



## Article

**Cite this article:** Pearson, C., Sham, R., Gardner, S., Klapman, S., & Altschuler, A. (2023). Perceived Quality of Online Music Therapy Sessions by Older Adults Aging at Home. *Canadian Journal on Aging / La Revue canadienne du vieillissement* 42(4), 607–620. <https://doi.org/10.1017/S0714980823000260>

Received: 15 October 2021

Accepted: 19 March 2023

### Mots-clés:

vieillesse; musicothérapie; virtuel; en ligne; télé santé; personne âgée; vieillir à domicile; santé mentale

### Keywords:

aging; music therapy; virtual; online; telehealth; older adult; aging at home; mental health

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## Résumé

La prestation de soins en ligne est une nouveauté dans le domaine de la musicothérapie. Cette étude analyse les perceptions des personnes âgées quant à la qualité de la prestation de soins de musicothérapie en ligne par des musicothérapeutes agréés. Neuf personnes âgées se sont portées bénévoles pour participer à cette étude de faisabilité, examinant à la fois le processus et les résultats. Le logiciel Zoom a été utilisé et un outil de musicothérapie virtuelle a été conçu pour l'étude. Les sondages et les difficultés techniques observées ont révélé que la qualité perçue variait légèrement selon le degré de difficulté technique vécu. Cependant, la moyenne générale de la qualité perçue était de 7,2 sur 9. Les entrevues menées après l'étude s'articulaient autour de trois thèmes : 1) les expériences personnelles de musicothérapie virtuelle; 2) les suggestions de développer de nouvelles séances de musicothérapie virtuelle; 3) les résultats personnels tirés des séances de musicothérapie virtuelle. Dans l'ensemble, les participants ont fait état d'impressions positives sur leurs expériences de musicothérapie virtuelle. Malgré une légère baisse de la qualité perçue en présence de difficultés techniques accrues, les participants ont tous exprimé le désir de poursuivre les séances, ainsi que l'intention de les recommander à d'autres.

## Abstract

Online delivery is new to the field of music therapy (MT). This research investigated older adults' perceived quality of MT online by certified music therapists. In this feasibility study, applying both process and outcome assessments, nine older adults volunteered to participate. Zoom was used, and a virtual music therapy (VMT) kit was developed as a resource. Surveys and observed technical difficulties revealed that perceived quality varied slightly by level of technical difficulty experienced; however, overall mean perceived quality was 7.2 out of 9. Post-study interviews revealed three main themes: (a) individual experiences with VMT, (b) individuals' suggestions for further development of VMT sessions, and (c) individuals' personal outcomes from VMT sessions. Participants reported overall positive experiences with VMT. Despite a slight decline in perceived quality when more technical difficulties were present, each participant reported a desire for more sessions, and they would recommend it to others.

## Introduction

A growing health care priority in Canada is for people to age well at home within their communities (Canadian Association of Retired Persons [CARP], 2012; Denton & Zeytinoglu, 2010; Government of Ontario, 2017, 2019; Special Senate Committee on Aging, 2009; World Health Organization, 2015). However, people aging at home do not always have the resources or opportunities to participate in services that target their physical, cognitive, and/or mental health challenges; prevent future health issues; and increase their quality of life. Without resources, loneliness (van Beljouw et al., 2014), poor mental health (Garrido, Kane, Kaas, & Kane, 2009), and cognitive decline (Hill, Mogle, Munoz, Wion, & Colancecco, 2015; Slavin, Brodaty, Kochan, Crawford, & Trollor, 2010) can develop. To prevent these issues, healthy older adults benefit from wellness-focused interventions (Canadian Institute for Health Information, n.d.; Kadowaki, Wister, & Chappell, 2015; Okereke, 2015; Public Health Agency of Canada [PHAC], 2019). Music therapy (MT), an evidence-based therapeutic practice provided by certified music therapists (Abrams, 2010; Canadian Association of Music Therapists [CAMT], 2020), has been found to positively impact the cognitive and emotional health of older adults (Brotons, Koger, & Pickett-Cooper, 1997; Brotons & Marti, 2003; Bruer, Spitznagel, & Cloninger, 2007; Lightstone, Bailey, & Voros, 2015; PHAC, 2019; Solé, Mercadal-Brotons, Gallego, & Riera, 2010). We investigated older adults' perceived quality of MT when delivered through live, face-to-face online sessions in their homes.

Increasingly, older adults are choosing to age at home (Government of Ontario, 2017, 2019; Stevens-Ratchford & Diaz, 2003; Stones & Gullifer, 2016). In addition to striving for a stronger quality of life, economic benefits include decreasing the demand for more long-term care beds, hospital stays, and other health care costs (Bock *et al.*, 2016; Denton & Zeytinoglu, 2010; Gitlin, Szanton, & Hodgson, 2013; Knickman & Snell, 2002; PHAC, 2019; Verma, Petersen, Samis, Akunov, & Graham, 2014). Leveraging technology to provide care to people in their homes is one way to meet the preventive health and psychosocial therapeutic needs of healthy older adults.

Despite common stereotypes, research shows that many older adults actively use technology such as smartphones, computers, and tablets in their day-to-day lives (Kaambwa *et al.*, 2017; Reynolds & Osborne, 2018; Sandwood, 2017; Vogels, 2019; Wagner, Hassanein, & Head, 2010; Wang, Chen, & Chen, 2018). Using e-mail and videoconferencing has been shown to help mitigate loneliness (Cotton, Anderson, & McCullough, 2013; McCausland & Falk, 2012; Siniscarco, Love-Williams, & Burnett-Wolle, 2017), improve social interaction (Bixter, Blocker, & Rogers, 2018; Blusi, Nilsson, & Lindgren, 2018; Hage, Wortmann, van Offenbeek, & Boonstra, 2016; Ihm & Hsieh, 2015), decrease isolation (Botner, 2018; Cutler, 2017), and improve access to mental health services (Cangelosi & Sorrell, 2014; Choi, Wilson, Sirrianni, Marinucci, & Hegel, 2014; Titov *et al.*, 2015). Ample research in medicine, nursing, and psychotherapy suggests the effective use of videoconference technology to meet health and wellness needs (Manhal-Baugus, 2001; Novotney, 2017; Recupero & Rainey, 2005; Sucala *et al.*, 2012).

MT, a discipline where “certified music therapists (MTAs) use music purposefully within a therapeutic relationship to support development, health and wellbeing” (CAMT, 2020, “About Music Therapy” section), continues to demonstrate significant positive effects on numerous indicators of wellness, including those related to social/interpersonal, physical, psychological/mood, and lifestyle.

To illustrate, research demonstrates benefits on social/interpersonal well-being (Brotons *et al.*, 1997; Brotons & Marti, 2003; Creech, Hallam, McQueen, & Varvarigou, 2013; McCaffrey, 2018; Solé *et al.*, 2010), in healthy older adults (Solé *et al.*, 2010), in cognitively impaired older adults (Brotons & Marti, 2003), and mentally ill (McCaffrey, 2018) older adults with each study reporting increased motivation to connect with others and to maintain connections.

Positive physical outcomes (perceived and actual) for older adults have been found with MT (Mathews, Clair, & Kosloski, 2001; Solé *et al.*, 2010) and/or therapeutic music listening as well (Chan, 2007; Nilsson, Unosson, & Rawal, 2005; Tse, Chan, & Benzie, 2005). In MT group programs focused on physical goals and therapeutic listening programs implemented in medical procedure settings, physical benefits have been found for heart rate (Chan, 2007; Tse *et al.*, 2005), pain perception (Chan, 2007; Nilsson *et al.*, 2005; Tse *et al.*, 2005), and activity (Mathews *et al.*, 2001).

Several literature reviews (Brotons *et al.*, 1997; Creech *et al.*, 2013; Gold, Solli, Kruger, & Lie, 2009; Zhao, Bai, Bo, & Chi, 2016) highlight the robust evidence of MT’s positive impact on the psychological well-being and mood of older adults. Research focused on older adults with mild to moderate levels of dementia who participated in as little as one group MT session (Orti *et al.*, 2018) to as many as 12 weekly group sessions (Solé, Mercadal-Brotons, Galati, & De Castro, 2014) found decreased levels of stress (Orti *et al.*, 2018), decreased anxiety and depression (Brotons &

Marti, 2003; Gallego & Garcia, 2017; Orti *et al.*, 2018), and improvement in emotional well-being (Solé *et al.*, 2014). Similar effects were found in studies that investigated older adults with mental health diagnoses such as depression, post-traumatic stress disorder, and anxiety. Participants in group or individual MT sessions experienced increased enjoyment and mood (Hanser & Thompson, 1994; McCaffrey, 2018), increased emotional self-expression (Lightstone *et al.*, 2015), and decreased depression and anxiety symptoms (Erkkila *et al.*, 2011; Hanser & Thompson, 1994).

With respect to lifestyle, Solé *et al.* (2010) found that healthy older adults engaged in MT sessions or one of two music leisure groups reported improvements in their quality of life. Involvement in MT or general music programs positively impacts the lifestyle of older adults (Creech *et al.*, 2013; Gold *et al.*, 2009; Solé *et al.*, 2010) as well; and most notably, with respect to their engagement in music. For example, Ansdell and Meehan (2010) found that older adults in a mental health setting who participated in at least 10 one-on-one MT sessions were able to use music beyond their sessions as a health-promoting strategy. Hanser and Thompson (1994) saw similar patterns in depressed older adults living at home who completed eight weekly home-based stress-reduction MT sessions, and they maintained the music listening techniques they had learned independently over a nine-month follow-up period. Finally, McCaffrey’s (2018) interviews with older adults participating in MT sessions in a mental health setting revealed that this participation helped fill a void of meaningful occupation in their lives.

Despite these documented benefits, accessing professional MT services requires meeting MT where it is offered. This means finding an organization that offers the service and travelling to that organization, or finding a private practice MTA willing to provide in-home sessions. If in-home sessions are available, they typically present significant costs to the client and require the client to prepare their home for a visitor. Thus, several financial, psychosocial, and logistical related barriers may prevent older adults access to MT.

Whereas online therapy and counseling are widely available in North America (Donkin *et al.*, 2011; Novotney, 2017), an informal survey of Canadian MTAs (Pearson, 2020) from across the country (approximately 25 responses) found that instances of online MT were nil prior to the global pandemic in 2020. Since then, out of necessity, many have moved their services online and, over the past two years, research on the delivery of virtual music therapy (VMT) has emerged. At the beginning of the pandemic, MT researchers investigated the extent to which music therapists were moving their practices online, their considerations for virtual delivery, and the impact it was having. Results demonstrated that music therapists across North America (Cephas, Sofield, & Millstein, 2022; Clements-Cortes, Mercadal-Brotons, Silva, & Moreira, 2021; Cole *et al.*, 2021; Gaddy *et al.*, 2020; Kantorova *et al.*, 2021; Knott & Block, 2020) and internationally (Agres, Foubert, & Sridhar, 2021; Baker & Tamplin, 2021) did adapt their practices to virtual delivery and that, in general, the majority found the benefits outweighed the challenges (Baker & Tamplin, 2021; Cole *et al.*, 2021; Kantorova *et al.*, 2021). Most studies focused on effectiveness from the music therapist’s perspective (Baker & Tamplin, 2021; Clements-Cortes *et al.*, 2021; Cole *et al.*, 2021; Lee, O’Neill, & Moss, 2021; Wilhelm & Wilhelm, 2022) while only few focused on clients’ perceptions of the experience (Baker & Tamplin, 2021; Brault & Vaillancourt, 2022). Clements-Cortes *et al.* (2021), Lee *et al.* (2021), and

Wilhelm and Wilhelm (2022) focused on VMT with older adults and discovered a mix of both opportunities and challenges, however, only from the perspective of the music therapist. Finally, prior to the pandemic, Lightstone et al. (2015) investigated the impact of short-lived VMT with an adult male coping with post-traumatic stress disorder. This study investigated the client's perspective. A 24-session treatment period focused on improving the client's awareness and tolerance of various emotional states and his ability to self-regulate. Following the treatment period, the client reported improvements in many of his symptoms and attributed much of his progress to MT. The authors found that the online medium did not create any therapeutic barriers between client and therapist in the attainment of the client's therapeutic goals. Preliminary findings like these combined with more recent research on delivering VMT suggest the development of a more comprehensive model for VMT could provide meaningful, long-term benefits for older adults unable to access MT in-person.

Thus, recognizing the well-documented benefits of MT for older adults in-person, and the potential for technology to bring these benefits to those aging at home, we proposed an online model of MT, delivered by MTAs via Zoom Video Communications. Zoom is PIPEDA (Personal Information Protection and Electronic Documents Act), a Canadian federal privacy law, and PHIPA (Personal Health Information Protection Act), Ontario legislation that protects personal health information, compliant (Zoom, 2020), and widely used in the health care sector. The study was approved by the Baycrest Research Ethics Board, and VMT sessions took place from February to May 2019, prior to the global COVID-19 pandemic. By focusing on older adults' perceptions of the quality of their MT experience online, this research adds to our understanding of the extent to which online therapeutic interventions are beneficial to diverse groups, especially within the context of sustaining health and wellness at home.

With participation of older adults from the community, we aimed to assess their perception of the quality of each VMT session, including their experiences with the technology, and their perceptions of the quality of their overall MT experience at the end of all of their sessions. Investigating how their experiences with the technology impacted their perceptions of quality was of particular interest given that videoconferencing as a platform for MT service delivery was novel at the time. We predicted that older adults would be satisfied with the quality of their online MT experiences; however, we anticipated that issues with technology could impact their perceptions negatively.

## Method

### Participants

Older adults were recruited through flyers and informal information sessions provided through outpatient programs and community dwelling locations of Baycrest. For inclusion in the study, participants had to be an older adult ( $n =$  up to 12) over the age of 65 residing in the community. They had to consent to participate in at least 75 per cent (9/12) of the VMT sessions and to the sessions being video recorded, and, lastly, they had to have a computer/laptop/tablet with Internet access.

Exclusion criteria included being unable to understand and speak English, the presence of severe vision or hearing problems that would interfere with seeing or hearing the MTA during

virtual sessions, and/or being unable to remain alert and engaged for a minimum of 20 minutes. The two MTAs and other research staff, in conjunction with Baycrest clinical staff, assessed potential participants for exclusion criteria. The assessment was based on information from the staff who knew the potential participants, and from the potential participants themselves.

Nine community-dwelling older adults ages 70 and older ( $M = 76.6$ ,  $SD = 7.4$ ) provided their informed research consent. Two additional people initially consented to participate but withdrew for personal reasons before receiving any VMT sessions. Of the remaining nine participants, five were male and four were female; most were married, and the others were divorced or widowed. The majority lived with a spouse, and all lived in a house or apartment. All our participants had completed at least 12 years of formal education.

Our participants self-reported their previous experiences with technology and results were mixed. Less than 50 per cent reported that they did not use the computer to communicate with family, whereas others reported they used either Skype or e-mail. However, no participants had used Zoom. All participants were included regardless of their previous experiences with technology. Each received instruction during the in-person intake session as well as an instruction manual included in the VMT kit described below.

Almost all participants were engaged in other forms of in-person therapy at the beginning of the study, including physiotherapy, occupational therapy, psychiatry, social work/counselling, and wellness programs. Two thirds of participants had no previous experience with MT.

A sample size was determined by the available funding, which allowed for the allocation of two MTAs for one day per week for a total of 16 weeks. During a 7-hour day, each MTA conducted up to five 45- to 60-minute sessions.

### Materials

A VMT kit was designed by the primary investigator (who was also one of the MTAs) to support participant engagement. The kit contained a binder with information about MT, an inventory sheet, instructions for using the technology, a personal music profile worksheet, and paper with writing tools for taking notes. The kit also included percussion instruments: a tambourine, a large maraca, two small maracas, a set of claves, and a small drum and mallet.

The MTAs provided the sessions using laptops with Zoom technology. They used various musical instruments, such as guitars, drums, or other smaller percussion instruments as required to meet therapeutic needs during sessions.

### Intervention

Once informed consent was obtained, participants received an initial in-home intake session with their assigned MTA. This included development of an initial therapeutic relationship, assessment of needs to be addressed through VMT, delivery of the VMT kit, and assistance with setting up and using Zoom. After the initial visit, participants then took part in up to twelve 45- to 60-minute weekly VMT sessions with the MTA who conducted their in-home visit. Participants received e-mail invitations to each session. Reasons for cancelled sessions were personal in nature, such as conflicting appointments or feeling unwell. Sessions were rescheduled

when possible. Technical issues were addressed in real time by the MTAs. Two sessions were rescheduled due to technical issues that could not be solved by the MTA: Wi-Fi not working and the Zoom app icon being deleted. In both cases, the participants resolved the issue prior to the next session.

To support therapeutic goals, individualized treatment plans informed the client-centred, interactive approach. Therapeutic goals ranged from physical, such as improving balance and range of motion, to emotional, such as exploring experiences of grief. Both MTAs drew from a range of MT techniques, including singing (with live music provided by the MTA or recorded music shared through Zoom technology), playing percussion instruments, song writing, lyric analysis and discussion, and music and imagery or relaxation techniques. Recorded music was shared via screen-sharing of YouTube videos. It should be noted that “audio only” sharing with Zoom was not an option at the time of this study and YouTube was used as a convenient way to share music, even when the video was not needed.

Both MTAs had several years (15 and 7 years, respectively) of experience working with older adults in community and institutional health care settings. Both identified as female and Caucasian. Both approached the VMT sessions in a client-centred manner with the intention of providing interventions that best met the needs of each individual. Neither had delivered music therapy in an online format before and neither had experience using Zoom.

### Measures

All measures of participants’ post-session and post-study perceived quality of experience and the observed technical difficulties were administered by a research assistant who was not involved in the VMT sessions. See Table 1 for a summary of the number of sessions with data available for various analyses.

### Post-session perceived quality of experience

Participant feedback was solicited after every session by the research assistant, via a brief phone survey consisting of 10 yes/no questions immediately after or within three days of the session.

**Table 1.** Number of sessions with data available for analysis

Data Source	Number of sessions	Analyses
Total completed sessions	88	N/A
Planned sessions	94	
Cancelled sessions	6	
Satisfaction surveys	84	Satisfaction
Unavailable surveys	4	
Session observations	86	Technological difficulties and interruptions
Unavailable videos	2	
Satisfaction + observations	82	Satisfaction and technical difficulties

The responses were manually, not audio, recorded. The survey questions were developed by the research team based on areas of interest and can be found in Table 2. One participant was mistakenly approached after a cancelled session, and the data recorded on that survey were not included in our analysis. There were four occasions where the research assistant was unable to reach the participant post-session. For two sessions, survey calls were made by other researchers on the project, who were also not involved in the sessions, as the primary research assistant was not available.

### Post-session observed technical difficulties

Each VMT session was recorded using Zoom. The research assistant used an observation template to review each recording. On the template, they noted their observations – in particular, the presence and frequency of any arising technology issues or interruptions. Technology issues focused strictly on technology, whereas interruptions focused on things that disrupted the flow of the session, which might have included technology issues. Technical difficulty was categorized as none (reference), slight, and major. There were two occasions where the session was not recorded and no observations were captured.

**Table 2.** Responses to Post-Session Survey Questions by Level of Technical Difficulty

Question	All sessions: % responding Yes (N = 84)	Sessions categorized by level of technical difficulty (N=82)		
		None (N = 36)	Slight (N = 28)	Major (N = 18)
1. I could see the music therapist clearly for the majority of the session	95.2	100.0	100.0	83.3
2. I could hear the music therapist clearly for the majority of the assessment time	86.9	94.4	89.3	72.2
3. I felt comfortable communicating with the music therapist through videoconferencing	92.9	100.0	89.3	88.9
4. I was satisfied with the quality of the music experience delivered through videoconferencing	88.1	91.7	92.9	77.8
5. I would be willing to use videoconferencing again with this music therapist	91.7	100.0	89.3	83.3
6. *I would rather see the music therapist in person than by videoconferencing	54.8	63.9	50.0	44.4
7. I was satisfied with my videoconferencing visit	92.9	97.2	96.4	83.3
8. If I knew I would be seen more frequently by the music therapist I would choose videoconferencing rather than having the music therapist visit in person	51.2	66.7	42.9	38.9
9. *I would have waited longer to see my music therapist in person than by using videoconferencing	67.9	63.9	71.6	72.2

\*reverse scored so percentage yes is related to videoconferencing

### Post-study perceived quality of experience

**Interviews.** Participants completed a phone interview after their final VMT session. Interview questions were decided on by the PI and research team to investigate participants' general experiences, ways they felt they were impacted by the VMT sessions, their perceptions of the VMT kit, and their perspectives on further developing VMT sessions. See Appendix A for interview questions. The interview sessions were audio-recorded, and observations were documented without identifying information. The interviews were semi-structured: Participants were asked a series of questions about their experiences with the VMT sessions and were encouraged to provide feedback. Their responses were probed for clarity and insight.

**Survey.** During the same phone call, participants also completed a post-study phone feedback survey. Questions focused on the extent to which the VMT sessions met their expectations ("Not at all," "Much," and "Very much") and achieved personal outcomes (e.g., social and musical), their comfort level with participating ("Not comfortable," "Comfortable," and "Very comfortable"), whether they would recommend VMT to others, and whether they would participate in further sessions. They were also asked about their perceptions of the VMT kits' contents, including the helpfulness of the MT information, the manual, and the instruments. They rated these on a scale of 1–5: "Not helpful at all," "Slightly helpful," "Somewhat helpful," "Very helpful," and "To a great extent helpful."

### Analysis

#### Quantitative

Descriptive summaries of post-session survey responses include means, standard deviations (SD), and proportions. Descriptive wording was used for the post-study survey summary due to the small number of study participants and the risk of residual disclosure.

The proportion of participants who answered "yes" to each question in the post-session survey (as opposed to answering no or ambivalent) was analysed separately. The main covariate was the level of technical difficulty observed during the session. Proportion ratios compared the proportion that answered "yes" to each question between technical difficulty categories. Marginal modified Poisson regression models with a log link were used to model proportion ratios. Since participants completed multiple sessions, the models were adjusted for repeated measures using generalized estimating equations (GEE) and a compound symmetry (exchangeable) correlation structure. Results included estimated proportion ratios and related 95 per cent confidence intervals (95% CI).

The survey was derived by adding up the number of questions where the response was "yes," including two items (*I would rather see the music therapist in person than by videoconferencing* and *I would have waited longer to see my music therapist in person than by using videoconferencing*), which were reverse coded. The original 10-item survey was reduced to a 9-item survey. The excluded item was, *I felt my problems and concerns were understood by the music therapist*. It was decided that this would be a standalone item since it was a different type of question (i.e., focused on connection with the therapist) compared to the other survey questions that more directly addressed aspects of videoconferencing. The mean number of "yes" responses was compared by level of technical difficulty using a marginal linear regression model with a similar GEE adjustment for repeated measures, as described above. Results

included an estimated difference in mean scores and related 95 per cent CI.

There were no adjustments made in the analyses for missing values or multiple testing. All analyses were completed using SAS version 9.4.

#### Qualitative

The final interviews lasted an average of 17.8 minutes (range: 9:00–34:39 minutes). The audio-recorded interviews were transcribed. All data were then de-identified with any personal information removed from the transcripts and then analysed using NVivo v11 (QSR International Pty Ltd, 2015). The primary coder adopted a hybrid approach to thematic analysis (Braun & Clarke, 2006) of the transcripts whereby a set of a priori codes was identified based on the interview guide, and then line-by-line coding was employed allowing flexibility to include new codes throughout the analysis process. Codes were then reviewed by another member of the study team and discussed until agreement was achieved. Primary themes, along with their subthemes, were reported and supporting quotations were extracted to reflect participants' experiences.

### Results

Results were presented for participants' perceived quality after each session first, followed by their overall perceived quality of their entire VMT experience.

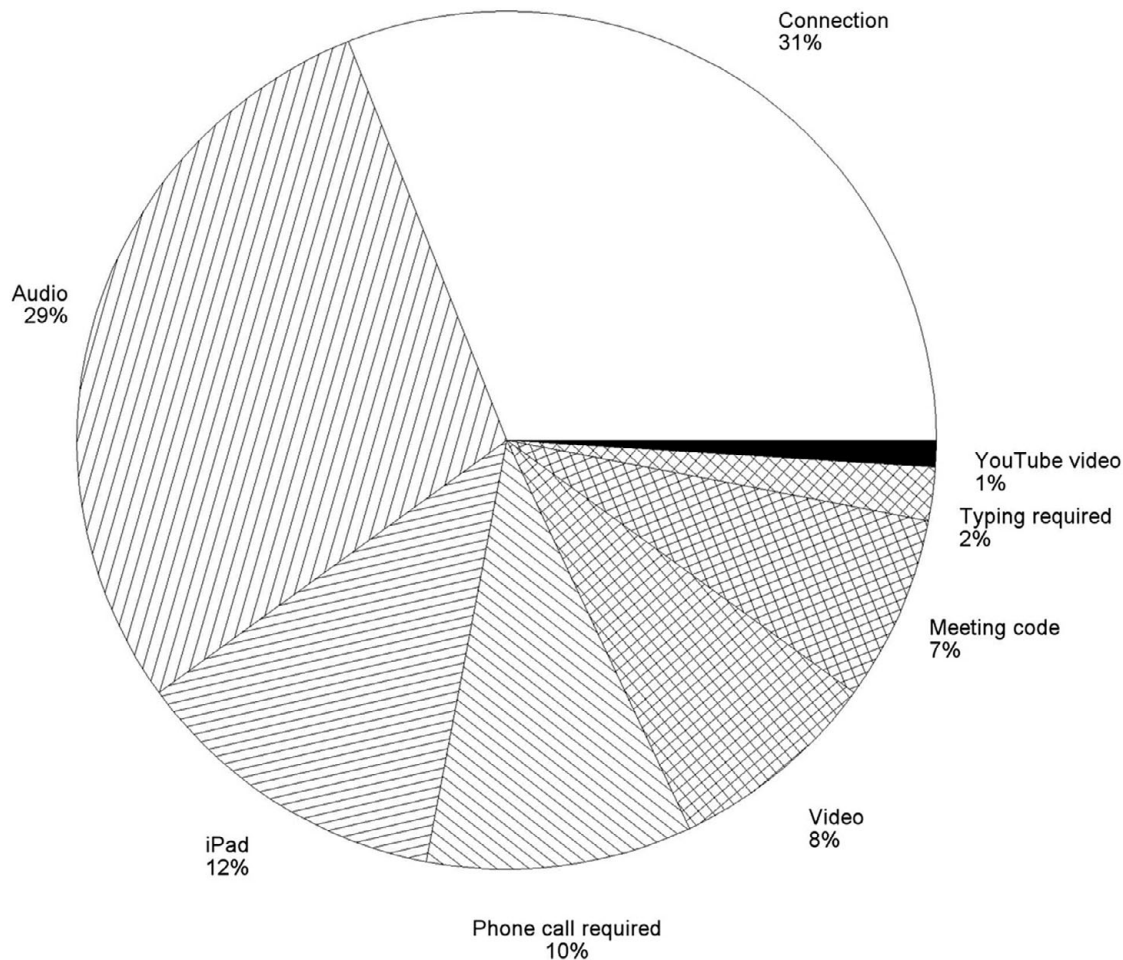
#### Post-Session Perceived Quality

##### Survey

Nine participants responded for an average of 9.3 (SD = 1.4, range = 7–11) sessions. Table 2 provides a summary of the individual questions and the percentage of all sessions where the participants' responses were "yes." For most questions, the per cent responding "yes" ranged from 85 per cent to 95 per cent (see Table 2;  $n = 84$ ), indicating a high degree of perceived quality for these items. Participants' perceived quality was less when asked to choose video conferences over in-person MT sessions (54.8%, 51.2%, and 67.9% for questions 6, 8, and 9, respectively; see Table 2). Participants' overall mean scores suggest that their perceived quality of experience with MT in an online environment was high ( $M = 7.2$  out of 9,  $SD = 1.9$ ,  $n = 84$ ), despite some degree of preference to see the MTA in person. Regarding the question that was not included in the nine-item scale, *I felt my problems and concerns were understood by the music therapist*, for 85 per cent of the sessions, participants answered "yes," indicating they felt their problems and concerns were understood by the MTA.

##### Observed technical difficulty

Participants experienced technical difficulties during 50 (58.1%) of the 86 sessions. Of those sessions, 21 (24.4%) involved major difficulties (i.e., preventing the participants' positive experiences) and 29 (33.7%) were slight (i.e., negatively impacting the participants' overall experiences). With respect to type, "connection problems" represented the majority of observed technical challenges, including dropped connections and difficulties connecting with Zoom due to the quality of the wireless connection. Audio problems were also frequent but were experienced primarily by a single participant. Video problems, for example, being unable to see the therapist, or undersized image windows were a less frequent issue. YouTube proved challenging when attempting to



**Figure 1.** The proportion of each type of technological problem as observed in the session recordings.

load a music video, and iPad problems included positioning and battery life (Figure 1). Technical challenges also varied amongst participants with some participants having none or few technical difficulties and others experiencing many types of technical difficulties.

Interruptions generally involved environmental factors unrelated to the video conference, such as family members entering the room and the phone and doorbell ringing. Other interruptions included audio and connection issues, general technical problems, iPad-related problems, and the need for typing to communicate (Figure 2).

#### Perceived quality and technical difficulty

Sessions with major technical difficulties had a mean score of 6.4 out of 9 ( $n = 82$ ; Table 3), significantly lower than sessions without technical difficulties ( $M = 7.8$ ,  $SD = 1.4$ , model estimate of difference =  $-0.8$ , 95% CI  $-1.1, -0.4$ ,  $p < 0.0001$ ). Sessions with slight technical difficulties had similar scores to sessions without technical difficulties ( $M = 7.2$ ,  $SD = 1.8$ , model estimate of difference =  $0.0$ , 95% CI  $-0.03, 0.03$ ,  $p = 0.99$ ).

Table 2 summarizes the proportion of “yes” responses to individual questions categorized by reported level of technical difficulty. When participants experienced *slight* technical problems, their reported perceived quality was not statistically different when compared to sessions when there were *no technical*

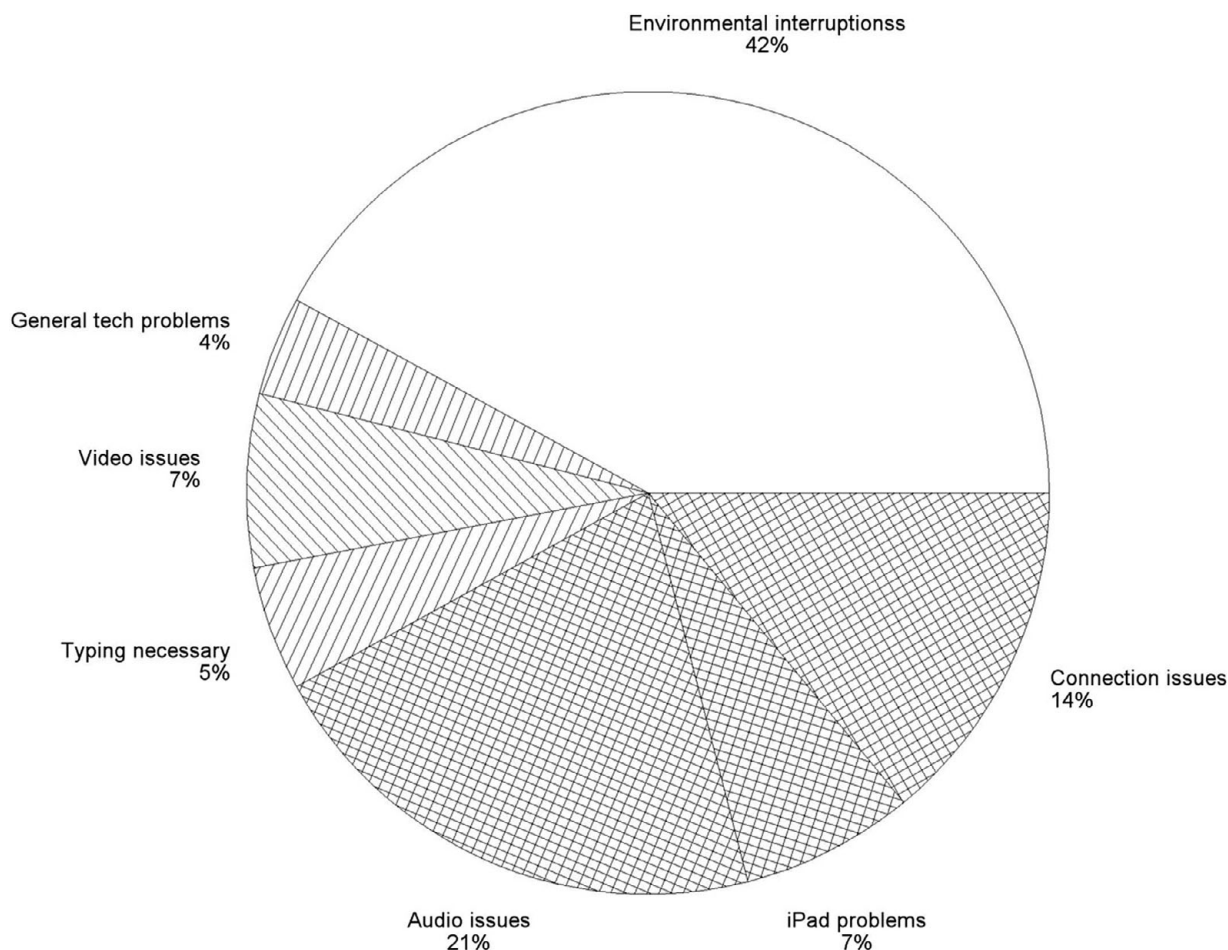
*difficulties* (Table 4 modeling results; all  $p > 0.14$  and estimated ratios close to 1). There were two exceptions: For Question 8 (seen more frequently via video conferencing), the proportion responding “yes” was 33 per cent lower for *slight* compared to *no technical difficulties* (ratio =  $0.67$ ,  $p = 0.0008$ , Table 4). The proportion responding “yes” was 27 per cent higher for Question 9 (not willing to wait longer for an in-person session when reverse scaled ratio =  $1.27$ ,  $p = 0.04$ ; see Table 4) for *slight* compared to *no technical difficulties*.

If participants experienced *major* difficulties, they were 20 per cent less likely to respond “yes,” that they could see clearly (ratio =  $0.80$ ,  $p < 0.0001$ ; see Table 4) or hear clearly (ratio =  $0.80$ ,  $p = 0.0013$ ; see Table 4) when compared to no technical difficulties. They were 22 per cent less satisfied with the video conferencing visit (ratio =  $0.78$ ,  $p < 0.0001$ ) and 48 per cent less likely to choose video conferencing if they could be seen more frequently (ratio =  $0.52$ ,  $p = 0.04$ ).

#### Post-Study Perceived Quality

##### Survey

Eight participants (89%) reported that sessions met their expectations either “much” or “very much” ( $n = 9$ ). Two-thirds (six participants) felt that the sessions addressed cognitive, communicative, and social areas of their lives. Approximately half (five



**Figure 2.** The proportion of each type of interruption as observed in the session recordings.

**Table 3.** Mean Perceived Quality by Reported Level of Technical Difficulty (Number of sessions=82)

Technical Difficulty	N	Mean	SD
None	36	7.8	1.4
Slight	28	7.2	1.8
Major	18	6.4	2.1

participants) felt the sessions addressed physical areas (e.g., movement), a few (two participants) found spiritual relevance, and most (eight participants) reported that the sessions addressed the musical domain.

With regard to their perceptions of the MT information in the VMT kit, 87.5 per cent of responses ranged from “somewhat helpful” to “a great extent helpful” (M = 3.4, SD = 0.9, range = 2 to 5). Perceptions of the manual were that it was “somewhat helpful” (M = 2.9, SD = 1.6, range = 1 to 5). With respect to perceptions of the instruments, 60 per cent regarded them as “Not at all helpful” to “Slightly helpful,” whereas 40 per cent found them to be “Very helpful” to “To a great extent helpful” (M = 3.3, SD = 1.5, range = 1 to 5).

Eight of the nine participants reported feeling “Very comfortable” participating in the sessions. All participants indicated that they would recommend the sessions to others and would be willing to attend follow-up sessions.

**Interviews**

Three themes emerged from the interview transcripts: (a) individual experiences with VMT varied, (b) individuals’ suggestions for further development of VMT sessions, and (c) individuals’ personal outcomes from VMT sessions.

**Theme 1: Individual experiences with VMT varied.** Participants reported varied experiences with their VMT sessions. Sub-themes highlighted contributors and barriers to a good experience with VMT, along with additional general comments about the experience.

*Contributors to a positive experience.* Some participants reported elements of the sessions that facilitated a positive and meaningful experience with VMT. For example, some described that the use of technology made music immediately accessible. Participant 106 shared: *And when you know what they can provide – what they want... you can produce that because of the wonderful equipment that is now at your fingertips and the broadcasting of it from your place to wherever you’re broadcasting, wherever the patient happens to be, that stuff is fabulous.* Participant 111 commented: *Every time I named a song that I wanted to hear, she was able to go to a – a site where she could pull it up and we could listen to it together.* Participant 109 explained having sessions via their computer helped them to focus, whereas they typically found it difficult to stay on task. Personal characteristics of the MTAs also contributed to seven of the participants’ positive experiences. They described the therapists as *very, very patient, always smiling,*

**Table 4.** GEE modeling results: estimated ratios of proportion satisfied after categorization by reported level of technical difficulty (n=82 sessions)

Question	Levels of technical difficulty being compared	Estimated ratio of proportion satisfied	Lower 95%CI	Upper 95%CI	p-value
1. I could see the music therapist clearly for the majority of the session	Slight vs None	1.01	0.99	1.04	0.3986
	Major vs None	0.80	0.73	0.88	<.0001
2. I could hear the music therapist clearly for the majority of the assessment time	Slight vs None	0.99	0.85	1.15	0.8559
	Major vs None	0.80	0.70	0.92	0.0013
3. I felt comfortable communicating with the music therapist through videoconferencing	Slight vs None	0.92	0.83	1.03	0.1455
	Major vs None	0.92	0.84	1.02	0.1174
4. I was satisfied with the quality of the music experience delivered through videoconferencing	Slight vs None	1.06	0.91	1.25	0.4468
	Major vs None	0.91	0.71	1.16	0.4442
5. I would be willing to use videoconferencing again with this music therapist	Slight vs None	0.97	0.92	1.03	0.3860
	Major vs None	0.92	0.75	1.13	0.4304
6. *I would rather see the music therapist in person than by videoconferencing	Slight vs None	0.93	0.79	1.1	0.3924
	Major vs None	0.85	0.55	1.3	0.4471
7. I was satisfied with my videoconferencing visit	Slight vs None	0.96	0.89	1.03	0.2319
	Major vs None	0.78	0.71	0.86	<.0001
8. If I knew I would be seen more frequently by the music therapist I would choose videoconferencing rather than having the music therapist visit in person	Slight vs None	0.67	0.53	0.84	0.0008
	Major vs None	0.52	0.27	0.97	0.0402
9. *I would have waited longer to see my music therapist in person than by using videoconferencing	Slight vs None	1.27	1.01	1.6	0.0427
* reverse scored	Major vs None	1.24	0.89	1.74	0.2004

*charming, friendly, kind, incredible, polite, lovely, wonderful, flexible with scheduling, capable of fixing technical challenges, and good at getting me to open up.* Therapists were also described as being *able, caring, excellent, expert, a fantastic resource, helpful, and responsive.* Finally, two participants reported that the MTAs' session facilitation style contributed to their positive experiences as well. Participant 101 commented on their therapist's ability to lead effective discussions: *She asked just enough questions to get me unloading. And uh... wasn't too nosy, I just, you know, could say whatever I wanted to say.* Participant 102 stated that the music therapist, *listened very well, very creatively, and that this made for a positive experience.*

**Barriers to a positive experience.** Responses revealed some barriers to a positive overall experience. While some participants appreciated the role of technology, others found it had a negative impact and described its challenges: Participant 108 – *I just sort of passed it off; she fixed it up. It didn't cancel the session, it just – was a little less. Frustrating for her, I'm sure.* The role of technology is also explored under Theme 2 below. Participant 101 expressed frustration that, *Although we both knew the song, sometimes the tune was a little different.* Participant 107 also expressed a preference for recorded music rather than the therapist's live music-making. Some participants identified session format as a barrier as well. Participant 106 reported that, *There were a couple of days I would've liked to not come, but the obligation is there, and the fact that you know somebody else is waiting on the other end, um, makes you responsible.* In contrast, another reported being dissatisfied that the sessions would eventually end. Finally, though some participants stated they enjoyed participating in sessions at home, others found returning home for a session inconvenient.

Participant 101 explained that, *Almost every other session, I was out. And I had to come home for the session, and that, There were a couple of times that I resented that I had to – 'Oh, I have to go home for this session. I have to run over here' [...].*

**Additional general comments about overall experience.** Additional responses from participants emerged as well. Some indicated that VMT was enjoyable, with multiple participants expressing they looked forward to their sessions, and others describing them as *positive.* Others reported they found the sessions *fun, nice, pleasant,* and that they *felt good* about the experience. Participant 106 summarized: *I was so impressed with this whole thing, really. I really was so impressed.* Additional general comments reflected advantages of the program such as helping to make sure participants *had somewhere to be on that day* (Participant 107) and the feeling of *doing something positive* (Participant 103). Participant 101 stated that, *For 45 minutes, I didn't have to think about outside world; we did talk about issues, but I didn't have to deal with them right that minute.* Others described the sessions as *useful, excellent,* and reported making progress toward their personal goals. Participant 108 stated that they would recommend the program to other people.

**Theme 2: Individuals' suggestions for further development of VMT sessions.** Subthemes included participants' perceptions related to their use of the VMT kit and program delivery recommendations.

**Use of VMT kit.** Participants' opinions varied on the overall VMT kit, which included a manual with accompanying instruments. Some participants indicated that they felt that the kit required no further materials. In contrast, others reported that the kit was missing *more of the music therapy aspect* (Participant



109). Others described a need for information about YouTube (Participant 111) or, also from Participant 109, *[a]ctual music, I don't know. Maybe, something that would encourage you to sing, providing actual songs and or where you could find them.* Multiple participants suggested adding lyric information for songs used during sessions.

With respect to adjectives used to describe the manual, participants reported finding it *good* and *very, very helpful*. Participant 104 called it *clear, cut and dry, succinct, and knowledgeable about the program*. Participant 103 reported that its main value lay in providing the Zoom appointment information. Many participants reported that they had not read it, and some indicated that they had read only part of it.

Regarding instruments, some positive responses included that they were *easy to use, well-chosen, and impactful*. However, Participant 111 felt that the instruments lacked variety because they were all percussion-based. Some participants reported never having used them, some stated that they had only used two or three from the range of options, and a couple of participants indicated their disinterest in playing any instruments at all.

**Program delivery recommendations.** With respect to session format, some participants reported that they would not have changed anything about the program, and several were *very happy* with the sessions. Participants referred to the program as *very promising and just beautiful*. Participant 104 reported that the program would be helpful for homebound older adults, noting that, *If I were a shut-in, this would be gorgeous to do. If a person has to be home. Or works from home, it would be no problem.* Participants commented on session format, including length, frequency, and duration of the sessions. Opinions on the ideal length of a VMT session differed amongst participants: Half responded that the sessions were the right length, whereas the others reported that the sessions were not long enough. Some participants wanted to add an additional 15–30 minutes to each session, and Participant 103 felt that the sessions should be two hours long. Other participants indicated that session length should be based on the individual's needs: *[F]or a more senior person, maybe half an hour would be more than enough* (Participant 102). Several participants indicated their desire for more than the limited number of sessions offered during the program, and Participant 107 reported that, *It should be a continuous program*. Participant 104 opined that once a week was an appropriate frequency. Some stated that sessions should be offered twice a week. Others agreed, contingent on individual participants' needs: *If I were a shut-in [...] I could do two, three times a week* (Participant 103) and *[...] someone who really, really needed it and was really responding to it, it certainly could be... very good to have it more often* (Participant 109).

The role of technology in the sessions prompted both positive and negative feedback. Participant 109 indicated that video conferencing contributed to a positive experience and should be kept as part of the program. Participant 106 suggested increasing the role of technology during the sessions. Some participants expressed their preference for in-person sessions versus sessions provided over video conferencing: *As I said eh, I prefer – prefer to do it... direct one-to-one – instead of on computer but eh, sometimes nothing – nothing, uh... else* (Participant 102).

**Theme 3: Individuals' personal outcomes from the VMT sessions.** When asked to provide feedback on the extent to which sessions influenced their interpersonal interactions, lifestyle, and mood, participants' responses varied.

**Impact on interpersonal interactions.** About half of participants reported that the sessions had not impacted their relationships in

any way. Of the other half who felt sessions did have an impact on their relationships, Participant 104 indicated that they were now learning how to establish personal boundaries. The same participant reported feeling increased gratitude toward their spouse. Participant 108 shared that the sessions improved a pre-existing music listening activity by deepening their understanding of their preferred music, and Participant 101 indicated that sessions had a positive impact on their sense of self within relationships, stating: *[T]his has influenced... I don't know about my whole life, but parts of my life, because I'm looking at them a little bit differently today than I did two months ago, for example. Because I'm forever searching for ways to make me more, um, quiet within myself, and knowing myself, and accepting myself, and not living for everybody else.*

**Impact on lifestyle.** According to many participants, sessions influenced their lifestyle, especially their interactions with music. Some participants reported that the sessions provided a new way of engaging with music: *[...] when I listen to music on a daily basis, I'm more working to it than dancing to it, but when we listen to it at the session, it was more, um, 'Where was I?' and, 'What did I do at that time?' – (Participant 109).* Others reported that the sessions had not resulted in any lifestyle changes: *[...] yet, but, um, I think it will because we talked about a variety of things, and I guess I would like to further explore some of them* (Participant 108). This same participant expressed interest in trying to follow through on *[Music Therapist]'s recommendation, which was to belt it out in the car by myself. [...]* So I might. *Because I was so hesitant to use my voice and she really, um... she brought that out; that I could do it* (Participant 108). A few participants indicated that the sessions increased their music engagement; one reported playing more music, whereas others reported that the program *influence[d] my lifestyle in listening and reintroducing – um music* (Participant 104) and *added music a little bit* (Participant 108). Participants also reported an *enjoyable* increase in music engagement.

**Impact on mood.** Participants' responses highlighted the extent to which and how the sessions impacted their mood. Participant 108 reported being sure the session had an impact; Participant 106 was unsure but later indicated their mood improved during a session, and Participant 107 reflected that they had not felt any change. Several participants reported the sessions had improved their mood. With respect to how, Participant 109 noted it was due to increased exposure to music: *I would think that it's improved my mood through bringing – through bringing me um, uh, bringing me music into my life, that I love [...]* So it's influenced my mood for the positive. For some participants, positive changes to their mood occurred during the sessions: *I think it has influenced me in a positive way. One day, I was very stressed, I couldn't find something that I needed and I was stressed and we had the music therapy and I felt much better after the therapy* (Participant 104). *Most of the time I felt better at the end than at the beginning* (Participant 101). Participant 108 reported that, *The more comfortable I became, the better my mood became.* Several participants indicated that their improved mood lasted beyond the duration of each session, for example, Participant 103 stated: *The nice feeling extended – stayed longer – when we finished on a nice note, which was every time.* Others reported enjoying having something to look forward to: *[...] it gives me something to look forward to on – on Wednesday morning, and uh, the more – the more busy I keep myself, the more things that I have to do in a week, the better off I feel* (Participant 111).

## Discussion

The purpose of our study was to investigate the perceived quality of VMT by older adults aging at home. We assessed this after each VMT session with a survey and video observation of technical difficulties and, at the end of the study, via a survey and interview.

Overall, participants were satisfied with the quality of VMT and slightly less so when major technical difficulties were present. Specifically, when technical difficulties were considered “major,” participant perceptions of quality were less, when compared to sessions where no technical difficulties were present. Furthermore, when there were “slight” or no technical difficulties present, there were no differences in perceived quality, suggesting that experiencing some technical difficulty did not have a far-reaching negative impact on MT outcomes (noting that mean responses for both categories were negatively skewed or at the higher end of the rating scale). Moreover, regardless of the level of technical difficulties, participants were willing to engage again in VMT. Likewise, they expressed satisfaction with the quality of the music equally across technical difficulty categories. The majority of difficulties involved the quality of Wi-Fi connection which depends on one’s ability to upgrade Internet services. Other difficulties could be addressed with improvements to the manual provided to support the online experience for participants.

When participants were asked directly to choose between online and hypothetical in-person MT sessions, approximately 50 per cent chose online (and approximately 50% chose in-person), regardless of levels of technical difficulty experienced. When told they could see their music therapist more frequently online, preference for online increased to approximately 65 per cent when no technical difficulties were experienced (compared to 40% when slight and major technical difficulties were experienced). Thus, when told they could see their therapist more often in the online environment, their interest increased when technical issues weren’t present and decreased slightly when they were present. Together, the data suggest that participants’ perceptions of the quality of MT via online versus in-person were less impacted by technical difficulties than we originally anticipated. Further, participants’ reflections on what impacted the quality of their experiences in the online setting are similar to what they might report in an in-person setting. For example, participants identified the therapist’s demeanor and their capacity to facilitate sessions as contributors to their experience. Moreover, their occasional desire to skip a session in the online setting would arise in an in-person setting as well. Thus, these therapeutic-type factors that tend to influence one’s perceived quality of a therapeutic experience generally might help explain the lack of strong preference for one setting overall. Our findings align with research on other therapeutic methods delivered online that find positive therapeutic outcomes (Berryhill *et al.*, 2019; Choi *et al.*, 2014; Jenkins-Guarnieri, Pruitt, Luxton, & Johnson, 2015; Maieritsch *et al.*, 2015; Orlando, Beard, & Kumar, 2019; Stubbings, Rees, & Roberts, 2013). However, research investigating the impact of technical difficulty specifically on perceived quality of therapy online is lacking and is worth further exploration.

Post-study interviews also revealed perceived positive outcomes of VMT on participants’ interpersonal relationships, lifestyle, and mood. Given the limited number of sessions and participants’ limited experiences with the technology, it is promising that all participants reported positive outcomes within at least one of these areas. Participants also reflected that their increased personal use of music was a positive outcome. This shift in lifestyle suggests the

ability of VMT to provide older adults aging at home with helpful tools to improve their quality life and overall wellness.

With respect to the feasibility of using MT online, perhaps the most promising finding from the interviews is that the majority of participants recommended that the session format be considered in future iterations. Some commented on increasing the session length by 15–30 minutes, whereas others expressed wanting to add more sessions to the limited number that the study allowed for. Along this line, participants reported feeling very comfortable participating in the sessions, willing to attend follow-up sessions, and willing to recommend VMT to others. Thus, despite issues with the technology at times, these positive qualities of the therapeutic connection achieved in the online environment contributed to the participants’ desire to increase the duration of online time with their therapist.

Both MTAs noted sound quality and lag problems when engaging in live music-making. Unison singing and/or playing was not possible without a jarring lag effect, which could explain why one of the participants indicated a preference for recorded music played through computer audio sharing rather than live music. Despite this lag effect, results found no difference in participants’ perceived quality of the music across technical difficulty categories in the post-session survey. Until there are further advancements with online live musical interaction, this sound quality issue may present barriers for the types of MT interventions that can be delivered online. Since this study, Zoom video conferencing has implemented improvements for how sound is shared, including a setting specifically for optimizing live music. These improvements broaden therapeutic possibilities.

Thus, despite being conducted pre-COVID-19 pandemic, and a number of studies investigating the effectiveness of online music therapy interventions (Baker & Tamplin, 2021; Brault & Vaillancourt, 2022; Clements-Cortes *et al.*, 2021; Cole *et al.*, 2021; Kantorova *et al.*, 2021; Lee *et al.*, 2021; Wilhelm & Wilhelm, 2022), our research fills a gap by focusing on the experience of the client and takes into account technical difficulties within their experiences. In contrast, current VMT research focuses mostly on the experiences of the therapists (Baker & Tamplin, 2021; Clements-Cortes *et al.*, 2021; Cole *et al.*, 2021; Lee *et al.*, 2021; Wilhelm & Wilhelm, 2022), except for a few that focus on the experiences of clients (Baker & Tamplin, 2021; Brault & Vaillancourt, 2022). Thus, our research provides insight into the perspectives of older adults in the online medium.

## Implications

Delivering MT services online presents positive possibilities for accessibility to MT given the social, personal, and economic benefits for older adults to age well at home. Older adults living in remote areas, or those who cannot leave their homes, can access an innovative, creative, evidence-based method for improving health and wellness at home. The live and interactive nature of VMT fosters purposeful and engaging social experiences. Research continues to find positive effects that social interaction has on preventing cognitive decline (Bourassa, Memel, Woolverton, & Sbarra, 2017; Hikichi, Kondo, Takeda, & Kawachi, 2017; Kim *et al.*, 2016; Kuiper *et al.*, 2015; McHugh Power, Kee, Steptoe, & Lawlor, 2019) and mental health challenges (Bilotta *et al.*, 2010; Cornwell & Waite, 2009; Glass, Mendes, Bassuk, & Berkman, 2006; Klinenberg, 2016; McHugh Power *et al.*, 2019; Park, Lee, Chiriboga, & Chung, 2019). Studies investigating older adults’ perceptions on aging

(Bowling, 2008; Stephens, Breheny, & Mansvelt, 2015) reveal that social engagement is an important component needed for quality of life.

As the number of people entering older adulthood increases, the need for more services to target quality of life is imminent. The government's commitment to aging well (Government of Ontario, 2017, 2019; Special Senate Committee on Aging, 2009; World Health Organization, 2015) calls for health care to expand upon and embrace new methods to address health and wellness. Striving to support the health and wellness of older adults has many positive implications for Canada's economy.

### Limitations and Future Directions

As more and more health care and wellness services move online, MT, too, must advance in the field of online delivery and research on its impact. Although there were 88 completed VMT sessions, the small sample size of nine participants limits post-study regression modeling and generalizability of the results. A greater number and a more diverse group of participants are recommended for future research. Though our participants' mean perceived quality rating was still quite high when technical difficulties were high, more work is needed to investigate types of difficulty on experience and outcomes. Perhaps by improving the VMT manual, participants would experience more ease with the technology, which, as the data show, could increase perceived quality of the service. It is possible that more sessions would have allowed participants to become increasingly comfortable with the technology and, therefore, experience less technical difficulties. It would be interesting to investigate the level of experience with the online technology on participants' perceived quality of the experience. Developing creative MT interventions that work well with any challenges posed by the lag experienced within musical aspects of the sessions is another area of importance.

Future research may also benefit from closely examining the differences between virtual and in-person MT sessions to inform best practices as well. As mentioned, some of participants' perceptions would be similar to those found with in-person therapy sessions. However, comparing specific aspects of the in-person and online experiences directly would delineate this. Research could also explore factors that influence the development of therapeutic relationships within an online MT context. While other health care professionals have found that technology did not hinder the development of healthy therapeutic relationships (Lightstone et al., 2015; Simpson & Reid, 2014; Sucala et al., 2012) (and our participants indeed listed this as a positive factor in their experiences online), focusing directly on therapeutic relationship factors in an online therapeutic environment will be fruitful for understanding the full scope of possibilities for MT in this context.

### Conclusion

Despite technical difficulties, each participant expressed satisfaction with the experience, many even recommending it to others. VMT shows great promise for older adults wishing services delivered remotely online to them at home. This study is one of the first of its kind, pre-pandemic, in the MT field, to explore the benefits of online delivery. Discovering more possibilities for how MT can reach people remotely and exploring further unique techniques that can foster therapeutic relationships online are exciting as the possibilities expand far beyond older adults aging at home. Since

the COVID-19 pandemic, many certified music therapists have moved their work to an online format. As our research shows and current studies suggest, online platforms for therapy, including MT, can meet the growing need for accessible care and can support our societal desire for aging well at home, with meaningful therapeutic interventions.

**Acknowledgements.** The authors would like to acknowledge the contributions of Justine Stehouwer, Karen Joseph, and Claire Chan. Special thanks to Cherie Werhun, PhD.

**Supplementary material.** The supplementary material for this article can be found at <http://doi.org/10.1017/S0714980823000260>.

**Competing interest.** None.

**Funding.** Financial support was received from the Centre for Aging & Brain Health Innovation's Spark program.

### References

- Abrams, B. (2010). Evidence-based music therapy practice: An integral understanding. *Journal of Music Therapy*, 47(4), 351–379. <https://doi.org/10.1093/jmt/47.4.351>
- Agres, K. R., Foubert, K., & Sridhar, S. (2021). Music therapy during COVID-19: Changes to the practice, use of technology, and what to carry forward in the future. *Frontiers in Psychology*, 12, 647790. <https://doi.org/10.3389/fpsyg.2021.647790>
- Ansdell, G., & Meehan, J. (2010). Some light at the end of the tunnel. *Music and Medicine*, 2(1), 29–40.
- Baker, F. A., & Tamplin, J. (2021). Music therapy service provision via telehealth in response to COVID-19 restrictions: A survey of Australian practitioners and consumers. *Australian Journal of Music Therapy*, 32(1), 1–24.
- Berryhill, M. B., Culmer, N., Williams, N., Halli-Tierney, A., Betancourt, A., Roberts, H., et al. (2019). Videoconferencing psychotherapy and depression: A systematic review. *Telemedicine and e-Health*, 25(6), 435–446. <https://doi.org/10.1089/tmj.2018.0058>
- Bilotta, C., Case, A., Nicolini, P., Mauri, S., Castelli, M., & Vergani, C. (2010). Social vulnerability, mental health and correlates of frailty in older outpatients living alone in the community in Italy. *Aging & Mental Health*, 14, 1024–1036. <https://doi.org/10.1080/13607863.2010.508772>
- Bixter, M., Blocker, K., & Rogers, W. (2018). Enhancing social engagement of older adults through technology. In R. Pak & A. C. McLaughlin (Eds.), *Aging, technology and health* (pp. 179–214). Cambridge, MA: Academic Press. <https://doi.org/10.1016/B978-0-12-811272-4.00008-7>
- Blusi, M., Nilsson, I., & Lindgren, H. (2018). Older adults co-creating meaningful individualized social activities online for health ageing. *Studies in Health Technology and Informatics*, 247, 775–779.
- Bock, J., Brettschneider, C., Weyerer, S., Werle, J., Wagner, M., Maier, W., et al. (2016). Excess health care costs of late-life depression – Results of the AgeMooDe study. *Journal of Affective Disorders*, 199, 139–147. <https://doi.org/10.1016/j.jad.2016.04.008>
- Botner, E. (2018). Impact of a virtual learning program on social isolation for older adults. *Therapeutic Recreation Journal*, LII(2), 126–139. <https://doi.org/10.18666/TRJ-2018-V52-12-8664>
- Bourassa, K. J., Memel, M., Woolverton, C., & Sbarra, D. A. (2017). Social participation predicts cognitive functioning in aging adults over time: Comparisons with physical health, depression, and physical activity. *Aging and Mental Health*, 21(2), 133–146. <https://doi.org/10.1080/13607863.2015.1081152>
- Bowling, A. (2008). Enhancing later life: How older people perceive active ageing? *Aging & Mental Health*, 12(3), 293–301. <https://doi.org/10.1080/13607860802120979>
- Brault, A., & Vaillancourt, G. (2022). Group telehealth music therapy with care givers: A qualitative inquiry. *Journal of Patient Experience*, 9, 23743735221107241. <https://doi.org/10.1177/23743735221107241>

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 2, 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Brotos, M., Koger, S. M., & Pickett-Cooper, P. (1997). Music and dementias: A review of literature. *Journal of Music Therapy*, 34(4), 204–245. <https://doi.org/10.1093/jmt/34.4.204>
- Brotos, M., & Marti, P. (2003). Music therapy with Alzheimer's patients and their family caregivers: A pilot project. *Journal of Music Therapy*, 40(2), 138–150. <https://doi.org/10.1093/jmt/40.2.138>
- Bruer, R. A., Spitznagel, E., & Cloninger, R. (2007). The temporal limits of cognitive change from music therapy in elderly persons with dementia or dementia-like cognitive impairment: A randomized controlled trial. *Journal of Music Therapy*, 44(4), 308–328. <https://doi.org/10.1093/jmt/44.4.308>
- Canadian Association of Music Therapists. (2020). What is music therapy? Retrieved May 10, 2021, from <https://www.musictherapy.ca/about-camt-music-therapy/about-music-therapy/>.
- Canadian Association of Retired Persons. (2012). A new vision for aging at home. Retrieved November 14, 2018, from <http://zweb-s3.uploads.s3.amazonaws.com/carp/2013/06/Aging-at-Home-Briefing-Updated-Oct-19.pdf>.
- Canadian Institute for Health Information. (2018). Dementia prevention and treatment. Retrieved February 18, 2020, from <https://www.cihi.ca/en/dementia-in-canada/spotlight-on-dementia-issues/dementia-prevention-and-treatment>.
- Cangelosi, P. R., & Sorrell, J. M. (2014). Use of technology to enhance mental health for older adults. *Journal of Psychosocial Nursing and Mental Health Services*, 52(9), 17–20. <https://doi.org/10.3928/02793695-20140721-01>
- Cephas, A. S., Sofield, S., & Millstein, A. (2022). Embracing technological possibilities in the telehealth delivery of interactive music therapy. *Nordic Journal of Music Therapy*, 31(3), 214–227. <https://doi.org/10.1080/08098131.2022.2040579>
- Chan, M. F. (2007). Effects of music on patients undergoing a C-clamp procedure after percutaneous coronary interventions: A randomized controlled trial. *Heart & Lung*, 36(6), 431–439. <https://doi.org/10.1016/j.hrtlng.2007.05.003>
- Choi, N. G., Wilson, N. L., Sirrianni, L., Marinucci, M., & Hegel, M. T. (2014). Acceptance of home-based telehealth problem-solving therapy for depressed, low-income homebound older adults: Qualitative interviews with the participants and aging-service case managers. *The Gerontologist*, 54, 704–713. <https://doi.org/10.1093/geront/gnt083>
- Clements-Cortes, A., Mercadal-Brotos, M., Silva, T. R. A., & Moreira, S. V. (2021). Telehealth music therapy for persons with dementia and/or caregivers. *Music and Medicine, An Interdisciplinary Journal*, 13(3), 206–210. <https://doi.org/10.47513/mmd.v13i3.821>
- Cole, L. P., Henechowicz, T. L., Kang, K., Pranjic, M., Richard, N. M., Tian, G. L. J., et al., (2021). Neurologic music therapy via telehealth: A survey of clinician experiences, trends, and recommendations during the COVID-19 pandemic. *Frontiers in Neuroscience*, 15, 648489. <https://doi.org/10.3389/fnins.2021.648489>
- Cornwell, E. Y., & Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal of Health and Social Behavior*, 50(1), 31–48. <https://doi.org/10.1177%2F002214650905000103>
- Cotton, S., Anderson, W., & McCullough, B. (2013). Impact of internet use on loneliness and contact with others among older adults: cross-sectional analysis. *Journal of Medical Internet Research*, 15(2), e39. <https://doi.org/10.2196/jmir.2306>
- Creech, A., Hallam, S., McQueen, H., & Varvarigou, M. (2013). The power of music in the lives of older adults. *Research Studies in Music Education*, 35(1), 87–102. <https://doi.org/10.1177/1321103X13478862>
- Cutler, N. E. (2017). Isolation and gerontechnology: Computer-assisted social engagement. In S. Kwon (Ed.), *Gerontechnology: Research, practice, and principles in the field of technology and aging* (pp. 417–428). New York: Springer Publishing.
- Denton, M., & Zeytinoglu, I. (2010). Editorial: An introduction to context, practice, and policy in caring for an aging population. *Canadian Journal on Aging*, 29(1), 1–4. <https://doi.org/10.1017/S0714980809990420>
- Donkin, L., Christensen, H., Naismith, S., Neal, B., Hickie, I., & Glozier, N. (2011). A systematic review of the impact of adherence on the effectiveness of e-therapies. *Journal of Medical Internet Research*, 13(3), e52. <https://doi.org/10.2196/jmir.1772>
- Erkkila, J., Punkanen, M., Fachner, J., Ala-Ruona, E., Pontio, I., Tervaniemi, M., et al. (2011). Individual music therapy for depression: randomised controlled trial. *British Journal of Psychiatry*, 199(2), 132–139. <https://doi.org/10.1192/bjp.bp.110.085431>
- Gaddy, S., Gallardo, R., McCluskey, S., Moore, L., Peuser, A., Rotert, R., et al. (2020). COVID-19 and music therapists' employment, service delivery, perceived stress, and hope: A descriptive study. *Music Therapy Perspectives*, 38(2), 157–166. <https://doi.org/10.1093/mtp/miaa018>
- Gallego, M. G., & Garcia, J. G. (2017). Music therapy and Alzheimer's disease: Cognitive, psychological and behavioural effects. *Neurologia*, 32(5), 300–308. <https://doi.org/10.1016/j.nrl.2015.12.003>
- Garrido, M. M., Kane, R. L., Kaas, M., & Kane, R. A. (2009). Perceived need for mental health care among community-dwelling older adults. *Journals of Gerontology: Series B*, 64B(6), 704–712. <https://doi.org/10.1093/geronb/gbp073>
- Gitlin, L. N., Szanton, S. L., & Hodgson, N. A. (2013). It's complicated - But doable: The right supports can enable elders with complex conditions to successfully age in community. *Generations: Journal of the American Society on Aging*, 37(4), 51–61.
- Glass, T. A., Mendes, C. F., Bassuk, S. S., & Berkman, L. F. (2006). Social engagement and depressive symptoms in late life. *Journal of Aging and Health*, 18(4), 604–628. <https://doi.org/10.1177%2F0898264306291017>
- Gold, C., Solli, H. P., Kruger, V., & Lie, S. A. (2009). Dose-response relationship in music therapy for people with serious mental disorders: Systematic review and meta-analysis. *Clinical Psychology Review*, 29, 193–207. <https://doi.org/10.1016/j.cpr.2009.01.001>
- Government of Ontario. (2017). Aging with confidence: Ontario's action plan for seniors. Retrieved November 14, 2018, from [https://files.ontario.ca/ontarios\\_seniors\\_strategy\\_2017.pdf](https://files.ontario.ca/ontarios_seniors_strategy_2017.pdf).
- Government of Ontario. (2019). Ontario is consulting with seniors and caregivers on aging strong in their communities: Feedback to support a new government-wide seniors strategy. Retrieved May 10, 2021, from <https://news.ontario.ca/en/release/52551/ontario-is-consulting-with-seniors-and-caregivers-on-aging-strong-in-their-communities>.
- Hage, E., Wortmann, H., van Offenbeek, M., & Boonstra, A. (2016). The dual impact of online communication on older adults' social connectivity. *Information Technology & People*, 29(1), 31–50. <https://doi.org/10.1108/ITP-09-2014-0216>
- Hanser, S. B., & Thompson, L. W. (1994). Effects of a music therapy strategy on depressed older adults. *Journal of Gerontology*, 49(6), 265–269. <https://doi.org/10.1093/geronj/49.6.P265>
- Hikichi, H., Kondo, K., Takeda, T., & Kawachi, I. (2017). Social interaction and cognitive decline: Results of a 7-year community intervention. *Alzheimer's & Dementia: Translational Research & Clinical Interventions*, 3(1), 23–32. <https://doi.org/10.1016/j.trci.2016.11.003>
- Hill, N. L., Mogle, J. M., Munoz, E., Wion, R., & Colancecco, E. M. (2015). Assessment of subjective cognitive impairment among older adults. *Journal of Gerontological Nursing*, 41(4), 28–35. <https://doi.org/10.3928/00989134-20150309-01>
- Ihm, J., & Hsieh, Y. P. (2015). The implications of information and communication technology use for the social well-being of older adults. *Information, Communication & Society*, 18, 1123–1138. <https://doi.org/10.1080/1369118X.2015.1019912>
- Jenkins-Guarnieri, M. A., Pruitt, L. D., Luxton, D. D., & Johnson, K. (2015). Patient perceptions of Telemental Health: Systematic review of direct comparisons to in-person psychotherapeutic treatments. *Telemedicine and e-Health*, 21(8), 652–660. <https://doi.org/10.1089/tmj.2014.0165>
- Kaambwa, B., Ratcliffe, J., Shulver, W., Killington, M., Taylor, A., Crotty, M., et al. (2017). Investigating the preferences of older people for telehealth as a new model of health care service delivery: A discrete choice experiment. *Journal of Telemedicine and Telecare*, 23(2), 301–313. <https://doi.org/10.1177%2F1357633X16637725>
- Kadowaki, L., Wister, A. V., & Chappell, N. L. (2015). Influence of home care on life satisfaction, loneliness and perceived life stress. *Canadian Journal on Aging*, 34(1), 75–89. <https://doi.org/10.1017/S0714980814000488>
- Kantorova, L., Kantor, J., Horejsi, B., Gilboa, A., Svobodova, Z., Lipsky, M., et al. (2021). Adaptation of music therapists' practice to the outset of the COVID-19 pandemic – Going virtual: A scoping review. *International Journal of*

- Environmental Research and Public Health*, **18**(10), 5138. <https://doi.org/10.3390/ijerph18105138>
- Kim, C., Wu, B., Tanaka, E., Watanabe, T., Watanabe, K., Chen, W., et al. (2016). Association between a change in social interaction and dementia among elderly people. *International Journal of Gerontology*, **10**(2), 76–80. <https://doi.org/10.1016/j.ijge.2016.03.006>
- Klinenberg, E. (2016). Social isolation, loneliness, and living alone: Identifying the risks for public health. *American Journal of Public Health*, **106**(5), 786–787. <https://doi.org/10.2105/2FAJPH.2016.303166>
- Knickman, J. R., & Snell, E. K. (2002). The 2030 problem: Caring for aging baby boomers. *Health Services Research*, **37**(4), 849–884. <https://doi.org/10.1034%2Fj.1600-0560.2002.56.x>
- Knott, D., & Block, S. (2020). Virtual music therapy: Developing new approaches to services delivery. *Music Therapy Perspectives*, **58**, 151–156. <https://doi.org/10.1093/mtp/miaa017>
- Kuiper, J. S., Zuidersma, M., Oude Voshaar, R. C., Zuidema, S. U., van den Heuvel, E. R., Stolk, R. P., et al. (2015). Social relationships and risk of dementia: A systematic review and meta-analysis of longitudinal cohort studies. *Ageing Research Reviews*, **22**, 39–57. <https://doi.org/10.1016/j.arr.2015.04.006>
- Lee, S., O'Neill, D., & Moss, H. (2021). Dementia-inclusive group-singing online during COVID-19: A qualitative exploration. *Nordic Journal of Music Therapy*, **31**(4), 308–326. <https://doi.org/10.1080/08098131.2021.1963315>
- Lightstone, A. J., Bailey, S. K., & Voros, P. (2015). Collaborative music therapy via remote video technology to reduce a veteran's symptoms of severe, chronic PTSD. *Arts & Health*, **7**(2), 123–136. <https://doi.org/10.1080/17533015.2015.1019895>
- Maieritsch, K. P., Smith, T. L., Hessinger, J. D., Ahearn, E. P., Eickhoff, J. C., Zhao, Q. (2015). Randomized controlled equivalence trial comparing videoconferencing and in person delivery of cognitive processing therapy for PTSD. *Journal of Telemedicine and Telecare*, **22**(4), 238–243. <https://doi.org/10.1177%2F1357633X15596109>
- Manhal-Baugus, M. (2001). E-therapy: Practical, ethical, and legal issues. *CyberPsychology & Behavior*, **4**(5), 551–563. <https://doi.org/10.1089/109493101753235142>
- Mathews, R. M., Clair, A. A., & Kosloski, K. (2001). Keeping the beat: Use of rhythmic music during exercise activities for the elderly with dementia. *American Journal of Alzheimer's Disease and Other Dementias*, **16**(6), 377–380. <https://doi.org/10.1177/153331750101600608>
- McCaffrey, T. (2018). Evaluating music therapy in adult mental health services: Tuning into service users perspectives. *Nordic Journal of Music Therapy*, **27**(1), 28–43. <https://doi.org/10.1080/08098131.2017.1372510>
- McCausland, L., & Falk, N. L. (2012). From dinner table to digital tablet: Technology's potential for reducing loneliness in older adults. *Journal of Psychosocial Nursing and Mental Health Services*, **50**(5), 22–26. <https://doi.org/10.3928/02793695-20120410-01>
- McHugh Power, J. W., Kee, F., Steptoe, A., & Lawlor, B. A. (2019). Loneliness and social engagement in older adults: A bivariate dual change score analysis. *Psychology and Aging*, **34**(1), 152–162. <https://psycnet.apa.org/doi/10.1037/pag0000287>
- Nilsson, U., Unosson, M., & Rawal, N. (2005). Stress reduction and analgesia in patients exposed to calming music postoperatively: A randomized controlled trial. *European Journal of Anaesthesiology*, **22**, 96–102. <http://doi.org/10.1017/s0265021505000189>
- Novotney, A. (2017). A growing wave of online therapy. *Monitor on Psychology*, **48**(2), 48.
- Okereke, O. I. (Ed.) (2015). *Prevention of late-life depression: Current clinical challenges and priorities*. Totowa, NJ: Humana Press.
- Orlando, J. F., Beard, M., & Kumar, S. (2019). Systematic review of patient and caregivers' satisfaction with telehealth videoconferencing as a mode of service delivery in managing patients' health. *PLoS ONE*, **14**(8), e0221848. <https://doi.org/10.1371/journal.pone.0221848>
- Orti, J. E., Garcia-Pardo, M. P., Iranzo, C. C., Madrigal, J. J. C., Castillo, S. S., Rochina, M. J., & Gasco, V. J. P. (2018). Does music therapy improve anxiety and depression in Alzheimer's patients? *Journal of Alternative and Complementary Medicine*, **24**(1), <https://doi.org/10.1089/acm.2016.0346>
- Park, N. S., Lee, B. S., Chiriboga, D. A., & Chung, S. (2019). Loneliness as a mediator in the relationship between social engagement and depressive symptoms: Age differences among community-dwelling Korean adults. *Health & Social Care in the Community*, **27**(3), 706–716. <https://doi.org/10.1111/hsc.12687>
- Pearson, C. (2020). Music therapy during a pandemic. *Ensemble*, **46**(2), 11–15.
- Public Health Agency of Canada. (2019). A dementia strategy for Canada: Together we aspire. Retrieved May 10, 2021, from [https://www.canada.ca/content/dam/phac-aspc/images/services/publications/diseases-conditions/dementia-strategy/National%20Dementia%20Strategy\\_ENG.pdf](https://www.canada.ca/content/dam/phac-aspc/images/services/publications/diseases-conditions/dementia-strategy/National%20Dementia%20Strategy_ENG.pdf)
- QSR International Pty Ltd. (2015). NVivo (Version 11). Retrieved August 21, 2021, from <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>.
- Recupero, P. R., & Rainey, S. E. (2005). Informed consent to e-therapy. *American Journal of Psychotherapy*, **59**(4), 319–331. <https://doi.org/10.1176/appi.psychotherapy.2005.59.4.319>
- Reynolds, A., & Osborne, T. F. (2018). Promoting technology adoption and engagement in aging. In D. Chau & T. Osborne (Eds.), *Using technology to improve care of older adults* (pp. 19–38). New York: Springer Publishing.
- Sandwood, J. (2017, December 19). Making the internet more accessible for Canadian seniors. Global Accessibility News. Retrieved May 10, 2021, from <https://globalaccessibilitynews.com/2017/12/19/making-the-internet-more-accessible-for-canadian-seniors/>.
- Simpson, S. G., & Reid, C. L. (2014). Therapeutic alliance in videoconferencing psychotherapy: A review. *Australian Journal of Rural Health*, **22**(6), 280–299. <https://doi.org/10.1111/ajr.12149>
- Siniscarco, M. T., Love-Williams, C., & Burnett-Wolle, S. (2017). Video conferencing: an intervention for emotional loneliness in long-term care. *Activities, Adaptation & Aging*, **41**(4), 316–329. <https://doi.org/10.1080/01924788.2017.1326763>
- Slavin, M. J., Brodaty, H., Kochan, N. A., Crawford, J. D., & Trollor, J. N. (2010). Prevalence and predictors of “subjective cognitive complaints” in the Sydney Memory and Ageing Study. *American Journal of Geriatric Psychiatry*, **18**(8), 701–710. <https://doi.org/10.1097/JGP.0b013e3181df49fb>
- Solé, C., Mercadal-Brotons, M., Galati, A., & De Castro, M. (2014). Effects of group music therapy on quality of life, affect, and participation in people with varying levels of dementia. *Journal of Music Therapy*, **51**(1), 103–125. <https://doi.org/10.1093/jmt/thu003>
- Solé, C., Mercadal-Brotons, M., Gallego, S., & Riera, M. (2010). Contributions of music to aging adults' quality of life. *Journal of Music Therapy*, **47**(3), 264–281. <https://doi.org/10.1093/jmt/47.3.264>
- Special Senate Committee on Aging. (2009). Canada's aging population: Seizing the opportunity. Retrieved November 14, 2018, from <https://senCanada.ca/content/sen/committee/402/agei/rep/agingfinalreport-e.pdf>
- Stephens, C., Breheny, M., & Mansvelt, J. (2015). Health ageing from the perspective of older people: A capability approach to resilience. *Psychology & Health*, **30**(6), 715–731. <https://doi.org/10.1080/08870446.2014.904862>
- Stevens-Ratchford, R., & Diaz, T. (2003). Promoting successful aging through occupation. An examination of engagement in life. *Activities, Adaptation & Aging*, **27**(3–4), 19–37. [https://doi.org/10.1300/J016v27n03\\_02](https://doi.org/10.1300/J016v27n03_02)
- Stones, D., & Gullifer, J. (2016). ‘At home it's just so much easier to be yourself’: Older adults' perceptions of ageing in place. *Ageing and Society*, **36**(3), 449–481. <https://doi.org/10.1017/S0144686X14001214>
- Stubbings, D. R., Rees, C. S., & Roberts, L. D. (2013). Comparing in-person to videoconference-based cognitive behavioral therapy for mood and anxiety disorders: randomized controlled trial. *Journal of Medical Internet Research*, **15**(11), e258. <https://doi.org/10.2196/jmir.2564>
- Sucala, M., Schnur, J., Constantino, M., Miller, S., Brackman, E., & Montgomery, G. (2012). The therapeutic relationship in E-Therapy for mental health: A systematic review. *Journal of Medical Internet Research*, **14**(4), e110. <https://doi.org/10.2196/jmir.2084>
- Titov, N., Dear, B. F., Ali, S., Zou, J. B., Lorian, C. N., Johnston, L., et al. (2015). Clinical and cost-effectiveness of therapist-guided internet-delivered cognitive behaviour therapy for older adults with symptoms of depression: A randomized controlled trial. *Behaviour Therapy*, **46**(2), 193–205. <https://doi.org/10.1016/j.beth.2014.09.008>
- Tse, M. M. Y., Chan, M. F., & Benzie, I. F. F. (2005). The effect of music therapy on postoperative pain, heart rate, systolic blood pressure and analgesic use following nasal surgery. *Journal of Pain & Palliative Care Pharmacotherapy*, **19**(3), 21–29.

- van Beljouw, I. M., van Exel, E., de Jong Gierveld, J., Comijs, H. C., Heerings, M., Stek, M. L., et al. (2014). Being all alone makes me sad: Loneliness in older adults with depressive symptoms. *International Psychogeriatrics*, *26*(9), 1541–1551. <https://doi.org/10.1017/s1041610214000581>
- Verma, J., Petersen, S., Samis, S., Akunov, N., & Graham, J. (2014). Healthcare priorities in Canada: A backgrounder. Canadian Foundation for Healthcare Improvement. Retrieved February 18, 2020, from [https://slidelegend.com/healthcare-priorities-in-canada-a-backgrounder-cfhi\\_59c1bd9b1723dd5342dcdd56.html](https://slidelegend.com/healthcare-priorities-in-canada-a-backgrounder-cfhi_59c1bd9b1723dd5342dcdd56.html).
- Vogels, E. (2019). Millennials stand out for their technology use, but older generations also embrace digital life. Pew Research Centre. Retrieved August 21, 2021, from <https://www.pewresearch.org/fact-tank/2019/09/09/us-generations-technology-use/>.
- Wagner, N., Hassanein, K., & Head, M. (2010). Computer use by older adults: A multi-disciplinary review. *Computers in Human Behavior*, *26*(5), 870–882. <https://doi.org/10.1016/j.chb.2010.03.029>
- Wang, K. H., Chen, G., & Chen, H. (2018). Understanding technology adoption behaviour by older adults. *Social Behavior and Personality*, *46*(5), 801–814. <https://doi.org/10.2224/sbp.6483>
- Wilhelm, L., & Wilhelm, K. (2022). Telehealth music therapy services in the United States with older adults: A descriptive study. *Music Therapy Perspectives*, *40*(1), 84–93. <https://doi.org/10.1093/mtp/miab028>
- World Health Organization. (2015). World report on ageing and health. Retrieved November 14, 2018, from [http://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811\\_eng.pdf;jsessionid=2D82693568C943D2A0BA452143C920B6?sequence=1](http://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811_eng.pdf;jsessionid=2D82693568C943D2A0BA452143C920B6?sequence=1).
- Zhao, K., Bai, Z. G., Bo, A., & Chi, I. (2016). A systematic review and meta-analysis of music therapy for the older adults with depression. *International Journal of Geriatric Psychiatry*, *31*, 1188–1198. <https://doi.org/10.1002/gps.4494>
- Zoom. (2020). Zoom and PIPEDA/PHIPA compliance guide. Retrieved May 10, 2021, from [https://explore.zoom.us/docs/doc/PIPEDA\\_PHIPA%20Canadian%20Public%20Information%20Compliance%20Guide.pdf](https://explore.zoom.us/docs/doc/PIPEDA_PHIPA%20Canadian%20Public%20Information%20Compliance%20Guide.pdf).