



Perspectives of older women with early breast cancer on telemedicine during post-primary treatment

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Abstract

Purpose Telemedicine has the potential to lessen healthcare burden of older patients due to frequent appointments, physical disabilities, and reliance on caretakers. To benefit from telemedicine, patients must have the capacity and willingness to engage with technology. This study aimed to better understand the telemedicine experiences of older women with non-metastatic breast cancer regarding visit convenience, completeness, and interpersonal satisfaction.

Methods Semi-structured interviews were conducted in a convenience sample of women age 65+, post-primary treatment for stage I–III breast cancer, who had received in-person outpatient care at a cancer center in urban North Carolina before a telemedicine appointment occurring after March 2020. Patients were interviewed about their perceptions of telemedicine (telephone, video) as compared to in-person visits. Audio files of interviews were transcribed and analyzed for themes and subthemes established a priori in the interview protocol.

Results Fifteen patients (telephone = 5, video = 10) were consented and interviewed July–October 2021, mean age 74. Thirteen participants reported they preferred a hybrid care model that included telemedicine care over in-person care alone. COVID-19, physical disability, and transportation burden were the most common factors for telemedicine preference. Comfort with familiar face-to-face interactions and having a physical exam were common factors for in-person appointment preference. In-person appointment was favored early in the post-primary treatment phase; telemedicine was more acceptable when relationships were well-established and patients were farther out from diagnosis.

Conclusions Patient-provider discussions about appointment modality should take into account newness of diagnosis, patient familiarity with the care team, travel burden, and necessity of physical exam.

Keywords Telemedicine · Breast cancer · Post-primary treatment · Older adults

Introduction

Explosive growth in the use of telemedicine (video or telephone visits) followed the onset of the coronavirus disease 2019 (COVID-19) pandemic to meet healthcare needs while avoiding unnecessary exposure risks in ambulatory care in the USA. In March 2020, the Centers for Medicare and Medicaid Services (CMS) expanded reimbursement for telemedicine visits to equal that for in-person visits [1, 2]. CMS is a federal agency within the US Department of

Health and Human Services that administers the Medicare program, which primarily insures Americans age 65 years or older. Medicare part B covers 80% of approved services in outpatient visits at a set rate decided on by CMS [3]. On January 1, 2021, CMS reimbursement of telemedicine visits was expanded to include charting and increased visit complexity [4]. CMS telemedicine reimbursements under the public health emergency plan have been extended through the 2023 calendar year in order to gather evidence and comments to support possible permanent reimbursement [5].

The policy and infrastructure that enabled emergency transition during COVID-19 may be laying the groundwork for enduring expansion of elective telemedicine, a technology that could decrease the burden of medical care for both older patients with cancer and the healthcare system. Frequent appointments, physical or cognitive disability, and reliance on caretakers for transportation are important

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factors that impact the burden of cancer care for this age group, and reasons for which telemedicine may provide important benefits over in-person care.

To benefit from telemedicine, patients must have basic skills to use technology and feel sufficiently comfortable engaging via this medium. This may be challenging for some older patients because of inexperience with and lack of access to technology and audiovisual or cognitive disability [6, 7]. Studies conducted prior to COVID-19 found that older age alone has been independently associated with less frequent telemedicine and video visits within specialty and primary care [8] and lower eHealth literacy [9]. As cancer is mainly a disease of older adults, with a median age of 65 at diagnosis for most cancer types [10], it is important to assess their acceptability of telemedicine.

To date, a scoping review on telemedicine acceptance among older adult patients with cancer identified 19 articles published before September 2020, 10 of which looked at telephone and video conferencing technologies. Eighteen of these studies collected data prior to the COVID-19 pandemic [11]. Now, there is also a growing body of literature describing telemedicine acceptability in cancer care during the COVID-19 pandemic [12–21]. However, there are few studies investigating telemedicine acceptability in patients ≥ 65 . Some studies report results stratified by age, allowing for a small subgroup analysis of older patients. One such report found that 71% of elderly participants ($n = 22/31$) felt that communication using telemedicine was equal or superior to in-person visits and 87% ($n = 29/31$) felt clinicians could show equal caring and support through telemedicine as through in-person care [21]. Another publication with a median age of 63 found that breast cancer patients' relative satisfaction with telemedicine tracked with their perception of its usability and that this was not associated with demographic factors such as age [19].

The purpose of our report is to provide a qualitative description of the perspectives of women age 65 or older who have received both in-person and telemedicine care for early-stage breast cancer. Participants were able to contrast their in-person experiences to their telemedicine experiences. Through a better understanding of patient perspectives on the accessibility and acceptability of video and telephone telemedicine visits, oncology providers and institutions can work towards improving clinical protocols and supportive infrastructure for telemedicine visits to better serve a diverse population of older patients with cancer.

Methods

In this qualitative report, we employed Braun and Clarke's six step thematic analysis framework [22] to analyze semi-structured interviews conducted in a convenience sample

of older women in post-primary treatment for stage I–III breast cancer, who received conventional outpatient care at a cancer center in urban North Carolina before utilizing telemedicine after March 2020.

Recruitment

To recruit participants, the North Carolina Cancer Hospital (NCCH) clinic schedule in Epic@UNC was screened for women who had completed primary treatment, which may have included surgery, chemotherapy, and/or radiation. Patients had to have been seen in-person at NCCH prior to March 2020 and subsequently had at least one telemedicine visit after January 1, 2021. Out of 40 eligible patients, 15 were consented and were interviewed between July and October 2021.

Participants were invited to complete Appendix II (patient-reported portion) of the geriatric assessment (GA) after their interviews, using secure link in REDCap or verbally with the interviewer. Participants received a \$25 gift card for their time. This study was approved by the UNC Lineberger Comprehensive Cancer Center Protocol Review Committee (PRC) and UNC-Chapel Hill IRB (Office of Human Research Ethics; IRB #21-0924.) It was registered prospectively at ClinicalTrials.gov (NCT04990934.)

Data collection

There were two groups of participants: cohort 1 had telephone provider visits ($n = 5$), and cohort 2 had video provider visits ($n = 10$). Both cohorts were interviewed by telephone by a qualified researcher (CB) who had no prior relationship with the participants. A semi-structured interview guide established a priori with themes and open-ended questions agreed upon by the research team (Appendix) guided these conversations that lasted 16 to 37 min. Audio files of interviews were transcribed and analyzed for themes established a priori in the interview protocol.

Data analysis

Interviews were analyzed according to the codebook produced from the interview guide. Two team members (CB, EOK) participated in the qualitative data analysis, independently coding transcripts and meeting to discuss impressions of the data and iterative expansion of sub-themes based on transcripts. KN was assigned to resolve coding conflicts if consensus could not be reached. Quotations remained tagged to pertinent demographic

Table 1 Description of cohort

Variable	Overall N =
Age—mean (SD) years	73 (5.24) Range 67–85
Race	
Non-Caucasian	2
Caucasian	13
Education ¹	
High school or some college	4
College	4
Advanced degree	5
Stage of breast cancer	
0	1
1	7
2	6
3	1
Years since completion of primary treatment ² , mean (SD) years	2 (3.17) Range 0.5–10
Distance from NCCH, mean (SD) miles ³	40 (52.4) Range 1–162

¹2 participants did not complete the geriatric assessment, and therefore, education is unknown

²1 participant declined primary treatment so years since primary treatment cannot be reported

³Out of state residences excluded

variables (Table 1) through ID number. High inter-rater reliability was achieved through comparison of coding decisions between two researchers.

Results

Study participants

Forty potentially eligible patients were identified in Epic@UNC clinic schedules as having had a telemedicine appointment between January and September 2021 and otherwise met inclusion criteria. Of these 40 patients, 3 had no memory of their telemedicine appointment, 3 had hearing impairment or cognitive disability that made them ineligible for interview, 13 were unreachable after three call attempts, and 6 were not interested in participating.

Recruitment was stopped early before enrollment of 30 participants because data saturation was achieved across themes determined a priori in the interview guide. In the final sample of 15 women (Table 1), the mean age was 74 years (range 67–85), the time since completion of primary treatment was 3.5 years (range 0–10 years), and the average commute time to NCCH from the participant's home zip codes was 40 miles (range 1–162 miles, excluding out-of-state residences).

Overview

In these interviews, participants reflected on their desires for continued access to or planned cessation of the telemedicine option as follow-up breast cancer appointments transitioned back to in-person. They described the most important factors influencing their preferences, with an emphasis on convenience, timeliness, efficiency, and physical disability. The perceived importance of the physical exam was the most commonly cited reason for an in-person appointment preference, and thus, telemedicine was seen more as a potential adjunct to, rather than replacement for, in-person care. Participants described reasons for choosing telephone vs. video and which modality they preferred. Reflections led to suggestions for improving telemedicine such as when it should be used along the cancer journey and how to make it more accessible.

Choosing telemedicine after COVID-19

Thirteen participants reported that they wanted to continue using a hybrid model of care that included telemedicine rather than in-person care alone, beyond the context of COVID-19. Telemedicine was seen as a valuable adjunct to in-person care, and not as a replacement. It was important to patients to be able to choose if and when they wanted to use this care modality given the multitude of shifting variables that modulated whether it was preferable or convenient for them.

Participant reasons for continuing interest in telemedicine beyond the reduced risk of COVID-19 exposure included convenience, efficiency, and greater healthcare access, particularly in regard to disability and rurality. The mean distance between a participant's residence and NCCH was 40 miles, with some participants commuting more than 150 miles for their appointments. Distance of commute was a significant determinant of telemedicine convenience, but the multifactorial burden of a commute—including driving, parking, and walking to the hospital—was even more prominent in participant reflections on telemedicine's convenience. The extent of physical disability or deconditioning modulated the necessity of this convenience. For instance, telemedicine enabled routine follow-up appointments that would otherwise not be practical for patients who relied on emergency medical services (EMS) and ambulance transport to the hospital because of disability. Other factors that increased burden of commute included the difficulty of navigating a growing urban landscape with new construction and traffic patterns and frustrations with finding parking. Older adults who were unable to drive at all were spared

the effort and cost of coordination of transportation when they had telemedicine visits.

Here, I'm gonna go back to age because as you age—as I've aged, and I've realized a lot of things, it's more difficult in this area now with all the growth. The time that it takes to get out, the traffic, all the construction. It's just so much that driving will eventually be a big problem for me. Participant #1 (P#1)

The efficiency of telemedicine was also seen as one of its greatest assets. There was less waiting to see the doctor—appointments were described as on-time and more efficient. For patients receiving concise follow-up appointments, or those with a high healthcare burden, being able to shorten the total time investment required by an in-person appointment was valued. There was a high tolerance from patients waiting to see a provider when they were able to do so from the convenience of their own homes. It was also noted that clinician schedules ran more on-time when they were mostly seeing patients via telemedicine (during periods of the COVID-19 pandemic).

I never waited. I was never delayed. In that way, maybe, telemedicine is better than in person, 'cause sometimes in person—many times, in person, you wait and wait and wait for a doctor. I did not wait during telemedicine videos. P#2

Retirees who often spend significant time traveling or visiting family appreciated the fact that telemedicine allowed for continuity of care without disrupting how and where they were spending their time. In the post-primary treatment phase of breast cancer, being able to receive follow-up care without the need to construct their life around this diagnosis was appreciated.

You don't have to plan your whole day around getting to the hospital or getting to your doctor's office. I think for people that have busy lives, it's easier. I'm out and about quite a bit and travel. P#3

Participants who were interested in elective telemedicine and those who preferred in-person care alone reported that the quality of virtual care they received was high. All participants felt they were heard by their clinicians, were satisfied with communication, and endorsed a feeling of connectedness to their healthcare team during virtual care.

Some participants, especially those with established relationships with their clinicians, felt that there was no interpersonal inferiority to telemedicine. Overall, utilitarian goals of an appointment such as having questions answered, answering clinician questions, and understanding treatment or follow-up plan were achieved with telemedicine. However, for some, the therapeutic relationship between clinician and patient was inferior to in-person care.

Well, I am a person that really enjoys person-to-person interaction and I'm very sensitive to all kinds of things: body language, facial expressions, touch. That was eliminated through video telemedicine, and I think, especially maybe older patients who haven't grown up with technology lose something by eliminating the in-person appointment. P#2

Telemedicine versus in-person care: the physical exam

Participant reflections on how they hoped to use telemedicine in the future revealed their priorities in care, and quality of care consistently outranked convenience in importance. Patients needed clinicians to communicate to them whether or not they would need to be seen in-person for a physical and breast exam.

Follow-up breast cancer appointments via telemedicine usually occurred post-mammogram, bloodwork, and DEXA scan (when prescribed), so the clinical necessity of a physical exam was unclear for some patients. Some viewed the breast exam as redundant after imaging, but for others, the hands-on exam was imperative, especially when presenting with a new concern. In the absence of an acute concern, patients were often comfortable with telemedicine as a non-inferior adjunct of care to be used between in-person appointments. However, the lack of a physical exam and its importance as a diagnostic tool in breast cancer were seen as the primary drawback for those who were interested in hybrid care models that included elective telemedicine.

When I saw the doctors, they told me what they found out from all (those tests) they were taking. They can tell you that on the phone as well as they can looking at you straight in the eye. P#4

There's always that doubt when you don't have a physical exam, am I missing something? P#5

Preferences for video vs. telephone appointments

All participants who had appointments via video preferred it to telephone, and frequently described it as more “personal” because of how it enables perception of expressive cues through body language, transmitting a higher degree of “personality,” “caring,” and “concern.” Participants noted that video appointments gave access to a higher level of care, insight, and connection to their clinician as compared to a telephone call. This is partially due to the clinician's ability to perceive things that often are not characterized in an interview, for instance, general appearance and affect. Among participants who had only telephone visits, many would have wanted to

use video but faced technological challenges in its use. For this reason, having telephone as a back-up option was seen as convenient.

Those who preferred to use telephone over video were more comfortable on the telephone, did not want to learn to use a new technology they found cumbersome, or felt that video conferencing from home was too intimate for an appointment with a healthcare provider.

Improving telemedicine experiences

Technological glitches that occurred during appointments were not an important factor in the acceptability of telemedicine. However, when asked about improvements that could be made in telemedicine, many participants stated that they wanted information or training on telemedicine technology prior to their appointment to decrease anxiety about whether and how it would work. Participants identified expanded support for telemedicine use as the most important area for improvement in telemedicine.

The only inconvenience (of telemedicine) is that I get kind of nervous just with the technology part, not with the visit itself-- Making sure I can get on and do what needs to be done. P#6

Timing the use of telemedicine in breast cancer care

During primary treatment or early in the post-primary phase, participants reported that they were or would be less interested in using telemedicine because of higher illness anxiety and preference for full physical and breast exam to monitor recurrence. Telemedicine was more acceptable when relationships were well-established and patients had lower illness anxiety. The pre-existing relationship with a clinician was noted as essential for connectedness in virtual spaces, improving the patient's telemedicine experience.

I'd be willing to do it as time moves by—moves on, but initially, when you're in the throes of the diagnosis and you're worried to pieces about everything, it was not—it wasn't so comforting. It felt a little mechanical. P#2

Improving accessibility for older adults with vision and hearing loss

Accommodations for impaired vision and hearing, common in older adults, are needed in telemedicine. One readily available adaptation for patients with visual impairments would be the option of using a computer for appointments, rather than calling a smart phone. Providing this option may be superior for all video telemedicine appointments, but is especially important for patients who might not otherwise be able to perceive

facial expression, body language, and other social cues essential to communication and connectedness in virtual space because of smaller images.

An inherent strength of telemedicine for participants with hearing loss was that it was easy to involve patient advocates who did not live locally or were unavailable to attend in-person clinic visits. By reducing barriers to involving a patient's support system, telemedicine can allow patients to benefit from well-developed advocacy strategies for navigating disability in older adults, such as repeating conversation items when it appears that the patient does not understand, or taking notes to be shared after the appointment.

The clinician consented to have a three-way conversation with me. Because I don't hear well, I had my daughter join us, which was, as you can imagine, quite helpful for me... that was just wonderful because that second person with you is so helpful whether it's in person or not... boy, it worked... I was the one that requested that my last (appointment) be telemedicine. P#7

Discussion

The aim of this qualitative study was to explore perspectives on telemedicine during the COVID-19 pandemic in a sample of women age 65 or older with early-stage breast cancer who had completed surgery, chemotherapy, and/or radiation treatment. Although several prior studies have quantified satisfaction and usability of telemedicine in cancer care before and during the COVID-19 pandemic in a wide age spectrum of patients, a focus on qualitatively characterizing these preferences through interviews in an older patient population receiving follow-up cancer care is not found in the literature. Other qualitative studies in older patients have elicited reflections on how COVID-19 has broadly affected their cancer care and may include a comment on telemedicine [20]. Uniquely, our report focuses on patient perspectives on the pros and cons of using telemedicine as a means of post-primary treatment cancer care. Prior quantitative studies show high rates of satisfaction with telemedicine among older adults [21], and our report adds nuance to preferences for follow-up care elicited through open-ended questions. Our report also characterizes how and when older adults find telemedicine useful and preferable for follow-up cancer care in a forward-looking and patient-centered way and give insight to how improvements in telemedicine can be made.

Counter to cultural assumptions about technology hesitancy in older adults, our report, similar to other quantitative studies [21], finds high satisfaction with telemedicine.

In contrast to studies enrolling older adults during active primary treatment [23], our post-primary treatment participants described interest in continued access to elective telemedicine because of its accessibility, convenience, and efficiency. However, this interest in telemedicine holds up only when patients are given the option of telemedicine as an adjunct but not as a replacement to in-person post-primary treatment. Telemedicine was considered inferior to in-person care with regard to (1) diagnostic rigor, because of the absence of a hands-on physical and breast exams, and (2) fostering the patient-clinician connection, which had variable importance to patients and was influenced by stage in illness-journey, but remains significant in follow-up care as patients continue to navigate long-term side effects of treatment, illness, and recurrence-anxiety.

Patients need clinicians to communicate clearly when an in-person appointment is essential and when they may use telemedicine without sacrificing rigor of care. A second consideration that should drive these conversations is where patients are in their cancer journey, and how familiar they are with the clinician they are seeing. During treatment, early in post-primary treatment, and when seeing a new clinician with whom patients do not yet have a relationship, participants felt more secure in their care and connected to their healthcare team when seen in-person.

There is significant continuity between our findings and the historical literature on telemedicine acceptance among older adult patients with cancer dating back to 2000 in terms of facilitators and barriers to its use [11]. This continuity demonstrates the ongoing acceptance of telemedicine as an adjunctive care due to its convenience. However, it also emphasizes that despite increased use of telemedicine in the context of COVID-19, there is still the need for educational campaigns within telemedicine infrastructure, such as technical training and support for older patients using telemedicine.

Limitations

Our study has some limitations. Our sample was small but achieved saturation of themes. Although our participants were diverse in age and rurality, the racial diversity of this sample underrepresents the proportion of Black patients seen for breast cancer care at our institution. We note that only 10% of eligible patients were Black rather than the 21% we would anticipate based on the population in North Carolina [24]. This could be an artifact of increased visit frequency that patients on endocrine therapy (ET) have relative to patients not on ET. There is a higher distribution of hormone receptor-positive (HR+) breast cancer in non-Hispanic White women (86%) than non-Hispanic Black women (73%) [25]. Furthermore, there is evidence that Black women with HR+ breast cancer are 33% less likely than White women to be started on ET [26].

Additionally, a third of our participants were highly educated, with approximately three times the prevalence of advanced degrees compared to the general population at this age [27]. This may be linked to geography as NCCH is positioned in an area with a high density of higher education institutions. This likely led to a higher degree of access to and comfort with telemedicine than in the general population.

Conclusions and implications

The potential of telemedicine as a patient-centered tool in cancer care can be maximized through patient-provider collaborative decision-making about whether and when it is right for a particular appointment. This requires attentive conversations that empower patient preferences. It also requires clear communication about the appropriateness of foregoing a physical exam.

There are many different types of “access issues” that impact use of telemedicine. Providers should offer patients the option to include family members or advocates through three-way telemedicine calls when appropriate. This may be particularly helpful in the older adult population because of the incidence of dementia and hearing loss. Patients with physical disabilities who cannot easily come to the hospital can benefit from telemedicine for routine follow-up care. This is also true for patients who have significant transportation barriers. Yet it is important to acknowledge that poor healthcare access due to rurality has been associated with worse health outcomes. Choosing telemedicine for patients living in rural areas cannot substitute for in-person care when appropriate.

Technological accessibility is another important consideration in telemedicine. Although the majority of participants in this study used video telemedicine successfully, some without issue and others relying on help at home, situations in which patients had to settle for a telephone appointment instead of video because of technological challenges were also relatively common and frustrating. Increased support from healthcare systems or the community could be mobilized for those who would benefit from telemedicine training or IT support (Table 2).

Semi-structured interview guide

Section I: Initial impressions (10 min)

1. I see from the clinician notes that you have had at least one *telephone/video* visit. If I understand the process correctly, because of Covid-19 concerns, you were offered an option between telephone of video visit. Is that right?
2. I see you chose telephone/video. How did you make that choice?

Table 2 Participant perspectives on telemedicine

Theme: preference of video over telephone

- "You can certainly get a lot of information on the phone. Directly, verbally, and in terms of nonverbals. The way the voice sounds. If you can see somebody, it's a lot better. From my perspective, being able to see the other person just makes for a better experience."
- "Well, it was better to see her face to face, but the telephone is fine with me... because I don't understand the video thing."
- "You can get more information, I think, if you're looking at somebody and gaging their responses and able to interact with 'em."
- "I just feel that at least having eyes on the person that you're speaking with (via video) makes it more personal. I chose that."
- "I think it gives you a sense of being personal with the doctor and the closest thing you can have to a personal visit. Now, if you're going to ask me if I would prefer a personal visit, absolutely yes. A video visit, I think, leaves a lot to be desired. I just don't feel it's as personal."
- "I guess for me personally, I do like seeing people 'cause I like to read the faces, you know, besides what their words are saying, so I would probably opt for video."
- "I think it would be best for the doctor to see the patient first in the video, because sometimes the patient cannot fully explain or cannot fully describe everything, but the doctor sees."
- "I have to say, it was more personal. I mentioned not hearing well, and when I can see a person—I guess I read lips more than I realize, and so seeing a person, face to face, up close, it helped me understand the conversation better."
- "I felt a good connection with the doctor. Well, because you could see her."
- "Okay. By phone, it's not the same as seeing the person that you're talking with. I think telemedicine would be more beneficial in that you can see the person you're talking to, and they can see you. For me, that interaction is a lot better than over the phone."

Theme: likes of telemedicine

- "Well, you know, given concerns about COVID, I actually preferred having a clinic visit by telemedicine rather than in person. At this point, being vaccinated is not nearly as much of an issue and I do have clinic visits in person but pre-vaccination there was that level of fear of being pretty much anywhere outside of the house and the yard. It was better doing the telemedicine."
- "I didn't feel any untoward effect or I had no emotions about the teleconference. I was comfortable with it. I was just as comfortable answering questions and expressing my concerns as I would have, had I been able to come in."
- "Well, the fact that—again, it was the offset of COVID and I feel it kept me protected. I wasn't exposed to anything. I'm in the safety of my own home.... You don't have to plan your whole day around getting to the hospital or getting to your doctor's office. I think for people that have busy lives, it's easier. I'm out and about quite a bit and travel. Even if you travel, (during) telemedicine appointments, you can be anywhere. I get better reception in Scotland. You can say, "Oh, gee, I have a six-month appointment, but I still wanna be able to go."
- "Even (my doctor's) personality comes through. I could feel the caring and concern, and (my doctor) is so thorough in answering your questions, and sometimes anticipates what might be a question that you've not even formulated. I appreciate that, but I mean, that's just a special skill."
- "It's okay, because it's for safety reasons. I can communicate with the doctor, right away. My present situation, my present health condition, it's okay... I think I'm satisfied with the telephone visit. It works well for me.. It's just very convenient and she asked me questions that she needed to know... It served a purpose. It's just like we had an in-person meeting."
- "Well, I guess, it made sense given the COVID stuff."
- "I knew what time they were gonna call. It was very convenient. Driving to the hospital, getting a parking space, waiting in the for the person, and all of that is just much quicker (with telemedicine). I'm at a point in my whole cancer journey that I don't think about it much anymore and I don't dwell on it on. It's in my past, so I didn't feel like it had any urgent questions for her."
- "I was happy to be able to do it rather than one, travel or two, certainly with COVID, I think it was a wonderful thing. Also, I think because of COVID, they were able to cross state lines, which I'm not sure will be in the future...I would like to be able to keep parts of your healthcare team at UNC, and telemedicine has made that possible (while living out of state.)"
- "During the COVID, it was almost absolutely necessary. Not only due to what the medical profession and whatever, but two of my sons did not want me to leave the house."

Theme: dislikes of telemedicine

- "Well, it's not something that I would want to do every time. Given COVID, I understood why it was necessary to do it that way. I laughingly said to somebody that I was gonna have this video visit. What was I gonna do, just open my shirt, and they were gonna look? You know, that was kind of a joke. I wouldn't choose to do it as a normal thing. Because of COVID, I understood why that was necessary. I wouldn't say there was anything that I liked, but there wasn't anything that I disliked. It was fine."
- "Oh, I resisted it. I didn't like the idea. Now, I'm older and I'm old fashioned, and I think that so much is imparted by the physician in person and the nurse or the nurse practitioner."
- "I didn't have any expectations one way or the other, but I didn't have any choice. That was not a—there was not the option of, "You can either do these at your convenience with telemedicine, or you can go in and have a personal visit." I was not given an option. Anyway, I didn't have any expectations or disappointments. It was a non-discussable option."
- "Well, it probably has something to do with my age. I'm just used to in-person visits with my physician, and I'm not a modern woman not that I don't want to be modern. I can't understand a lot of stuff that's going on."
- "The physical is critical, I think, certainly with cancer."
- "Yes. I'd prefer it to be in person, but I'm okay if I have to have it (via telemedicine). I think my age has got something to do with it. I think, with all the new technology in telemedicine, that unless you keep up with it, or you have someone working with you, it would be difficult."

Theme: convenience of telemedicine

- "There's also a level of convenience... with the telemedicine because, while I might need to be available, I wasn't having to sit around for long periods of time in the waiting room and then in the exam room, which, unfortunately, tends to be the case... generally, to just be able to be able to be at home and not have to deal with finding a parking space and all the rest... I had back problems and so it's hard for me to walk on concrete for very far."
- "It's better for me. It's easier. I don't have to travel. I don't have to wait on the calls. They're usually on time. It's so easy."
- "(It) was always very timely, I never waited. I was never delayed. In that way, maybe, telemedicine is better than in person, 'cause sometimes in person—many times, in person, you wait and wait and wait for a doctor. I did not wait during telemedicine videos.... Oftentimes, in-person appointments are delayed by doctors being late or being—having too much—just normal patient delay. That was a benefit to telemedicine but the negative of no relationships, no face-to-face, hand-to-hand care, I think, outweighed that."
- "I think it's convenient. You don't have to spend the whole day getting somewhere. I felt like it would be, if I did have an emergency where I could go and say, "I needed to speak to a doctor right away," I wouldn't have to wait for an appointment. They could somehow figure how to fit these in. I didn't find I had to wait for appointments if I need one, and I think that from an equity standpoint, I think for those people that can't, that don't have access easily, that I think it serves as one more tool in making sure that people will connect with their doctors. I also think, not in my case, but from my perspective, my husband had a brain injury at one point. I always need to be in the doctors' appointments with him. It makes it easy if you have an advocate or a family member that you wanna include, especially in these times. I think it gives the ability to have collaboration with your advocates or support people. That may be one benefit that is realized through this... You can wait until 10 minutes ahead of time to be able to put on a decent t-shirt and pair of pants."
- "Really, it's just convenient that I can do it in my pajamas if I want... It is convenient that you don't leave home."
- "Oh, because of COVID, I understood completely that it was imperative."
- "It's efficient. It conserved time. I think it's environmentally a positive. I actually am a fan."
- "I was delighted. I didn't have to make an hour and a half trip to the hospital."
- "The travel and the wait time—the checking in and the waiting and all of that. Yeah, it was very convenient... It's at least an hour and fifteen minutes, then you have to check in, and then you wait. Then you go to the doctor and check in and wait and go through all the computer information, and then finally see your doctor, so it saves times and effort."
- "Here, I'm gonna go back to age because as you age—as I've aged, and I've realized a lot of things, it's more difficult in this area now with all the growth. The time that it takes to get out, the traffic, all the construction. It's just so much that driving will eventually be a big problem for me."

Table 2 (continued)

Theme: challenges of telemedicine

- "They had to help me get onto it, get connected to it. I didn't have a problem other than that I am extremely technology challenged. When it doesn't go smoothly, I get frustrated. We were planning to do the video, but it was convenient that we could do the phone when I couldn't get the video to come up right. The only inconvenience is that I get kind of nervous just with the technology part, not with the visit itself—Making sure I can get on and do what needs to be done."
- "When I would be in the office, she'd do a breast exam but after having had a mammogram and MRI, I didn't feel like that was any particular loss to not have a breast exam on top of that.. Yeah, it was mostly a check in on how I was feeling and how I was doing and those sorts of things. Like I said, it was a different stage of the game. That kind of interaction would be fairly routine. The connection is stronger, I think, in person. At that point, I think having a stronger connection is important. (early on in treatment).... I think that the level of connection is not as great. There is connection, but how deep that is, is not as great."
- "The nutritionist and the psychologist were not as important to me to be face to face... the ones with the oncologist, I wanted—I preferred having video conferencing. It's more comforting, I think."
- "Well, I am a person that really enjoys person-to-person interaction and I'm very sensitive to all kinds of things. Body language, facial expressions, touch. That was eliminated through telemedicine, and I think, especially maybe older patients who haven't grown up with technology lose something by eliminating the in-person appointment. It wasn't insurmountable. It wasn't unmanageable, but I don't think it was optimum."
- "Well, the only issue that I had is when it's breast cancer and it relies so much on a physical exam, or when you're speaking to your radiologist... I didn't feel like it was absolutely necessary that I had a physical exam by the doctor, but I do early on, when you're not sure, I think that's the concern that you have not like I'm talking through a counseling appointment, or they can look at my skin and see how some kind of lesion's progressing. It was all about how are you doing on your medication, and are—those kinds of things. I would say that's the only hesitation. I went back in September in-person. I was glad to be back where the doctor could do a physical exam of my breast."
- "There were a couple of times where there was a glitch in the sign-in procedure where there—we got switched off at the university from one I think application to another or support system to another, but we worked it through just by either getting on the phone and saying, "What's goin' on here?" I think I'm pretty comfortable working online. For me, it didn't throw me off. I would imagine there might be other people who were less—I've been on Zoom for a year. I can see the people that struggle even with Zoom. It would always be good I think to have especially for people that are in this age category and might not be comfortable an alternative or a support team to help them with it... It's just whenever your technology doesn't work, you're like, "Oh, God. Here we go."
- "North Carolina has absolutely no infrastructure for on this or high-speed internet, or fiber or anything. I live 10 miles from the university. I just have seen what's going on. I work. I volunteer a lot with school systems. It's just a real challenge for so many people to have connectivity either through their computer and/or through their telephone on a regular basis. That needs to be identified as a primary issue moving forward."
- "I had connected with them personally... I don't know if it would've been felt as personal, and I would have been as confident or connected had I only done everything over telemedicine."
- "No, only the touch... If I don't need to be examined, that's fine."
- "I don't know how to. The nurse sets it up. There has to be some coordination, of course, between doing video on my side and on the doctor's side, too. That's hard for me. As I said, my nurse does it. She's good at it."
- "I had a little anxiety about it, so the daughter with whom I live with... assisted me in doing what needed to happen for it to take place. I think I could've done it, but I didn't want to take a chance. After the first appointment, I had confidence that I could use the technology, and I liked it. Now I've done so much more zooming and all that with the pandemic, I feel really more up to it."
- "Well, when we had the in person visit, the doctor had the opportunity to look at our physical condition... While in the telephone visit, the doctor depends only on the description of the patient."

Theme: desire to use telemedicine in the future

- "No. I would say only in the event of some future pandemic, hopefully never again. I don't know. If we had a snowstorm, and I couldn't get there or something. Only if there was some, I guess, emergency situation."
- "I'd be willing to do it as time moves on, but initially, when you're in the throes of the diagnosis and you're worried to pieces about everything, it wasn't so comforting. It felt a little mechanical. That's what it is. I don't know the right word. I don't know if the doctor particularly wants or needs that. Doesn't need that, but I do, and I like it. I've had relationships with the few physicians I have had in my life, and I just think it contributes to your care. I live in the western part of the state and so I had to be in Chapel Hill for my care. For instance, now—and especially as time goes by and my appointments are stretched out a little bit—it might be helpful to me to have telemedicine appointments so that I don't have to drive to Chapel Hill. Now that I'm over the hump or over the biggest part of it, it might be nice to have those from my home instead of from being in the hospital."
- "I had met them personally. With the oncologist I had I think two appointments. I don't know if it would've been felt as personal, and I would have been as confident or connected had I only done everything over telemedicine."
- "There's always that doubt when you don't have a physical exam, am I missing something? I think, in the best of all worlds, it's a combination of telemedicine and being and being able to see the doctor when we need to."
- "I would hope that this has propelled a switch to a hybrid model of care for people where you have a choice in terms of what you wanna do. I think it needs to be a personal choice on the part of the patient, quite frankly, because people have different preferences for different circumstances, but I do think that I can't imagine us going backwards and not seeing this as a great resource."
- "As I think I said to you last week, I'm fine with teleconference as long as there's no need for exam manipulation about patients."
- "Well, I think I might use telemedicine. Again, it might be a day where I just don't wanna get dressed or I have a need to talk to the doctor, but I just don't wanna go out. Yes."
- "My particular reason for being here is I can't walk. Well, my original thought was that there's no option for me because I can't walk, and I can't leave the compound here. For me it's a blessing simply because I don't have any options. It's a big problem. I don't go anywhere. (Telemedicine) has been a godsend in that sense."
- "What you see the doctor about now is to give you the results of a test that you've had. The CT scan, the other tests that you've had, the blood that they've taken. When I was in the hospital, I was like a pin cushion. They took blood all the time. When I saw the doctors, then they told me what they found out from all that blood they were taking... They can tell you that on the phone as well as they can looking at you straight in the eye."
- "Well, because of the nature of the appointment that I had, it was a follow up, I felt that it was very appropriate for a televisit, and in fact, even non-COVID, I feel this kind of appointment could be done as a televisit. My next appointment is one where he needs to palpate. Well, you can't televisit that, but the ones where the doctor is just following up on your lab work or just making sure what your pain levels are, that type of thing, I would do telemedicine for those. This is going into my second year. During the first year, I had quarterly appointments, and they were more physical and hands-on, sort of—well, literally."
- "I'm very positive about it. I think it's a wonderful adjunct. I would never want to be only telemedicine, but I see it as a nice complimentary practice, and there could be some efficiencies that could be beneficial across the board."
- "I think with or without COVID, it's convenient for some patients... You know, when the patient need really see the doctor, especially for some minor conditions only. You can only consult the doctor through telephone, or video call, but it's such a hassle to go to the hospital or clinic to see the doctor."
- "It's a fine way to fill in the blanks, but if I'm really not feeling well, I want to see my doctor or my practitioner... I think the diagnostic process is more accurate."
- "I think it's gonna be probably highly individualistic. I'm old but I'm young enough to be able to adapt to new things. I don't know how older people with more serious situations than mine might be able to deal with it."
- "Well, I think it depends on what you have to see the doctor about, and it depends on the person. If you can't get to the doctor, at least you can talk to the doctor. That would be very convenient. I see a place for it. I see a place for it depending on what your sickness is, or what your questions are. Yeah, there is a place for it."
- "I am 100 percent for it. It's very important to have it. I'm still enrolled in a study that wants to check-in and make sure I'm alive every six months too."
- "Being in a remote location, you have no idea what it's like compared to being in Chapel Hill. The nearest hospital here is two hours away to get up to the hospital as opposed to five miles... Yeah, so telemed, to me, is fabulous. I hope it never goes away... Having a familiar face and people who at least know your history on the chart, that's a good thing."
- "I would really enjoy it. For example, if it's a follow-up where your doctor simply asks questions, that's fine. Of course, there are reasons for in-person, and I understand that, but if it can be handled otherwise, I think it's a great. Sometimes there are reasons for hands on exams. (For those that) can be handled by conversation, I'd rather do it telemedicine. It's just the time and effort."
- "The clinician consented to have a three-way conversation with me. Because I don't hear well, I had my daughter join us, which was, as you can imagine, quite helpful for me... that was just wonderful because that second person with you is so helpful whether it's in person or not... boy, it worked... I was the one that requested that my last (appointment) be telemedicine"

(This question will vary to the extent the study participant has experience with *both* telephone and video)

3. Did you need any assistance with your first telemedicine visit or any other telemedicine visit (explore)?
4. What were your initial thoughts about having a clinic visit by telephone or video instead of in person? Did you have any particular concerns about that type of visit? Any particular expectations?

Section II: Convenience (5 min)

5. Now that you have had at least one telemedicine visit, what did you like about using telemedicine? What did you not like so much?
6. What makes telemedicine convenient or not so convenient for you?
7. Do you have any thoughts about switching the technology you use for telemedicine? (Phone video, video phone)

Section III. Psychosocial (5 min)

8. Did you feel you could be heard by your oncology clinician during your telemedicine appointment?
9. Was it easy to hear and understand your oncology clinician?
10. Did you feel connected to your oncology clinician and care team while receiving remote care?
11. What do you feel is missing during a telemedicine visit that is different from being seen in-person?

Section II: Technology (5 min)

Now, I am going to ask you a little about use of certain technologies that are important in telemedicine.

12. Overall, what is your comfort level with technology – high, low, somewhere in between? Do you have a smart phone? Computer? WiFi?
 - a. Does anyone help you with technology? Help you program your phone etc?
 - b. Do you talk or vi
 - c. deo chat with family or friends? Is that easy for you?
 - d. Do you use any apps?
13. Did you use any other health-related technology differently during the pandemic, such as making better use of MyChart?

Section IV. Conclusion (5 minutes)

14. What are your thoughts about continuing to have the option of telemedicine versus in-person visits when Covid is no longer the concern it is today?

15. Do you have any final thoughts or advice for how telemedicine could be made better for patients such as yourself?

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Declarations

Ethics approval This study was approved by the UNC Lineberger Comprehensive Cancer Center Protocol Review Committee (PRC) and UNC-Chapel Hill IRB (Office of Human Research Ethics; IRB #21-0924.).

Consent to participate All participants provided consent for participation verbally or electronically via REDCap forms.

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References

1. United States Congress (2020) Coronavirus preparedness and response supplemental appropriations act, 2020, HR 6074, 116th Cong. <https://www.govtrack.us/congress/bills/116/hr6074>. Accessed 18 Jan 2021
2. Federal Register (2020) Medicare and Medicaid programs, basic health program, and exchanges; additional policy and regulatory revisions in response to the COVID-19 public health emergency and delay of certain reporting requirements for the skilled nursing facility quality reporting program, 85 FR 27550. <https://www.federalregister.gov/documents/2020/05/08/2020-09608/medicare-and-medicaid-programs-basic-health-program-and-exchanges-additional-policy-and-regulatory>. Accessed 18 Jan 2022
3. Cms.gov (2022) Medicare costs at a glance. <https://www.medicare.gov/your-medicare-costs/medicare-costs-at-a-glance>. Accessed 10 June 2022
4. Cms.gov (2020) Final policy, payment, and quality provisions changes to the Medicare physician fee schedule for calendar year 2021. <https://www.cms.gov/newsroom/fact-sheets/>

- final-policy-payment-and-quality-provisions-changes-medicare-physician-fee-schedule-calendar-year-1. Accessed 4 Apr 2021
5. Cms.gov (2021) MM12519 – summary of policies in the calendar year (CY) 2022 Medicare physician fee schedule (MPFS) final rule, telehealth originating site facility fee payment amount and telehealth services list, ct modifier reduction list, and preventive services list. <https://www.cms.gov/files/document/mm12519-summary-policies-calendar-year-cy-2022-medicare-physician-fee-schedule-mpfs-final-rule.pdf>. Accessed 10 June 2022
 6. Narasimha S, Madathil KC, Agnisarman S et al (2017) Designing telemedicine systems for geriatric patients: a review of the usability studies. *Telemedicine and e-Health*. 23(6):459–472. <https://doi.org/10.1089/tmj.2016.0178>
 7. Anderson M, Perrin A (2017) Tech adoption climbs among older adults. <https://www.pewresearch.org/internet/2017/05/17/technology-use-among-seniors/>. Accessed 31 Dec 2020
 8. Eberly LA, Kallan MJ, Julien HM et al (2020) Patient characteristics associated with telemedicine access for primary and specialty ambulatory care during the COVID-19 pandemic. *JAMA Netw Open*. 3(12):e2031640. <https://doi.org/10.1001/jamanetworkopen.2020.31640>
 9. Hoogland AI, Mansfield J, Lafranchise EA, Bulls HW, Johnstone PA, Jim HSL (2020) eHealth literacy in older adults with cancer. *J Geriatr Oncol* 11(6):1020–1022. <https://doi.org/10.1016/j.jgo.2019.12.015>
 10. Rowland JH, Bellizzi KM (2014) Cancer survivorship issues: life after treatment and implications for an aging population. *J Clin Oncol* 32(24):2662–2668. <https://doi.org/10.1200/JCO.2014.55.8361>
 11. Pang NQ, Lau J, Fong SY, Wong CYH, Tan KK (2022) Telemedicine acceptance among older adult patients with cancer: scoping review. *J Med Internet Res* 24(3):e28724. <https://doi.org/10.2196/28724>
 12. Johnson BA, Hui JYC (2022) ASO author reflections: the patient perspective of telemedicine in breast cancer care. *Ann Surg Oncol* 29(6):3859–3860. <https://doi.org/10.1245/s10434-021-10592-z>
 13. Irfan A, Lever JM, Fouad MN et al (2022) Does health literacy impact technological comfort in cancer patients? *Am J Surg* 223(4):722–728. <https://doi.org/10.1016/j.amjsurg.2021.08.006>
 14. Zomerdijk N, Jongenelis M, Yuen E et al (2022) Experiences and needs of people with haematological cancers during the COVID-19 pandemic: a qualitative study. *Psychooncology* 31(3):416–424. <https://doi.org/10.1002/pon.5819>
 15. Heyer A, Granberg RE, Rising KL, Binder AF, Gentsch AT, Handley NR (2021) Medical oncology professionals' perceptions of telehealth video visits. *JAMA Netw Open* 4(1):e2033967. <https://doi.org/10.1001/jamanetworkopen.2020.33967>
 16. Bizot A, Karimi M, Rassy E et al (2021) Multicenter evaluation of breast cancer patients' satisfaction and experience with oncology telemedicine visits during the COVID-19 pandemic. *Br J Cancer* 125(11):1486–1493. <https://doi.org/10.1038/s41416-021-01555-y>
 17. Moentmann MR, Johnson J, Chung MT, Yoo OE, Lin H, Yoo GH (2022) Telemedicine trends at a comprehensive cancer center during the first wave of the COVID-19 pandemic. *J Surg Oncol* 125(2):101–106. <https://doi.org/10.1002/jso.26681>
 18. Chan RJ, Crichton M, Crawford-Williams F et al (2021) The efficacy, challenges, and facilitators of telemedicine in post-treatment cancer survivorship care: an overview of systematic reviews. *Annals of Oncology* 32(12):1552–1570. <https://doi.org/10.1016/j.annonc.2021.09.001>
 19. Johnson BA, Lindgren BR, Blaes AH et al (2021) The new normal? Patient satisfaction and usability of telemedicine in breast cancer care. *Ann Surg Oncol* 28(10):5668–5676. <https://doi.org/10.1245/s10434-021-10448-6>
 20. Haase KR, Kain D, Merchant S et al (2021) Older survivors of cancer in the COVID-19 pandemic: Reflections and recommendations for future care. *J Geriatr Oncol* 12(3):461–466. <https://doi.org/10.1016/j.jgo.2020.11.009>
 21. Street RL, Treiman K, Kranzler EC et al (2022) Oncology patients' communication experiences during COVID-19: comparing telehealth consultations to in-person visits. *Supportive Care in Cancer* 30(6):4769–4780. <https://doi.org/10.1007/s00520-022-06897-8>
 22. Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qual Res Psychol* 3(2):77–101. <https://doi.org/10.1191/1478088706qp063oa>
 23. Rodler S, Apfelbeck M, Schulz GB et al (2020) Telehealth in urooncology beyond the pandemic: toll or lifesaver? *Eur Urol Focus* 6(5):1097–1103. <https://doi.org/10.1016/j.euf.2020.05.010>
 24. U.S. Census Bureau (2019) Quick Facts North Carolina. <https://www.census.gov/quickfacts/NC>
 25. American Cancer Society (2019) Breast cancer facts & figures 2019–2020. American Cancer Society, Inc., Atlanta
 26. Reeder-Hayes KE, Meyer AM, B.Dusetzina S, Liu H, Wheeler SB (2014) Racial disparities in initiation of adjuvant endocrine therapy of early breast cancer. *Breast Cancer Res Treat* 145(3):743–751. <https://doi.org/10.1007/s10549-014-2957-z>
 27. Ryan CL, Bauman K (2016) Educational attainment in the United States: 2015 population characteristics. <http://census.gov/library/publications/2011/dec/c2010br-02.html>

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