homes and 8 staff from nursing facilities had used the service *during* as well as *before and during* the Circuit Breaker. Most patients were above 50 years of age and had received at least secondary school education, while most caregivers including staff from nursing facilities were below 50 years of age and had received up to tertiary education. English was the preferred language for more than half of the participants. The sociodemographic characteristics of the 70 respondents are reported in Tables 1 and 2.

Impact of sociodemographic factors

All respondents expressed that they were satisfied with the telepractice service. Of the 62 respondents from personal

Table 1. Sociodemographic characteristics of participants in personal homes.

	n	Gender		Age				Education				Language																	
		Male	Female	Prefer not to say	<31 years old	31-50 years old	51-70 years old	>70 years old	No formal education	Primary school	Secondary school	Post-secondary school	University	English	Mandarin	Malay	Tamil	Others	>1 language including English										
																				62	30	16	1	4	1	20	1	1	0
Personal homes	47	30	16	1	4	1	22	20	1	1	0	7	22	4	6	11	8	31	10	0	0	0	0	0	0	0	0	0	6
Patient	15	4	11	0	5	2	1	1	0	0	0	4	3	8	3	8	0	8	0	0	0	0	0	0	0	0	0	7	
Caregiver	47	30	16	1	4	1	22	20	1	1	0	7	22	4	6	11	8	31	10	0	0	0	0	0	0	0	0	6	

homes, 19 indicated that they were *very satisfied*, 27 were *satisfied*, 15 were *somewhat satisfied* and 1 was *neutral*. Of the 8 respondents from nursing facilities, 1 was *very satisfied*, 6 were *satisfied*, 1 was *somewhat satisfied*.

Regarding the continued use of telepractice, 40 respondents from personal homes would use telepractice again while 22 would not. 5 out of 8 respondents from nursing facilities would use telepractice again while 3 would not.

Age

The chi-square test of independence showed no significant association between age and the willingness to use telepractice again $X^2(1, N = 62) = 0.64, p = 1.000$.

Gender

The chi-square test of independence showed no significant association between gender and the willingness to use telepractice again $X^2(1, N = 61) = 0.15, p = 0.789$. One case was disregarded from the analysis as the respondent had declined to report gender.

Education level

The chi-square test of independence could not be used as the minimum expected count was not met. Fisher's Exact Test found no significant association between education level and the willingness to use telepractice again (2-sided $p = 0.307$).

Preferred language

Similarly, conditions for the chi-square test were not met. Fisher's Exact Test found no significant association between preferred language and the willingness to use telepractice again (2-sided $p = 0.673$).

Impact of service-related factors

171 responses were obtained for why participants chose telepractice. Each respondent could select multiple choices. The most popular reasons for choosing telepractice were that it saved travelling time ($n = 41, 24.0\%$) and was easy to use ($n = 33, 19.3\%$). Some respondents felt it improved access to healthcare ($n = 30, 17.5\%$) with less time spent waiting for registration or transportation ($n = 30, 17.5\%$). Some also felt that telepractice saved money ($n = 15, 8.8\%$).

10.5% of the responses ($n = 18$) reflected COVID-19 as a factor influencing their choice to use telepractice. Of these, 6/18 (33.3%) responses involved COVID-19 restrictions where in-person sessions were not allowed for non-essential services while 7/18 (38.9%) responses expressed safety concerns. The remainder (5/18, 27.8%) did not specify. One advocate, whose loved one was having cancer, favoured telepractice as it minimised trips to the hospital and physical contact with others.

Participants were similarly afforded multiple choices for their reasons as to whether or not they would use telepractice again. 88 responses were obtained. 73.9% ($n = 65$) were positive responses while 26.1% ($n = 23$) were negative responses. Similar themes of convenience, improved access,

Table 2. Sociodemographic characteristics of participants in nursing facilities.

n	Identity		Gender		Age				Education				Language						
	Caregiver (Staff Nurse)	Patient	Male	Female	<31 years old	31-50 years old	51-70 years old	>70 years old	No formal education	Primary school	Secondary school	Post-secondary school	University	English	Mandarin	Malay	Tamil	Others	>1 language including English
8	8	0	1	7	0	2	1	0	0	0	0	1	7	4	0	0	0	0	4

safety and ease of use were highlighted as positive reasons for continued use. The top negative reasons included respondents' preference for 'personal touch' during face-to-face visits ($n = 10, 11.4\%$) and having reduced confidence and technical know-how in navigating video-conferencing technology ($n = 4, 4.5\%$). The technological limitations experienced involved disruptions due to unstable internet connections, difficulty reading due to poor video quality, or therapy materials not being sent beforehand.

A small group of responders also opined about the lack of medical subsidies for telepractice, given that it was still a relatively new service that had not been approved for national subventions then ($n = 4, 4.5\%$). No adverse events were reported.

Caregivers' survey

The third aim of the study was to examine whether caregivers in nursing facilities perceived telepractice differently from caregivers in personal homes. All caregivers were reportedly satisfied with the service ($n = 23, 100\%$). Most respondents rated that they would use the service again ($n = 19, 82.6\%$). Based on Fisher's Exact Test for small samples, there was no significant association between caregiver location and satisfaction with telepractice (2-sided $p = 1.000$) and the likelihood of using it again (2-sided $p = 0.103$).

Amongst the 26 responses from caregivers in personal homes who would use telepractice again, the top reasons for choosing telepractice were that it saved travelling time ($n = 8, 30.8\%$), was easy to use ($n = 4, 15.4\%$) and it reduced waiting time ($n = 5, 19.2\%$). 3 out of 8 caregivers from the nursing facilities also agreed that telepractice saved time travelling and waiting.

37.5% (3/8) of caregivers from the nursing facilities said they would not use the service again, compared to 26.7% (4/15) of caregivers from personal homes. Of these, 2 out of the 3 caregivers from nursing facilities indicated a preference for face-to-face sessions. The nursing staff felt that they 'can get more precise information from in-person sessions' and 'it is better for the therapist to interact with the patient in person'. In-person visits were also seen as an 'opportunity for the resident to go out'. Similarly, 2 out of 4 caregivers from personal homes preferred in-person sessions as they 'want the patient to be properly assessed by the therapist' and they 'can better see the therapist's effort or feedback, more personal touch'. Although the remaining 2 out of 4 caregivers from personal homes were hesitant to use telepractice again due to cost issues, caregivers from nursing facilities cited technological and logistical reasons. One indicated that their 'resident was hard of hearing and cannot hear well through digital means', and 'the clinician cannot see well from the video so staff had to repeat multiple times'. Another said that staff 'need to set up many things but busy, has many other things to do'.

Discussion

Sociodemographic factors

Age, gender, education level and language preference did not impact user satisfaction and the likelihood of continued use.

Although younger respondents with higher education levels have increased receptivity to telepractice,^{9,10} technological literacy and language familiarity may not have been an issue for the participants surveyed. Most of the patients surveyed cited English as a preferred language and had received at least secondary school education, while most caregivers had received up to tertiary education. High smartphone penetration rates in Singapore²⁵ and the exposure to high-technology devices may mean more adults can easily navigate the telepractice systems or have caregivers who can provide technical support.

Service-related factors

On the other hand, service-related factors such as convenience, improved access, safety and ease of use associated positively with participants' satisfaction and the likelihood of continued use. These findings match the UTAUT¹⁶ where technologies perceived as useful^{26,9} and requiring low-effort commitment^{27,28} are more likely to be adopted. Cost was a recurring concern for some respondents, who indicated they would not use the service again. These respondents expressed keenness for government subventions, which by the time of writing, have been rolled out to support telehealth. Their responses align with prior findings that high costs can be a barrier to telepractice adoption.⁷

Although all respondents expressed satisfaction with telepractice, 35.5% (22/62) from personal homes and 37.5% (3/8) from nursing facilities were not keen to continue telepractice. This disparity between satisfaction and interest in continued use finds support in Orlando's systematic review²⁹ where in-person appointments were preferred even though telehealth was a satisfactory option. Respondents from those studies and our research highlighted challenges in rapport building and unfamiliarity in technological aspects of telehealth as factors influencing their choice. One way to address these issues is to establish a hybrid model of service where some sessions are done face-to-face while other sessions are done via telepractice. Solution guides to commonly experienced issues could be provided to all users beforehand. This way, the patient receives benefits from both methods and the clinician-patient relationship is preserved.³⁰

Telepractice in nursing facilities

Despite the convenient access telepractice provided to nursing staff and patients³¹ during the Circuit Breaker period, 37.5% (3/8) of caregivers from nursing facilities were not keen to continue telepractice, compared to 26.7% (4/15) of caregivers from personal homes. This finding was not unexpected given previous research had suggested reduced expertise in telehealth may lower telepractice usage amongst nursing staff^{19,20} Social, technical and logistical challenges were cited as reasons to discontinue telepractice. This outcome aligns with findings from a recent

article³² where overseas nursing home staff felt that telehealth could worsen social isolation for patients and increase staff burden if technological infrastructure and training were lacking.

Another reason why nursing staff in our study may prefer physical consultations could be because telepractice was introduced to nursing facilities only during the Circuit Breaker period. The quick roll-out allowed minimal time to establish processes. Other than their usual duties, nurses now have to solve IT-related problems via trial and error during telepractice. Moreover, the caregiver to patient ratio is much higher in nursing facilities than in personal homes, so staff may not have dedicated time to set up and troubleshoot.

The adoption of telehealth during the pandemic has been reported to be quicker in nursing homes that were already using the service before COVID-19.³² Given that having experienced tech-savvy caregivers encourage successful adoption and implementation of telehealth,^{33–35} nursing staff could be provided with the necessary training for telepractice. Risk management protocols and guidelines delineating job roles during telepractice could also be created with nursing staff, so staff and patients feel assured of the care delivered.

Limitations and future directions

One limitation of this study is its short duration and small non-randomised sample size, with most of the data coming from one tertiary hospital in Singapore that provides adult outpatient speech therapy services. The survey did not compare users who used telepractice with those who declined telepractice as the focus of the initiative was to assess users' satisfaction. Unfortunately, the restricted sampling made it challenging to obtain a well-balanced perspective of patients and caregivers towards telepractice. Second, the cultural validity and reliability of the survey on the population sampled could not be established. Although the questions were adapted from TUQ, TUQ's validation study was conducted on participants from the University of Pittsburgh, where most participants were Caucasians and had at least college and above education.²³ Third, qualitative input obtained were limited in response length. More in-depth qualitative responses could be obtained in future to facilitate the transition towards technology-enabled care.

Conclusion

Telepractice has come a long way. We envision that telepractice will continue as a service delivery option post-COVID-19, particularly as the population age and the caregiving workforce shrinks. Our findings indicate that having good logistical and technological infrastructure, adequate training and developing guidelines, would help telepractice remain a sustainable alternative for delivering healthcare.

Appendix A

Video consultation patient feedback survey (English/Mandarin)

S/ N	Question	Options
1	Are you 您是	<ul style="list-style-type: none"> • Patient 病患 • Caregiver 看护者
2	Gender 性别	<ul style="list-style-type: none"> • Male 男性 • Female 女性 • Prefer not to say 不想透露
3	Age range 年龄层	<ul style="list-style-type: none"> • < 31 • 31-50 • 51-70 • > 70
4	Highest education level attained 最高学历	<ul style="list-style-type: none"> • No formal education 无正式教育 • Primary school 小学 • Secondary school 中学 • Post-secondary education 中学以上的教育和培训 • University 大学
5	Preferred language(s) (tick all that applies) 常用语言(请在所有适当的选项中打勾)	<ul style="list-style-type: none"> • English 英语 • Mandarin 华语 • Malay 马来语 • Tamil 淡米尔语 • Others 其他: _____
6	When did you use video consultation with your clinician? (tick all that applies) 请问您在哪段期间使用线上视讯的医疗服务?(请在所有适当的选项中打勾)	<ul style="list-style-type: none"> • Before COVID-19 Circuit Breaker (before 7th April 2020) 2019冠状病毒阻断期前 (2020年4月7日前) • During COVID-19 Circuit Breaker (7th April – 1st June 2020) 2019冠状病毒阻断期 (2020年4月7日至6月1日) • After COVID-19 Circuit Breaker (after 1st June 2020) 2019冠状病毒阻断期后(2020年6月1日后)
7	What type of service did you receive via video consultation? (tick all that applies) 请问您在线上视讯获得哪项医疗服务?(请在所有适当的选项中打勾)	<ul style="list-style-type: none"> • Communication 发音, 语言, 咬字 • Swallowing 吞咽 • Others 其他: _____
Satisfaction 满意程度		
8	Overall, how satisfied are you with the video consultation sessions? 总体来说, 您对线上视讯的医疗服务感到满意吗?	<ul style="list-style-type: none"> • Very satisfied 非常满意 • Satisfied 满意 • Somewhat satisfied 有点满意 • Neutral 中立 • Somewhat unsatisfied 不太满意 • Unsatisfied 不满意 • Very unsatisfied 非常不满意
Ease of Use 使用方便		
9	The video consultation system was simple to use 线上视讯系统简单易用	<ul style="list-style-type: none"> • Strongly agree 非常同意 • Agree 同意 • Somewhat agree 有点同意 • Neutral 中立 • Somewhat disagree 不太同意 • Disagree 不同意 • Strongly disagree 强烈反对
Reliability 可靠性		
10	The sessions provided over video consultation are as effective as in-person visits 线上视讯所提供的服务与面对面服务并无差异	<ul style="list-style-type: none"> • Strongly agree 非常同意 • Agree 同意 • Somewhat agree 有点同意 • Neutral 中立 • Somewhat disagree 不太同意 • Disagree 不同意 • Strongly disagree 强烈反对

(continued)

(continued)

S/ N	Question	Options
11	I felt comfortable communicating to the clinician via video consultation 我透过线上视讯与治疗师沟通时感到很自在	<ul style="list-style-type: none"> • Strongly agree非常同意 • Agree同意 • Somewhat agree有点同意 • Neutral中立 • Somewhat disagree不太同意 • Disagree不同意 • Strongly disagree强烈反对
12	I felt my privacy is protected during video consultation 我觉得使用线上视讯不会影响我的隐私	<ul style="list-style-type: none"> • Strongly agree非常同意 • Agree同意 • Somewhat agree有点同意 • Neutral中立 • Somewhat disagree不太同意 • Disagree不同意 • Strongly disagree强烈反对
Interface & Interaction Quality界面和互动质量		
13	I could hear the clinician clearly 我可以清楚地听到治疗师的声音	<ul style="list-style-type: none"> • Strongly agree非常同意 • Agree同意 • Somewhat agree有点同意 • Neutral中立 • Somewhat disagree不太同意 • Disagree不同意 • Strongly disagree强烈反对
14	I could see the clinician clearly 我可以清楚地看到治疗师	<ul style="list-style-type: none"> • Strongly agree非常同意 • Agree同意 • Somewhat agree有点同意 • Neutral中立 • Somewhat disagree不太同意 • Disagree不同意 • Strongly disagree强烈反对
Usefulness有用性		
15	What were your reason (s) for choosing video consultation? (tick all that applies) 您为什么会选择线上视讯? (请在所有适当的选项中打勾)	<ul style="list-style-type: none"> • Ease of use容易使用 • Reduce wait time节省了等待复诊的时间 • Saves travelling time节省了往返医院的时间 • Improves access to healthcare使我更容易获得医疗服务 • Saves money节省金钱 • Others其他: _____
Use of Video Consultation in the Future未来使用线上视讯服务		
16	Video consultation sessions are as value-for-money as in-person visits 线上视讯所提供的医疗服务与面对面服务一样物有所值	<ul style="list-style-type: none"> • Strongly agree非常同意 • Agree同意 • Somewhat agree有点同意 • Neutral中立 • Somewhat disagree不太同意 • Disagree不同意 • Strongly disagree强烈反对
17	Will you use video consultation again after COVID-19 circuit breaker? 2019冠状病毒阻断期后, 您是否会继续使用线上视讯的医疗服务?	<ul style="list-style-type: none"> • Yes会 • No不会
18	Please share why you would/would not use video consultation again 请分享您为什么会/不会再次使用线上视讯的医疗服务	
19	Would you recommend video consultation to someone else? 您会不会向他人介绍使用线上视讯的医疗服务?	<ul style="list-style-type: none"> • Yes 会 • No 不会
20	Please provide any additional comments or feedback for our video consultation service 请对我们的线上视讯的医疗服务提供任何评论或反馈	

Acknowledgments

The authors thank all colleagues, patients and caregivers from the Speech Therapy Department and Rehabilitation Centre at Tan Tock Seng Hospital, as well as the Nursing Homes in Singapore for supporting this telepractice effort. We would like to specially acknowledge: (1) Head of Department and Principal Speech Therapist Zenne T'ng Kuan Chen for supporting the initiative. (2) Principal Speech Therapist Ng Seok Kheng for encouraging the development of the work. (3) Principal Speech Therapist Kwong Seh Ling for her guidance and for vetting the manuscript. (4) Senior Therapy Assistant Cheok Bee Khim for calling the patients and caregivers for data collection.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Christine H Chua  <https://orcid.org/0000-0002-3932-6695>

References

- American Speech-Language-Hearing Association. *Telepractice*. <https://www.asha.org/practice-portal/professional-issues/telepractice/> (2019, accessed 20 March 2020).
- Theodoros D. Speech-language pathology and tele-rehabilitation. In: Kumar S and Cohn E (eds) *Tele-rehabilitation*. *Health Informatics*. London: Springer, 2013, pp. 311–323.
- Weidner K and Lowman J. Telepractice for adult speech-language pathology services: a systematic review. *Perspect ASHA Spec Interest Groups* 2020; 5(1): 326–338.
- Yee K, Peh HP, Chong W et al. Telepractice adoption in speech and language therapy during COVID-19 circuit breaker period: benefits and challenges. In: Poster presented at: Singapore Allied Health Conference [Internet], Singapore, 8–9 March 2021.
- Fong R, Tsai CF and Yiu OY. The implementation of telepractice in speech language pathology in Hong Kong during the COVID-19 pandemic. *Telemed J e-Health* 2021; 27(1):30–38.
- Chen JI, Yap JC, Hsu LY, et al. COVID-19 and Singapore: from early response to circuit breaker. *Ann Acad Med Singapore*. 2020; 49(8): 561–572.
- Kavandi H and Jaana M. Factors that affect health information technology adoption by seniors: a systematic review. *Health Social Care Commun* 2020; 28(6): 1827–1842.
- United Nations. *World population ageing 2019. Report*, Department of Economic and Social Affairs, Population Division, New York, 2020.
- Qi M, Cui J, Li X, et al. Perceived factors influencing the public intention to use e-consultation: analysis of web-based survey data. *J Med Int Res* 2021; 23(1): e21834.
- Kruse CS, Mileski M and Moreno J. Mobile health solutions for the aging population: a systematic narrative analysis. *J Telemed Telecare* 2017; 23(4): 439–451.
- GSMA. *Women & mobile: A global opportunity. A study on the mobile phone gender gap in low and middle-income countries. Report*, London, 2010.
- Hoque MR. An empirical study of mHealth adoption in a developing country: the moderating effect of gender concern. *BMC Med Inf Decis Making* 2016; 16(1): 1–10.
- Polinski JM, Barker T, Gagliano N, et al. Patients' satisfaction with and preference for telehealth visits. *J Gen Int Med* 2016; 31(3): 269–275.
- Tenforde AS, Borgstrom H, Polich G, et al. Outpatient physical, occupational, and speech therapy synchronous telemedicine: a survey study of patient satisfaction with virtual visits during the COVID-19 pandemic. *Am J Phys Med Rehabil* 2020; 99(11): 977–981.
- Craig L and Mullan K. Parenthood, gender and work-family time in the United States, Australia, Italy, France, and Denmark. *J Marriage Fam* 2010; 72(5): 1344–1361.
- Venkatesh V, Morris M, Davis G, et al. User acceptance of information technology: toward a unified view. *MIS Q* 2003; 27(3): 425–478.
- Jeon E and Park HA. Factors affecting acceptance of smart-phone application for management of obesity. *Healthc Inf Res* 2015; 21(2): 74–82.
- Bedford J, Enria D, Giesecke J, et al. COVID-19: towards controlling of a pandemic. *Lancet* 2020; 395(10229): 1015–1018.
- van Houwelingen CT, Ettema RG, Kort HS et al. Hospital nurses' self-reported confidence in their telehealth competencies. *J Contin Educ Nurs* 2019; 50(1): 26–34.
- Brewster L, Mountain G, Wessels B, et al. Factors affecting front line staff acceptance of telehealth technologies: a mixed-method systematic review. *J Adv Nurs* 2014; 70(1): 21–33.
- Tan Tock Seng Hospital. Corporate profile. <https://www.ttsh.com.sg/About-TTSH/Pages/Corporate-Profile.aspx> (2021, accessed 20 March 2021).
- Ramig LO, Fox C and Sapir S. Speech treatment for Parkinson's Disease. *Expert Rev Neurother* 2008; 8(2): 299–311.
- Parmanto B, Lewis AN Jr, Graham KM, et al. Development of the telehealth usability questionnaire (TUQ). *Int J Tele-rehabilitation* 2016; 8(1): 3–10.
- IBM Corp. *IBM SPSS statistics for windows, version 27.0*. Armonk, New York: IBM Corp, 2020.
- Statista. Smartphone penetration rate as share of the population in Singapore from 2015 to 2019, with forecasts for 2025. <https://www.statista.com/statistics/625441/smartphone-user-penetration-in-singapore/> (2020, accessed 20 March 2021)
- van Houwelingen CT, Ettema RG, Antonietti MG, et al. Understanding older people's readiness for receiving telehealth: mixed-method study. *J Med Int Res* 2018; 20(4): e123.
- deVeer AJ, Peeters JM, Brabers AE, et al. Determinants of the intention to use e-Health by community dwelling older people. *BMC Health Serv Res* 2015; 15: 103.
- Tsai CH. Integrating social capital theory, social cognitive theory, and the technology acceptance model to explore a behavioural model of telehealth systems. *Int J Environ Res Public Health* 2014; 11(5): 4905–4925.
- Orlando JF, Beard M and Kumar S. Systematic review of patient and caregivers' satisfaction with telehealth videoconferencing as a mode of service delivery in managing patients' health. *PLoS One* 2019; 14(8): e0221848.

30. Luz PLD. Telemedicine and the doctor/patient relationship. *Arq Bras Cardiol* 2019; 113(1): 100–102.
31. Bashir A and Bastola DR. Perspectives of nurses toward telehealth efficacy and quality of health care: pilot study. *JMIR Med Inf* 2018; 6(2): e35.
32. Powell KR and Alexander GL. Consequences of rapid telehealth expansion in nursing homes: promise and pitfalls. *Appl Clin Inf* 2021; 12(4): 933–943.
33. Cimperman M, Makovec Brenčič M and Trkman P. Analyzing older users' home telehealth services acceptance behavior-applying an Extended UTAUT model. *Int J Bio-Med Inf* 2016; 90: 22–31.
34. Lam MK, Nguyen M, Lowe R, et al. "I can do it": does confidence and perceived ability in learning new ICT skills predict pre-service health professionals' attitude towards engaging in e-healthcare? *Stud Health Technol Inf* 2014; 204: 60–66.
35. van Houwelingen CT, Barakat A, Best R, et al. Dutch nurses' willingness to use home telehealth: Implications for practice and education. *J Gerontol Nurs* 2014; 41(4): 47–56.