Perceptions on Telemedicine Adoption in Older Adults After Major Colorectal Surgery: A Qualitative Study

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Abstract

Background: In-person physical consultations remain the norm during the surveillance phase in managing colorectal cancer (CRC) patients after surgery.

Objective: With increasing advocacy of telemedicine worldwide, this study aimed to understand the perceptions of older CRC patients on the role of telemedicine for post-surgical management and surveillance of their disease.

Methods: An exploratory qualitative design study involving 18 participants aged ?65 years who had undergone prior CRC surgery were recruited between March and November 2022. Recruitment stopped when data saturation was achieved. Semi-structured interviews were conducted using the Unified Theory of Acceptance and Use of Technology (UTAUT) model as a reference and analysed using thematic analysis.

Results: Data from the interviews were summarized into four main themes corresponding to the four constructs of the UTAUT model: Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. Specific subthemes were identified within each of the four main themes. Considerations raised about how telemedicine might compromise quality of care, challenges in communicating over a digital medium, and the individual's digital competency and comfort in using technology were top concerns.

Conclusions: This study identified numerous areas that represent opportunities and obstacles towards adoption of telemedicine in older adults after CRC surgery. Targeted interventions must be considered for older adults following cancer surgery to increase adoption of telemedicine and other new technology.

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Abstract

Introduction

In-person physical consultations remain the norm during the surveillance phase in managing colorectal cancer (CRC) patients after surgery. With increasing advocacy of telemedicine worldwide, this study aimed to understand the perceptions of older CRC patients on the role of telemedicine for post-surgical management and surveillance of their disease.

Methods

An exploratory qualitative design study involving 18 participants aged ≥65 years who had undergone prior CRC surgery were recruited between March and November 2022. Recruitment stopped when data saturation was achieved. Semi-structured interviews were conducted using the Unified Theory of Acceptance and Use of Technology (UTAUT) model as a reference and analysed using thematic analysis.

Results

Data from the interviews were summarized into four main themes corresponding to the four constructs of the UTAUT model: Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. Specific subthemes were identified within each of the four main themes. Considerations raised about how telemedicine might compromise quality of care, challenges in communicating over a digital medium, and the individual's digital competency and comfort in using technology were top concerns.

Conclusion

This study identified numerous areas that represent opportunities and obstacles towards adoption of telemedicine in older adults after CRC surgery. Targeted interventions must be considered for older adults following cancer surgery to increase adoption of telemedicine and other new technology.

Keywords

Older adults, telemedicine, surgery, cancer, post-operative care

Introduction

The fear of patients following a successful surgery for non-metastatic colorectal cancer (CRC) is always the concern of disease recurrence. As such, surveillance protocols based on international guidelines are often adhered which involves multiple physical visits to the hospital over the subsequent 5 years. Typically, a CRC patient who does not require chemotherapy visits the surgeon every quarterly in the first year, with each visit potentially lasting four to six hours due to blood investigations, sometimes stretching over two separate days. These are not inclusive of other allied health follow-ups. For patients who require chemotherapy as part of their cancer treatment, visits to the medical oncology clinic can be as frequent as 16 occasions over a six-month period. At the end of the first year, whether chemotherapy was necessary, a patient will undergo a CT scan and colonoscopy. From the second year onwards, patients who did not require chemotherapy will be asked to return every 4 to 6 monthly until the end of the 5 years. For patients who require chemotherapy, quarterly visits are often the norm and the frequency reduced if the condition remains stable.

Taking a step back, each visit exerts severe burden and impact on the lives of such patients and their caregivers. However, recent local data showed that 99.7% of the CRC patients that were physically assessed during surveillance consultations did not lead to clear benefit in oncological outcomes.[1] Internationally, two randomised studies which evaluated the effectiveness of physical examination by specialists to diagnose recurrent colon cancer also reported similar oncological outcomes in asymptomatic patients who were physically assessed during surveillance and those who were not. [2,3] A landmark publication by Graham et al. that evaluated 421 of 1356 patients who developed recurrent disease found that the first indication of disease was detected via CEA testing, imaging (X-rays and ultrasound of the liver) and then colonoscopy (in that order of frequency), and not by routine physical examination. The same authors found that the total cost spent for physician examinations was US$418,615 compared to US$170,880 for CEA.[4] Hence, the benefits of physical face to face consults in surveillance in CRC is questionable, and may be a case of “this is the way we have been doing things”.

Accelerated by the COVID-19 pandemic, telemedicine has been increasingly adopted, initially as a modality to reduce physical visits to the hospital whilst maintaining certain resemblance of continuity of care..[5–7] Whilst it is clear that the reach and application of telemedicine will grow in the Singapore healthcare system, a crucial piece of the puzzle that is poorly understood is the patient

attitudes, acceptability, and barriers to adoption of telemedicine initiatives.

The use of telemedicine may be very intuitive in younger working adults who are more technology savvy, but it remains debatable how this would be perceived amongst older patients. Relevant questions pertaining to older patients' acceptability and barriers to adoption of telemedicine initiatives must be answered before widespread implementation. Moreover, unlike many chronic conditions managed in primary care, cancer patients are also concerned about recurrent disease and the need for accurate early detection.

Therefore, this study aimed to understand the perceptions of older CRC patients on the potential use of telemedicine for post-surgical treatment and surveillance. From these shared perspectives, we hoped to assess the perceived value of telemedicine to its users; identify various concerns that hinder their adoption of this remote modality and explore possible ways to resolve these issues.

Methods

Study participants aged ≥65 years who had undergone surgical resection for CRC within the past 1 – 4 years at the National University Hospital in Singapore were conveniently sampled. Written informed consent for study enrolment and data collection through audio-recording was obtained. Recruited participants completed in-depth, semi-structured interviews that were developed based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model (see Appendix A).[8,9] Interviews were conducted over telephone or with a video conference software.

For the purpose of this study, telemedicine consults refer to consultations conducted via video or voice calls. All interviews were conducted between March 2022 and November 2022 by three qualitative-trained researchers (NQP[male], WLK[female], JSHYN[female]). Each interview was minimally attended by two interviewers to ensure consistency and neutrality in the collection of data. None of them had prior interactions with the participants. Data was de-identified with pseudonyms. Saturation point was reached when additional data did not yield additional themes or perspectives pertinent to the study objectives.

Data was transcribed verbatim by separate research personnel. Accurate transcription was ensured by study team members who were not involved in the original transcription (WLK). Data was analysed using an inductive-deductive thematic approach. This iterative process involved listening to the

interview audio tapes, reading verbatim transcripts, translating to the English language where applicable and interpreting the data using Braun and Clarke's interpretation framework.[10] An *a priori* codebook delineating the four UTAUT constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) was used. Textual units from the transcripts relevant to these four constructs were identified from the data and classified accordingly by two authors (NQP and WLK). The subthemes under these four overarching domains were inductively generated. Throughout this process, the research team met frequently to resolve differences and generate the report. This study has been reported in line with the COREQ criteria. [11] The study was approved by the National Healthcare Group's Domain Specific Research Board (DSRB No.: 2020/01288).

Results

Eighteen (n=18) of the 79 participants approached successfully completed the interviews. The breakdown of exclusions and drop-outs, with their respective reasons is represented by Figure 1. The demographic characteristics of the study participants are shown in Table 1. The mean interview duration was 28m 58s (range 17m 42s – 40m 30s).

A total of 292 textual units pertinent to the four UTAUT constructs were extracted from the 18 interviews and classified accordingly. Out of these 292 quotes, 180 were relevant to PE, 55 to EE, 28 to SI and 29 to FC. From these quotes, specific subthemes were identified within each of the four main UTAUT constructs which were used as four main themes. There were four subthemes identified for PE, two for EE, one for SI, and three for FC, as shown in Table 2.

Theme 1: Performance expectancy

Subtheme 1.1: Impact of telemedicine on care coordination and involvement

Participants generally associated telemedicine use with quicker and direct connectivity to medical personnel for trustworthy advice as opposed to scheduling and waiting for onsite visits, unless the service was overly complicated. For instance, a participant opined that "if in between these two (face-to-face) appointments can have a way to contact the doctor is also very good I feel" (P4). None of them had privacy-related concerns. Also, telemedicine was perceived to enable easier and more convenient participation from family, friends and caregivers who may be unable to attend physical consults at times.

***Subtheme 1.2*: Impact of telemedicine on quality of care**

There were mixed reactions to the quality of care delivered through telemedicine. Several participants opined that telemedicine does not allow full and thorough physical examinations, which could affect the doctor's judgement and cast doubts about diagnostic accuracies. Even with visual input in video calls, some maintained strong opinions like "you need the tactile part where you got to feel… the physical part is very important" (P12) and that "sometimes they (the doctor) can pick things up (if doing an in-person physical exam)" (P17), highlighting the shortfall of telemedicine in this respect.

A handful of them, on the contrary, did not find this a big issue as they felt that visual assessment alone was sufficient as a first-line, and if "there's an issue, he (the doctor) will call me to go down (to see the doctor)" (P6). Others believed that doctors are "highly trained and highly intelligent" (P12) and would therefore not be limited by the lack of certain features in telemedicine to execute their duties and professionalism.

***Subtheme 1.3*: Challenges in communicating over a digital medium**

One of the greatest reservations cited by participants pertained to the reduction in human touch from traditional consults. Many quotes illustrated this, including "there are certain factors, human factors, that makes a difference, even if is the same doctor (conducting the telemedicine consult), the whole scenario has changed, being not physically there for critical illnesses" (P12), and "the doctor may have more personal touch when talking (in-person) […] make me more at ease" (P14). One participant even went as far as to describe an imaginary scenario of a doctor breaking bad news over the phone as 'soul-less' (P16), and that the 'human warmth is missing in a (telemedicine consult)" (P16). As such, telemedicine services were deemed to be incapable of providing the reassurance that face-to-face consults offer, especially for older patients who are more fearful and reliant on non-verbal cues, or less confident in their understanding of their health conditions.

The majority also found it more difficult to ask questions and verbalise their concerns over telemedicine, with only a small proportion of them saying that telemedicine is "quite convenient almost anything can ask" (P1). There were divided views on the ease (or difficulty) of using telemedicine services to convey information. While proponents saw no major difference between the consult modes for the usual disclosure of results and health reports, others felt that such information would be better received in person, particularly during new patient-doctor encounters where little

rapport and trust have been built.

***Subtheme 1.4*: Perceived convenience of a remote consultation**

Some patients were happy to adopt telemedicine as they then would not need to be in the hospital physically for long hours (one participant mentioned that he/she “cannot stand the smell of hospitals” (P1). Others, however, were quick to point out that in fact for them (as older adults), the doctor’s appointment provides them with a routine to look forward to: “it gives your day a fuller meaning, than if I were just to sit and watch TV” (P16). To some of them, travelling down to the hospital was not troublesome at all, and being onsite also meant that other things can be done, such as collection of medicine. Moreover, some older patients use the doctor’s appointment as a motivation to stay out and socialize more: “then after the appointment, then since I'm out already, oh I might as well go for lunch with some friends” (P16). Time was not a factor for those who are retirees, as they have “all the time on our (their) hands” (P17).

There were, however, perceived drawbacks to telemedicine use such as the difficulty in obtaining a medical certificate (to be absent from work) (P3), given its lack of recognition as an official consult mode. Getting appropriate coverage by a co-worker for that brief consult session might be challenging (P10). Besides that, participants also worry that appointments might be cancelled casually (for example, if the doctor is caught up in an emergency) if the consult was an online one, and that would be wasteful for those who had taken leave but had not rightfully utilised it.

Theme 2: Effort expectancy

***Subtheme 2.1*: User competency and comfort in using technology**

The level of technical competence required to set up a telemedicine consult was another barrier mentioned by several participants, who shared that they lacked confidence in being able to troubleshoot any technical-related issues on the spot, especially if the consult was in video format. Emotions of anxiety and fear in adopting the new technology were prevalent, including: “I-I don't know how to use. How-how to do it? I’m afraid I would press randomly and press wrong(ly)” (P6), and that “personally I am the problem, how-how to use the technology those err err devices I am not too familiar with and plus I don't have confidence” (P5). Even for voice-only consults, some of them were hesitant: “I don’t know to operate (the handphone). Sometimes I receive call, I cannot receive. I receive I cannot receive, I cut off. I don’t know to press which button. Never learn.” (P7) Most participants with this worry attribute it to their age: “We, older generation one, don't know. We don't

know these things one." (P15)

Subtheme 2.2: **User-perceived telemedicine complexity**

On the flip side, a smaller group perceived telemedicine to be manageable in complexity. In fact, some of them were hopeful that that they will be more likely to adopt the use of telemedicine as a routine if they subsequently become familiar with it: "I think like doing Zoom (app for video teleconsults), it-it's not difficult at all what" (P8). This was echoed by another participant who said: "At the moment because it's a new thing. So for my age group it might be a little bit daunting, […] it will take time getting used to. But I imagine as with all new technologies that is being introduced to us, once we get the hang of it, or once we've done it a couple of times, we will probably say: 'Ah, so much more convenient, I don't have to trek all the way to, the hospital.'" (P16).

Concerns about language competence and their ability to articulate their needs – especially if they are not proficient or comfortable conversing in English was another perceived barrier for telemedicine adoption, unless instructions to set up and the conduct of the telemedicine is available in their first language.

Theme 3: Social influence

Subtheme 3.1**: Support and validation from others in adopting telemedicine**

The extent of social support influence and its sources on the uptake of telemedicine adoption varied among this sample of participants. Some participants were more inclined to adopt telemedicine if the HCW recommended it, in the interests of the individual: "Because I always think the doctors, you know, give you the best advice" (P8). However, not all were convinced and some participants still felt that it is mainly a patient-based decision.

Similarly, there was an equal share of participants who spoke about how support from family or friends would contribute to the adoption of telemedicine, and those who would still eventually decide on their own regardless of external pressure. Some participants felt that such support will go a long way in encouraging participants to adopt telemedicine. For example, one participant expressed the view that "unless they (the older adults who are not familiar with new technology) have their family member operate (the telemedicine device) for them" (P3), it would be challenging for the older adults to truly embrace this form of medical consult. Others felt that as a potential user of telemedicine, their personal opinion and preferences mattered much more, with a participant

expressing the view that “I’m just quite liberal to use any method in which I wish to” (P12).

Exposure to news about the use of telemedicine influenced older adults’ intention to adopt telemedicine as well. For instance, a participant spoke about how “the news had reported it recently” and “then, I saw that the elderly know how to use it, but I don't. Haha.” (P6). Increased awareness of virtual consults through media platforms helped participants realise that if others can learn and adapt to the new technology, they too will be able to do so.

Theme 4: Facilitating conditions

***Subtheme 4.1*: Situational “push” factors in telemedicine adoption**

Certain circumstances were quoted by some participants to have driven their desire to utilise telemedicine. The recent COVID-19 pandemic was expressed and identified as a possible facilitating condition that would have made participants more inclined to adopt telemedicine. It was clear that in such a situation, telemedicine would enable care continuity while ensuring safe-distancing and decreasing unnecessary human contact, especially in the hospital where the number of COVID cases might be high.

Apart from infectious outbreaks, participants also reckoned that they might be keen to opt for telemedicine if they were physically unfit or faced with any limiting impairments. In such cases, telemedicine might in fact be more feasible than physical consults, and its advantages for those who have mobility issues was clear: “especially for those who […] cannot really walk. That's (having the option of using telemedicine is) beneficial to them” (P10).

***Subtheme 4.2*: Service related charges, set-up and assistance**

Issues surrounding value for money, support availability and environmental set-up were other conditions perceived by the participants to facilitate telemedicine utilisation. For instance, some participants raised the point that teleconsults are not as economical as physical consults if both services cost the same, as argued by one participant: “you don't see the doctor in physical form, so the feeling is the charges should be reduced” (P13). Participants also opined that telemedicine might be more appealing if there were standby translators to reassure patients non-fluent in English that the quality of the consult will not be compromised. Lastly, the presence of pre-requisites such as a stable internet connection at home would encourage the use of technology such as telemedicine.

Subtheme 4.3: **A "willing to learn" attitude**

Intrinsically, willingness to learn is a facilitating factor for participants to adopt telemedicine. Several participants reflected this sentiment despite age, and how such an attitude could empower one to overcome the difficulties faced in the process of learning the technology with compensatory mechanisms such as: "on a paper take down. Because I very... Grow old forget. Better write down (instructions on how to use telemedicine)" (P7).

Discussion

To our knowledge, this was the first study to specifically examine the perceptions and concerns surrounding acceptability of adopting telemedicine as part of post-operative care in older adults with CRC. A lot of studies in recent years focusing on telemedicine in older adults were published in the context of the COVID-19 pandemic, which decreases their external validity in a post-COVID world. [12–17] Many studies also focused on satisfaction with telemedicine, which does not necessarily translate to acceptability and adoption of telemedicine for older adults.[13,18,19] This is especially pertinent in the context of rapidly ageing societies globally.

As with every new innovation/technology that is introduced to the community, one often falls into the trap of confirmation bias. Stakeholders often only focused on the positive aspects and thereby reaffirming their beliefs that the newer option is superior. In this instance, it is not surprising that the advantages of telemedicine that were mentioned include the increased accessibility to HCWs, the convenience afforded by telemedicine, in certain situational demands such as the recent pandemic, and in patients with mobility issues.

However, for any new model of care to withstand the test of time, one must focus on the barriers and concerns that are often dismissed by stakeholders. Concerns raised about communicating across digital platforms, and the individual's digital competency and comfort in using technology, were especially pertinent in our study group. Concerns that we might normally attribute to a younger patient may also resonate with older patients. For example, it is a fallacy to assume that older individuals mean retirees, and work-related considerations would similarly apply to older patients, as reported by our study participants.

Delving deeper into our findings, the theme that featured most prominently in our study is performance expectancy. Significant portions of our interviews were inevitably required to cover

aspects of PE of telemedicine amongst participants. In particular, the subthemes of how telemedicine might compromise quality of care and challenges in communicating over a digital medium were top concerns for these older CRC patients interviewed. Effort expectancy, especially the subtheme of individual's digital competency and comfort in using technology, follows closely behind as a major consideration amongst our participants. In other words, a multi-themed concern of how telemedicine compares to traditional consult and the effort required to learn this new technology represented the main considerations in this study. Indeed, most studies in the literature pertaining to the adoption of telemedicine reports considerations that are multi-themed. [20–22]

One interesting feature that all stakeholders have often touted as the biggest benefit of telemedicine is that of time-savings. But our cohort of older participants, especially the retirees, reflected that they have 'all the time in the world' and were happy to use the opportunities as a social visit, not just to the hospital but also to mingle with their friends. This is not a common insight reported by current literature on telemedicine even in studies focusing on older adults, but must be dealt with seriously in many developed countries where the population is greying.[13–15,23] Perhaps this finding may be more pertinent to city-states like Singapore and major metropolises of the world where the distance from their home to the hospitals is less than 20km at most. The extensive transportation networks that is present in Singapore also makes travelling less of a hassle. In contrast, in other countries where the journey may take hours or even days, the convenience presented by telemedicine is definitely considerable. The difference in telemedicine uptake between different populations may therefore be explained by differential experiences in each of the themes. While the UTAUT model allows us a theoretical basis to understand the individual factors that leads to telemedicine adoption, ultimately in each individual there is a barriers-to-benefits analysis, and adoption happens when the expected benefits outweigh the barriers. In urban centres like Singapore where the strongest attributes of telemedicine (such as convenience) may be diminished, the adoption of telemedicine may therefore be handicapped.

That said, what is clear is that our findings highlighted important insights in a developed healthcare landscape like Singapore and other countries with ageing societies. The number of patients with cancers is rising worldwide, and with the advent of newer surgical techniques and non-surgical therapeutics, cancer patients are expected to live longer, all of which would translate to higher number of hospital consultations.[24] The adoption of telemedicine in healthcare is inevitable and is in the stage of finding its position. The benefits of decreasing the number of hospital visits per

patient and relieving the stress of the rapidly increasing patient pool at the health system level are immense.

To reach that eventuality, authorities will likely need to involve all stakeholders, especially those in the care of older patients to support the use of telemedicine – including the caregiver, HCWs, and improving public opinion (via news/media coverage). These are the exact factors uncovered under the theme of social influence, and their impact must not be underestimated. In addition, to decrease effort expectancy, particularly in improving the individual's digital competency and comfort in using technology, government/hospital-led efforts to provide educational courses for senior citizens may be a strategy worth considering. System-level improvements, such as decreasing the cost of telemedicine consult relative to traditional face-to-face consult or ensuring that all telemedicine consults have a translator, may also entice older patients who want 'value for money' and who are concerned about language competency affecting the quality of the consult.

In the context of our participants who are on active surveillance for recurrence after CRC diagnosis and major surgery, their main concern will likely be that whatever method of follow up is adopted, it must be good enough to pick up a recurrence. This is likely why performance expectancy came up as the main theme discussed by most participants. This seems to be the main difference in attitudes of our CRC patients compared to what is reported in the literature for telemedicine use in chronic diseases.[25,26] In addition, we have also seen how personal factors such as existing rapport with the HCW or an intrinsic 'willingness to learn' can be critical factors in the adoption of telemedicine. Learning from this insight, authorities who are initiating telemedicine services should focus resources on appropriate patient groups (e.g., those with low-risk, early stage disease, with good established rapport and no major post-operative complications) for maximal yield. To allay anxiety related potential compromised care with telemedicine, a flexible method of follow-up care can be instituted, where patients who are likely to require physical assessments or emotional support are still allowed and encouraged to come to the clinic for a face-to-face consult.

There are limitations to our study. While our qualitative methodology allowed us to capture unique themes pertaining to older adults' inclination to use telemedicine, the relative weights of each theme in their contribution to intention to use telemedicine could not be determined. In addition, our study seems to suggest that there exists a deeper layer of individuality that may not be represented by the UTAUT model which is largely based on logical assumptions. Lastly, 61 (77.2%) out of 79 patients

who were approached declining to participate. This could introduce a selection bias in our study – for example, patients who had strong views about or experience with telemedicine may have been more likely to participate.

The themes identified in this review are by no means exhaustive, and older adults in different regions and cultures will likely have different considerations. However, the authors hope that this study will be able to lay the groundwork for the identification of generic considerations affecting the adoption of telemedicine in older adult cancer patients worldwide. This would be helpful for policy makers who may be keen to adopt telemedicine initiatives while trying to help older adults adapt to the post-COVID world. Future studies could explore the effectiveness of telemedicine in improving long-term health outcomes or cost-effectiveness of a health system.

Conclusion

Telemedicine will likely remain a feature in healthcare. Using the UTAUT model as a conceptual framework, under the four main constructs of PE, EE, SI and FC, this study identified numerous subthemes that represent opportunities and obstacles to the adoption of telemedicine in older adults after CRC surgery. The authors hope that these findings would serve as a reference for policy makers keen to adopt telemedicine while ensuring that older adults are not left behind by new technology.

References

1. Tham HY, Lau J, Lee SKF, Hwang S, Chan DKH, Tan KK. Is There Still a Role for Physical Consultation in Colorectal Cancer Surveillance? J Gastrointest Surg. 2021 Jan;25(1):290–2.

2. Mäkelä JT, Laitinen SO, Kairaluoma MI. Five-year follow-up after radical surgery for colorectal cancer. Results of a prospective randomized trial. Arch Surg. 1995 Oct;130(10):1062–7.

3. Ohlsson B, Breland U, Ekberg H, Graffner H, Tranberg KG. Follow-up after curative surgery for colorectal carcinoma. Randomized comparison with no follow-up. Dis Colon Rectum. 1995 Jun;38(6):619–26.

4. Graham RA, Wang S, Catalano PJ, Haller DG. Postsurgical surveillance of colon cancer: preliminary cost analysis of physician examination, carcinoembryonic antigen testing, chest x-ray, and colonoscopy. Ann Surg. 1998 Jul;228(1):59–63.

5. Boehm K, Ziewers S, Brandt MP, Sparwasser P, Haack M, Willems F, Thomas A, Dotzauer R, Höfner T, Tsaur I, Haferkamp A, Borgmann H. Telemedicine Online Visits in Urology During the COVID-19 Pandemic-Potential, Risk Factors, and Patients' Perspective. Eur Urol. 2020 Jul;78(1):16–20.

6. Shirke MM, Shaikh SA, Harky A. Implications of Telemedicine in Oncology during the COVID-19 Pandemic. Acta Biomed. 2020 Sep 7;91(3):e2020022.

7. Hau YS, Kim JK, Hur J, Chang MC. How about actively using telemedicine during the COVID-19 pandemic? J Med Syst. 2020 Apr 30;44(6):108.

8. Venkatesh V, Morris MG, Davis GB, Davis FD. User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly. 2003;27(3):425–78.

9. Harst L, Lantzsch H, Scheibe M. Theories Predicting End-User Acceptance of Telemedicine Use: Systematic Review. J Med Internet Res. 2019 May 21;21(5):e13117.

10. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006 Jan 1;3(2):77–101.

11. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007 Dec;19(6):349–57.

12. Frydman JL, Li W, Gelfman LP, Liu B. Telemedicine Uptake Among Older Adults During the COVID-19 Pandemic. Ann Intern Med. 2022 Jan 18;175(1):145–8.

13. Alsabeeha NHM, Atieh MA, Balakrishnan MS. Older Adults' Satisfaction with Telemedicine During the COVID-19 Pandemic: A Systematic Review. Telemed J E Health. 2023 Jan;29(1):38–49.

14. Choi MCY, Chu SH, Siu LL, Tse AG, Wu JCY, Fung H, Chiu BCF, Moi VCT. Telemedicine acceptance by older adults in Hong Kong during a hypothetical severe outbreak and after the COVID-19 pandemic: a cross-sectional cohort survey. Hong Kong Med J. 2023 Oct;29(5):412–20.

15. Bhatia R, Gilliam E, Aliberti G, Pinheiro A, Karamourtopoulos M, Davis RB, DesRochers L, Schonberg MA. Older adults' perspectives on primary care telemedicine during the COVID-19 pandemic. J Am Geriatr Soc. 2022 Dec;70(12):3480–92.

16. Kuang W, Zeng G, Nie Y, Cai Y, Li J, Wan Y, Qiu P. Equity in telemedicine for older adults during the COVID-19 pandemic. Int Health. 2022 May 2;14(3):329–31.

17. Sano E, Benton E, Kenny J, Olsen E, Heravian A, Truong J. Telemedicine Use by Older Adults in a COVID-19 Epicenter. J Emerg Med. 2022 Sep;63(3):325–31.

18. Şahin E, Yavuz Veizi BG, Naharci MI. Telemedicine interventions for older adults: A systematic review. J Telemed Telecare. 2024 Feb;30(2):305–19.

19. Pang NQ, Lau J, Fong SY, Wong CYH, Tan KK. Telemedicine Acceptance Among Older Adult Patients With Cancer: Scoping Review. J Med Internet Res. 2022 Mar 29;24(3):e28724.

20. Scott Kruse C, Karem P, Shifflett K, Vegi L, Ravi K, Brooks M. Evaluating barriers to adopting telemedicine worldwide: A systematic review. J Telemed Telecare. 2018 Jan;24(1):4–12.

21. Jacob C, Sezgin E, Sanchez-Vazquez A, Ivory C. Sociotechnical Factors Affecting Patients' Adoption of Mobile Health Tools: Systematic Literature Review and Narrative Synthesis. JMIR

Mhealth Uhealth. 2022 May 5;10(5):e36284.

22. Venkataraman A, Fatma N, Edirippulige S, Ramamohan V. Facilitators and Barriers for Telemedicine Systems in India from Multiple Stakeholder Perspectives and Settings: A Systematic Review. Telemed J E Health. 2024 May;30(5):1341–56.

23. Wilson J, Heinsch M, Betts D, Booth D, Kay-Lambkin F. Barriers and facilitators to the use of e-health by older adults: a scoping review. BMC Public Health. 2021 Aug 17;21(1):1556.

24. Arnold M, Sierra MS, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global patterns and trends in colorectal cancer incidence and mortality. Gut. 2017 Apr;66(4):683–91.

25. Segal JB, Dukhanin V, Davis S. Telemedicine in Primary Care: Qualitative Work Towards a Framework for Appropriate Use. J Am Board Fam Med. 2022;35(3):507–16.

26. Goldberg EM, Jiménez FN, Chen K, Davoodi NM, Li M, Strauss DH, Zou M, Guthrie K, Merchant RC. Telehealth was beneficial during COVID-19 for older Americans: A qualitative study with physicians. J Am Geriatr Soc. 2021 Nov;69(11):3034–43.

Tables

Table 1: Demographic characteristics of participants

Demographic		
Age, n (%)	65-69 years	8 (44.44)
	70-74 years	8 (44.44)
	> 75 years	2 (11.11)
	Mean (SD)	73.6 (6.31)
Gender, n (%)	Male	12 (66.67)
	Female	6 (33.33)
Ethnicity, n (%)	Chinese	18 (100.00)
	Malay	0 (0.00)
	Indian	0 (0.00)
	Others	0 (0.00)
Employment status, n (%)	Working	4 (22.22)
	Unemployed	2 (11.11)
	Housewife	2 (11.11)
	Retired	10 (55.56)
Monthly household income, n (%)	< $,3000	12 (66.67)
	$3,000 to $6,000	2 (11.11)
	$6,001 to $9,000	1 (5.56)
	$9,001 to $12,000	2 (11.11)
Highest education level, n (%)	Primary	4 (22.22)
	Secondary	6 (33.33)
	Tertiary	7 (38.89)
	Did not answer	1 (5.56)
Marital status, n (%)	Single	1 (5.56)
	Married	13 (72.22)
	Divorced	1 (5.56)
	Widowed	3 (16.67)
Type of housing, n (%)	3 room HDB flat	2 (11.11)
	4 room HDB flat	7 (38.89)
	5 room HDB flat	1 (5.56)
	Executive maisonette	3 (16.67)
	Condominium	3 (16.67)
	Landed housing	1 (5.56)

Table 2: Main themes and sub-themes

Themes	
Performance Expectancy	Subtheme 1.1: Impact of telemedicine on care coordination and involvement Subtheme 1.2: Impact of telemedicine on quality of care Subtheme 1.3: Challenges in communicating over a digital medium Subtheme 1.4: Perceived convenience of a remote consultation
Effort Expectancy	Subtheme 2.1: User competency and comfort in using technology Subtheme 2.2: User-perceived telemedicine complexity
Social Influence	Subtheme 3.1: Support and validation from others in adopting telemedicine
Facilitating Conditions	Subtheme 4.1: Situational “push” factors in telemedicine adoption Subtheme 4.2: Service related charges, set-up and assistance Subtheme 4.3: A “willing to learn” attitude

*HCW – healthcare workers

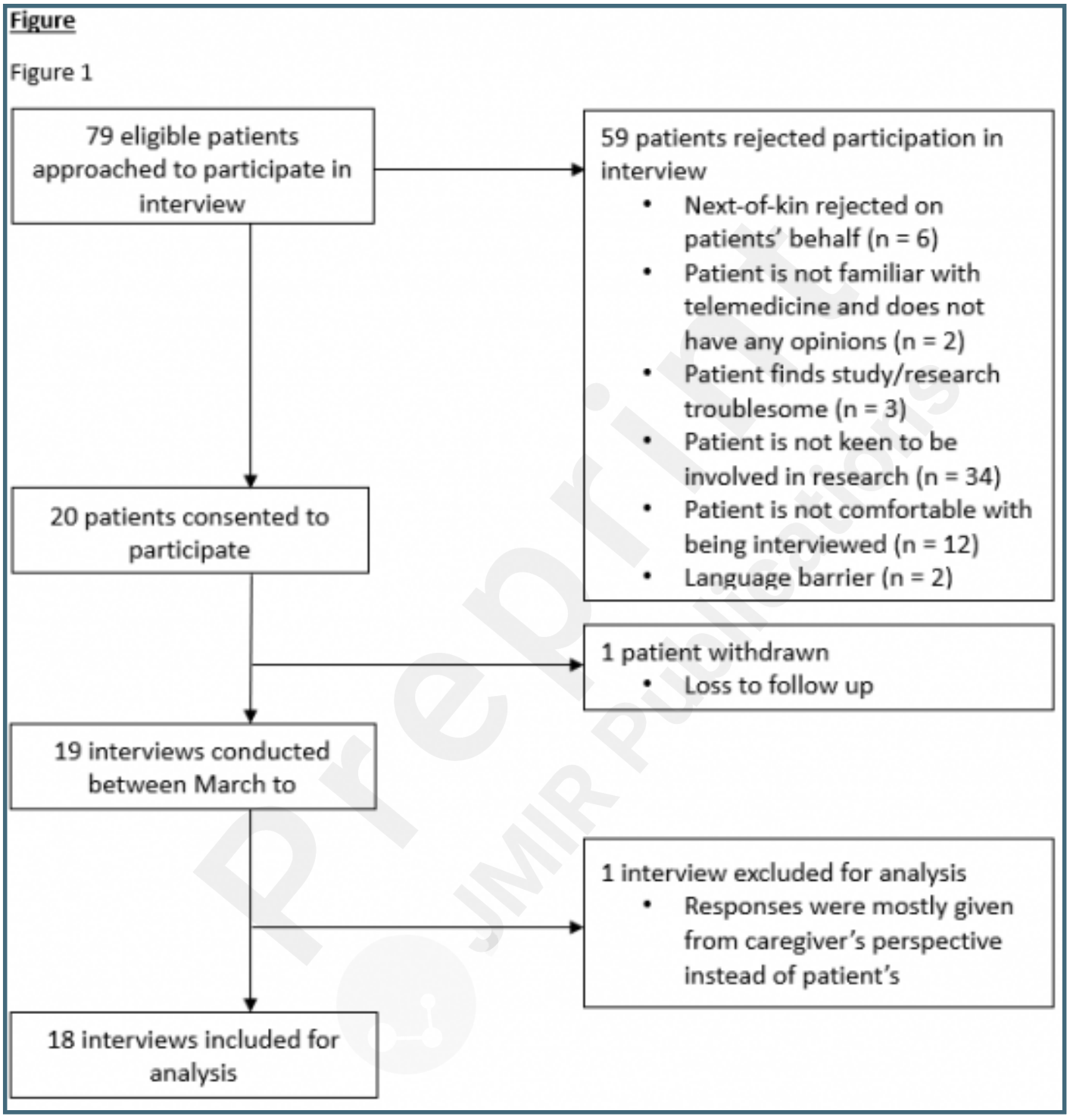
Supplementary Files

Figures

Untitled.

Figure

Figure 1



CONSORT (or other) checklists

COREQ checklist.
URL: http://asset.jmir.pub/assets/38d8666d5053ccb96ee3c2d8dca74b8d.pdf