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## A descriptive exploration of younger and older adults' experiences of Integrative Medical Group Visits for Long COVID

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### Abstract

**Introduction:** Long COVID disproportionately affects older adults. Individuals with Long COVID (LC) often experience symptoms that severely impact quality of life, and treatment approaches are still evolving. The Integrative Medical Group Visit (IMGV) model is an evidence-based approach that may be useful to treat patients with LC; however, there is limited evidence describing the experience and/or feasibility of using IMGV for LC treatment, especially among the older adult population. The purpose of this study is to describe older and younger adults' experiences of both having LC and participating in a virtually delivered IMGV for LC.

**Methods:** This is a secondary analysis of qualitative data from a parent study examining the experiences of participants in a virtually delivered IMGV for patients with LC. Patients participated in semi-structured interviews before and after 8 weekly IMGV sessions. Thematic analysis was used to analyze interview data.

**Results:** Overall, 21 pre-interviews and 17 post-interviews were collected. Thematic analysis of patient interviews by age group resulted in three themes that each contained similarities and differences between the younger and older adult participants. These themes included: (1) experiences of LC (2) feelings about the future (3) experiences of the pilot IMGV on LC.

**Conclusion:** This study provides critical context for clinicians who treat older adults with LC. Results support virtually delivered IMGVs as a potentially feasible option for both older and younger adults who want to apply an integrative approach to their LC treatment. Findings from this study will inform future research on IMGV for LC treatment.

### Keywords

Long COVID; Older adult; Integrative Medicine; Group medical visit

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#### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.ahr.2023.100137](https://doi.org/10.1016/j.ahr.2023.100137).

## 1. Introduction

Globally, over 100 million individuals worldwide have experienced Long COVID [1]. Long COVID syndrome is defined as continued signs and symptoms of COVID-19 that persist for 4 or more weeks after the initial diagnosis of the virus [2]. Long COVID affects multiple organ systems, and common symptoms include chest pain, fatigue, respiratory distress, digestive symptoms, ageusia (loss of taste), and olfactory agnosia (loss of smell) [3,4]. Risk factors for Long COVID include female sex, severe clinical status, having co-morbidities, being unvaccinated, as well as hospital admission and/or oxygen supplementation during an individual's course of acute COVID-19 [3,4]. However, individuals without common COVID-19 risk factors also experience Long COVID [3]. Preliminary research on the etiopathology of Long COVID suggests multiple possible causes of Long COVID [5–7]. Some research indicates Long COVID may be related to injury sustained during the acute phase of the condition or mediated by inflammation and autoimmunity secondary to viral infections [5,6]. Other studies have proposed that Long COVID involves a “reactivation or reinfection of the SARS CoV-2” virus [6,7]. Individuals with Long COVID may experience multiple unpredictable symptoms which severely impact their daily activities and quality of life [8–10]. For example, a recent study indicated that at 7 months post-COVID, 45.2% of patients still required a reduced workload and 22.3% had not returned to work [8]. Long COVID may also increase suicide risk [9] due to the convergence of psychiatric symptoms (depression, anxiety, etc.), physical symptoms (cough, fatigue, dyspnea, pain), and neurological symptoms (e.g., headache, dizziness, seizures, etc.) [10].

Older adults are a particularly vulnerable population with a higher risk for Long COVID [11,12]. The CDC estimates that 25% of adults infected with COVID-19 over 65 years of age will experience Long COVID symptoms compared to 20% of adults under 65 years [11]. Moreover, individuals over 60 are at increased risk for fatigue, shortness of breath, and increased heart rate post-COVID [13]. Older adults with Long COVID are also at an increased risk for neurologic symptoms and mental health conditions such as mood disorders [11–13]. This is compounded by the fact that older adults may also experience a variety of other comorbidities, including increased cardiac risk factors, and often have a more severe experience of the initial acute phase of the illness [14,15]. Many patients with Long COVID also experience misdiagnosis of their symptoms by their healthcare providers [16–19]. This potential for misdiagnosis is even higher with older adults whose presenting symptoms may be associated with multiple chronic conditions [18,19].

Integrative medicine approaches that combine traditional medical management with complementary therapies have been recommended for individuals with Long COVID [20]. Due to its comprehensive lens and diverse array of modalities, as well as its focus on lifestyle factors, integrative medicine has the potential to support people's health throughout the lifespan [20–22]. Furthermore, non-pharmacologic treatments and informed use of supplements benefits older adults who often face issues with polypharmacy while trying to manage multiple concurrent acute and chronic conditions [22,23].

### 1.1. Integrative Medical Group Visits (IMGVs) for chronic conditions

The Integrative Medical Group Visit (IMGV) model was developed to help introduce integrative medicine approaches to health in a way that is supportive of patients and physicians and reimbursable by health insurance [24–26]. Each session typically involves patients with similar conditions or health concerns meeting with a medical provider (and another facilitator, such as a mindfulness or yoga instructor) over the course of several weeks to expose participants to various integrative approaches to managing their chronic condition. For example, participants learn to self-administer acupressure and to practice gentle yoga seated in a chair. Weekly themes often include topics such as nutrition, stress reduction, and sleep. These are supplemented with guided breathwork and meditation practices, opportunities for patients to share both their challenges and improvements, and time for patients to discuss individual questions with the provider. This provides an opportunity to regularly monitor the condition, answer questions, and ultimately build a social support network as participants build relationships with each other and the facilitator(s) over the course of several weeks. Participants may choose to independently explore one or more of the integrative modalities introduced during the group program [24–26].

Previous literature has shown IMGV-based interventions to be feasible and beneficial options for adults of various socioeconomic backgrounds [27–30]. This is particularly pertinent for adults with chronic conditions which require long-term care and monitoring for the maintenance of overall health. For example, previous studies have found IMGVs to be an effective intervention for adults' chronic pain [29,30]. Though some studies on the effectiveness of IMGVs for a particular condition have included older adults, most have not evaluated the impact of age on either their experience of the intervention or its effectiveness for their health. It is also important to note that the aforementioned studies were all conducted in-person. Physical distancing requirements and health concerns, especially for older adults during the pandemic, resulted in a shift from in-person to virtual delivery of many aspects of healthcare [31]. There is currently a gap in the literature regarding the effectiveness and feasibility of virtually delivered IMGVs, including barriers participants of different ages may have faced in participation. Moreover, there is limited research on the use of integrative medicine for Long COVID and for older adult populations. Therefore, the purpose of this study is to explore younger and older adults' experiences of Long COVID.

## 2. Methods

### 2.1. Design

This study is a secondary analysis of qualitative data from a parent study, which sought to assess the feasibility of IMGV for patients with Long COVID.

### 2.2. Parent study

The parent study was a pilot observational study assessing the feasibility of an adapted IMGV program for patients with Long COVID [32]. Participants were recruited from a Long COVID specialty clinic in the Southeastern United States based out of an academic medical system and referred to participate in the IMGV. The group was offered to patients

regardless of their interest in research participation. The IMGV program was conducted via Zoom<sup>®</sup> (video conferencing platform) over 8 weeks, for 2 h each week. Groups were facilitated by a medical doctor and a co-facilitator with training in yoga and mindfulness. Two cohorts were conducted between June and December of 2021. Each week in the program covered a different integrative health topic, and respective guest speakers such as dietitians, naturopathic physicians, and other healthcare professionals were included to present on their area of expertise and answer participants' questions. Participants interacted through discussion of health topics, sharing reflections on experiential activities, and weekly check-ins led by the physician. Participants were also able to communicate one-on-one with the physician as needed using the "breakout room" function on Zoom. Participants were provided with resources to supplement their participation in the group, including a website with audio and video recordings, as well as an electronic manual with teaching points from the IMGV curriculum, organized by weekly topics. Data was collected by several validated measures and semi-structured interviews, pre and post-intervention. This study was approved by the University of North Carolina at Chapel Hill Institutional Review Board under (#21-1326) and research participants provided verbal consent. Verbal consent was used to both limit any potential breaches of confidentiality and for ease with participants participating in virtually delivered interviews.

### 2.3. Data source for secondary qualitative analysis

We used data from pre- and post-interviews as the basis of the secondary qualitative analysis. Interview questions were developed from expert consensus of the research team and included questions on participants' experiences of Long COVID as well as the IMGV intervention. Interview questions included Long COVID-related questions on topics such as symptomatology and illness experiences. IMGV-related questions asked what patients were looking for from the IMGV in the pre-interview, what they gained from IMGV in the post-interview (including how this met their healthcare needs), and recommendations for future IMGV studies (see Supplemental Material A and B). Participant interviews were conducted via Zoom<sup>®</sup> and lasted from 20 min to over an hour depending upon participants' responses. They were audio recorded and transcribed verbatim by research assistants. Across our analysis, we defined older adults as adults 60 and older, which is consistent with the World Health Organization [34] definition. Younger adults were defined as adults less than 60 years old. Pseudonyms were used in the final manuscript to preserve participants' confidentiality.

This secondary qualitative analysis utilized reflexive thematic analysis to interpret the data [33]. Reflexive approaches emphasize taking one's positionality into consideration since that inevitably colors one's interpretation of qualitative data. In-depth coding was performed by the first author (R.M.) who is a younger adult and medical student with a background in public health and anthropology. The primary coder did not originally conduct the interviews or experienced Long COVID herself, which gave her a more etic ("outsider's") perspective when analyzing the data.

The recursive coding process was modeled from the steps described by Braun and Clarke [33]. This involved thoroughly reading and re-reading through the interviews to get familiar

with the data, a round of coding, generating themes based on the initial codes, verification, and discussion with the senior author of this manuscript (I.R.) to further develop and review these themes, and another round of coding to consolidate themes and incorporate feedback. Further research was then done to contextualize the findings from this qualitative analysis and understand how it fits in with the existing literature on this subject. Lastly, the findings were incorporated into a final manuscript, which includes quotes selected by the primary coder to illustrate the main themes in the participants' own words.

### 3. Results

Overall, 26 people completed the pre-interview. However, five could not be included due to technical difficulties, resulting in 21 pre-interviews with viable data. 17 of the 26 original participants completed the post-interview, as well as one additional participant who had not completed the pre-interview, resulting in 18 final post-interviews. In both the pre- and post-interviews, most of the participants were younger adults (less than 60 years) and self-identified as European American (Tables 1 and 2). The average age for older adults was 64 in both the pre- and post-interview samples while the average age for younger adults was 45 in pre-interview sample and 44 in the post interview sample. Thematic analysis of patient interviews by age group resulted in three primary categories within which similarities and differences were observed between older and younger adults' responses. The themes were: (1) experiences of Long COVID (2) feelings about the future (3) experiences of the pilot IMGV on Long COVID. We describe these themes in the sections that follow.

#### 3.1. Experiences of Long COVID

Both younger and older adults expressed uncertainty regarding the etiology of their symptoms and whether they were a result of Long COVID or another health condition. For example, some younger participants were unsure whether fluctuations in blood pressure, tight muscles, headaches, or teeth grinding were due to stress/anxiety or something else entirely. One older adult mentioned not knowing if their shortness of breath was due to iron deficiency or a symptom of Long COVID. In relation to their Long COVID experiences, older adults specifically brought up symptoms that were related to aging-related comorbidities. One participant described:

“the dizzy thing, too, especially since you know, at my age, it’s already a thing that you got to watch out for the falling and stuff. I didn’t want to put a button on that said I fell and I can’t get up. So I have a watch that’s supposed to detect if I go ‘clunk.’ It will send somebody a message to come fetch me out of the woods or wherever I walk off to. But you know, just that kind of uneasiness about being well enough to just go do whatever it is you’re about to go do.” - Rose, Pre-Interview

There was also concern that Long COVID symptoms, especially cognitive issues, in older adults might be missed, dismissed, or misattributed to being “just old”. For example, one participant stated:

“Well the cognitive memory is one... People say ‘well you’re just old,’ but I did not have this problem before coronavirus... I found that I’m slow in my reactions,

slow and identifying slower than I am before...I would like to be able to get my cognitive abilities back a little bit better” - Jack, Pre-Interview

Both younger and older adults also expressed uncertainty regarding what made their condition better or worse, and ultimately, how long it would last. For example, one younger participant expressed how they could not “really...pinpoint anything” despite trying to track their symptoms. The participant stated:

“I was journaling...every day, like, this is how I feel today, this is what I did today...Is there something that’s making it worse, you know, and exacerbating me feeling that way?... And I can’t really like pinpoint anything, right? Like, there’s nothing that’s consistent about it, I think is the thing.” - Helen, Pre-Interview

Another participant lamented that “there are so many unanswered questions, such as how long is this going to go on, when is this going to end” (Mary Post-Interview). This sentiment was shared by other participants as well. For example, one participant shared:

“People who are suffering from Post-Covid symptoms...are taking trips to the doctor, but the doctors tell them that they have no idea. Or like my PCP he wants to throw 10,000 prescriptions every time I go. There’s no need for anybody to prescribe medication that can be detrimental just because they want to throw something at you, so you don’t feel what’s going on.” - Sarah, Post-Interview

These unanswered questions also influenced their desire for further support and more research on their condition. They also contributed to their mixed feelings about the future, and the lingering question of whether they would ever experience a return to normalcy.

Both younger and older participants brought up trying various complementary, alternative, and integrative approaches to see if they would help with their symptoms. This ranged from physical therapy, to guided meditations, to supplements, to Traditional Chinese Medicine approaches like acupuncture and qi gong. For example, one older adult described their trial-and-error approach with their diet until they found something that worked for them:

“I went through the elimination diet so many times and gotten down to six months with nothing but crackers and water. But then I learned about the anti-inflammatory and planetary diet. And so that helped.” - Sarah, Post-Interview

Whether participants had been utilizing holistic approaches prior to the IMGV or not—many expressed a desire to learn more about them.

### 3.2. Feelings about the future

In part due to the lack of answers that participants were faced with, older and younger adults expressed mixed feelings about the future. While some did express hope that they would improve or that things would work out for the better, they were cautious about whether to expect significant improvements moving forward since their journey thus far had been so unpredictable. One younger adult shared, “I feel more hopeful about the future, but it is with this feeling that this might be something I have for the rest of my life, which is difficult.” - Laura, Pre-Interview

When asked about their feelings about the future, one idea that (specifically) older adults brought up was the experience of having Long COVID and other chronic conditions simultaneously. An older patient who had chronic fatigue and fibromyalgia prior to contracting COVID described their hope that COVID research might also help improve understanding of other autoimmune and inflammation-related issues. The participant stated:

“I’m still on the roller coaster but overall, I feel more hopeful...I happen to deal with the chronic fatigue and fibromyalgia for 20 years and there’s so much overlap that I anticipate that COVID may unlock some of the puzzles related to those auto immune and the inflammatory problems because there’s so much overlap.. The hardest part is still that we don’t know with Long COVID...at least hopeful with the type of research that’s being done that we’ll get continued support.” - Harriet, Pre-Interview

This quote not only illustrates this patient’s personal perspective on dealing with three different chronic conditions but also comes back to the broader idea of mixed feelings about the future and participants’ desire for continued research and support.

The participants also expressed a variety of mixed feelings about the future and retirement, depending on where they saw themselves in life. One felt the pandemic had disrupted their retirement plans. However, they still saw their upcoming retirement as a hopeful sign that life was returning to normal soon. The participant stated:

“I mean, I’m probably moving toward retirement. COVID kind of disrupted some of that cause who wants to retire and not travel. But you know...as the world rights itself a bit I think things are starting to feel a little more normal about getting out and doing things. So I think that’s made me more positive. I think there’s hope that we can all go back to doing things we’d like to do with other people.” - Rose, Pre-Interview

On the other hand, another participant shared their anxieties about their future and retirement plans,

“I had anticipated working until I was at least 67. I don’t know if that’s going to be possible. It is not like I have a lot saved up for retirement, so this is not who I wanted to be at this point in time. So there are a lot of uncertainties right now.” - Sarah, Pre-Interview

Thus, participants shared varied perspectives on uncertainty, exacerbated for many by their inability to work due to Long COVID symptoms.

### 3.3. Experiences of pilot IMGV on Long COVID

Both younger and older adults experienced the group as a “safe place” and a source of support and validation where they could find consolation in others’ similar experiences, regardless of age. One older participant shared:

“Just hearing what everybody else says about their problems and all the information that you guys provided I mean yes. It’s sort of helps to renew your spirit a little bit to tell you yes it’s good...I enjoyed listening to what all the other ideas people have

and plus what they're going through and what they're struggling with" - Katelyn, Post-Interview

Another younger participant described how the other participants genuinely cared and wanted to see each other improve. They shared sensitive information and medication that they're on and physical therapy that they're trying. One participant stated:

"I like that they're sharing of information and really caring. Dr. [blinded] was a really good facilitator and very caring as well I would say." - Melissa, Post-Interview

In addition to participating in the IMGV, a few participants (both younger and older) described utilizing social media groups, such as Facebook, as an avenue for virtually seeking support and information about Long COVID. One older participant shared that they "had been reading a lot on Facebook and I knew I wasn't out there by myself" (Tom, Post-Interview). However, as helpful as it was to meet people on Facebook, they still wanted to connect with other Long COVID patients on a more personal level: "I'm also very interested in meeting other people like myself-I have on Facebook but that's different than hearing that people talking" (Rachel, Pre-Interview).

The youngest participant in the group (under age 25) brought up how they felt very included in the group even though everyone else was older than them. The participant stated:

"I feel like the best parts was listening to how everyone's weeks had gone. Just being able to empathize with one another and have someone here being like you know I experience that too. Especially with me being so young because I'm not sure but I think I was the youngest one." - Irene, Post-Interview

Older participants who considered themselves quiet, private, or introverted shared that they still benefited from the group and hearing everyone open up. One participant stated:

"I'm quiet and private by nature so it's hard for me to share. But I think overall it was good, it was good to hear from other people." - Tom, Post-Interview

Alternatively, one older adult did bring up that sometimes hearing other participants' worse symptoms was anxiety inducing for them and brought on a fear that they might develop these symptoms. The participant stated:

"I think my challenge for me is there were times I was looking forward to the meeting but then when I would listen and hear what other people had to say...there was times at the end of the session that we finished, and I was a little bit depressed. I was a little anxious because I started everything 'OK are my symptoms going to get better or am I going to get worse or is this a symptom that I didn't have that someone else had?' Then I started thinking 'am I gonna develop that?'" - Katelyn, Post-Interview

Both younger and older adults also found learning about holistic approaches beneficial for their condition and overall well-being. Though it did not necessarily cure their symptoms, participants were grateful to learn about mindfulness, self-care, meditation, and body scan to become more aware of their bodies' needs. A couple of older adults specifically mentioned



benefitting from the nutrition, relaxation, and yoga introduced in the IMGV curriculum. As one older adult put it:

“What I got out of it is trying to eat better. It gave you a sense of awareness, of being mindful of what you eat. It made you mindful of trying to look at the better side of things of what God has provided for us. Looking at nature and meditating I’m trying techniques to try to calm yourself down even though yes we’re going to have upset moments” - Katelyn, Post-Interview

Both younger and older participants expressed a desire to learn about current findings related to Long COVID, as well as an urgent need for the global medical community to conduct more research on the condition. One participant stated:

“There is research going on outside of [research university], the world is trying to figure this out. So there are consistently new... topics being discussed on what can be attempted to resolve certain subset of symptoms and I would’ve loved to see more of that incorporated [in the IMGV]” - Richard, Post-Interview

Some even suggested that the IMGV group could serve as a platform to collect and/or disseminate data. One participant shared:

“I guess in the beginning I just thought it was going to be more research based... Just to find common ground... I think that there should be more data collection... on what people have found have worked for their situation and what people have been prescribed that didn’t work at all. As I mentioned, I’ve got six prescriptions, but I took one pill and I know not to ever again. If there was some way of knowing this has been prescribed, it might be something that we could open up a conversation with.” - Sarah, Post-Interview

One participant hoped that findings from the IMGV could help better inform physicians as well: “I’m hoping that the doctors learn more. So they know how to deal with it... I want it to be informative to the doctors” (Tom, Pre-Interview). One older participant specifically made it clear that they would be willing to participate in research studies on Long COVID if it would mean more clarity on their condition. The participant shared:

“if there’s anything we can find about what things help people get through this, I would always be willing to participate and stuff to help with that. If it would help.” - Rose, Pre-Interview

When asked about the virtual delivery of the intervention, several participants (both younger and older) remarked at the convenience of being able to participate from the comfort of their homes. This was particularly relevant since some individuals lived far and/or had trouble driving since the onset of their Long COVID symptoms—meaning they would have faced difficulty participating or have had to rely on a family member or some other form of transportation. One younger participant shared:

“It was great, right, because a lot of us can’t drive, we have these severe symptoms you know, we can make it... I thought it was the best. I don’t know how else we would’ve done it. I physically couldn’t have gone in somewhere every Monday for two hours and driven and put that effort and you know so, I thought it was great.

For zoom I liked seeing the people, that was important to have videos.” - Emily,  
Post-Interview

A couple of older participants had not used Zoom® much independently prior to this and one had some technical difficulties initially. However, this did not appear to impede their participation in the group. Other older adults were already quite familiar with Zoom® from using it for work and did not express any concerns about the program being delivered virtually. One older adult mentioned they preferred in-person, but still enjoyed the virtual group and found it convenient given the circumstances: “I would’ve loved to have had an in-person thing but I know...the Covid situation and all that...[so] I really enjoyed it.” (Katelyn, Post-Interview).

#### 4. Discussion

This study describes the experiences of younger and older adults with Long COVID who participated in virtual Integrative Medical Group Visits (IMGVs). Similarities among their experiences included uncertainty regarding their symptoms and disease course, utilization of social media groups, mixed feelings about the future, interest in holistic approaches, and desire for more research on Long COVID. Both younger and older adult participants found IMGV to be a significant source of support and validation and found the virtual platform to be convenient overall. Older adults specifically brought up having comorbidities along with Long COVID as well as different perspectives on retirement. Findings from this study provide important insight on the potential impact of age on Long COVID experience, context and background for providers treating these patients, and perspective for future virtual interventions aimed at Long COVID and other chronic conditions.

In our study, we found that younger and older adults’ experiences participating in IMGVs were not substantively different. Older adults, alongside younger adults in this study, sought out integrative therapies, especially in the context of a condition not yet well defined by Western medicine [34]. However, this interest is likely overrepresented in our study since there may be self-selection bias from participants who already had an inclination toward an integrative approach. Although some older adults did initially face technical difficulties with Zoom®, these were soon resolved with help from the research team and did not serve as a barrier to their participation in the program. However, more than half of these older adults had already been exposed to Zoom® from their work or other avenues, so they were somewhat familiar with the platform. Our study findings demonstrate that older adults successfully navigated the telehealth platform. However, prior research has indicated that older patients are less likely to use and engage in telemedicine due to disabilities and/or inexperience with virtual platforms and technologies [35–37]. Moreover, the older adults in our study were in their first decade of the older adult age group therefore may not be representative of the overall older adult population. In addition, many of the older adults successfully navigated the IMGV telehealth because they were exposed to virtual platforms and technologies in their workplaces. Future studies may consider exploring feasibility of IMGV visits for older adults, particularly adults over 70 years old and/or older adults who do not have strong backgrounds in navigating virtual platforms and technologies. Telehealth may be a potential avenue for interventions designed for older adults if adequate technical

help and support either from their caregivers or the healthcare team is provided. Virtual delivery of IMGVs has potential to eliminate barriers to in-person IMGV participation such as transportation, limited mobility, excessive fatigue with exertion, hearing impairment, low vision, and other limitations.

Our findings also demonstrated that it is important to consider older adults' experiences of Long COVID in the broader context of aging and associated comorbidities. While research suggests that older adults have a higher likelihood of contracting COVID and experiencing more severe symptoms of the acute illness [14,15], Long COVID is likely being underdiagnosed in older adults [18,19]. This may, in part, be due to symptoms, such as cognitive decline/brain fog, increased falls, and muscle weakness, being attributed to the “natural aging” process [3,4]. Many Long COVID symptoms are present in illnesses common to older adults, such as cancer, osteoporosis, cardiovascular disease, and diabetes. In addition to Long COVID's status as a discrete illness, it may come to be characterized as an accelerant of multiple chronic diseases. Another factor complicating the diagnosis for patients of all ages is that many people contracted COVID before reliable testing became available. Therefore, a history of COVID infection that predates Long COVID symptoms may not be verifiable.

Another notable finding from our study is that older adults reported significant concerns about retirement, an important topic for many older adults. Some older adult participants reported concerns about the financial implications of early retirement due to their Long COVID symptoms. However, participants also viewed retirement as a source of hope and joy, and as something to look forward to, depending on their prior financial situation and future financial security.

Our findings also demonstrate implications for future research. Since older adults (>60 years) are significantly affected by Long COVID and often underrepresented in research [38], it is critical for studies to actively include and pay special attention to the ways that Long COVID affects and manifests in this population. Five participants, including expressed a desire for more research on Long COVID. Two of these individuals specifically expressed their willingness to be active participants—either by using the IMGV as a source of data collection or through other studies. Future studies should consider accessibility for economically diverse patients as well as those with limited technological literacy. Although the virtual option was convenient for the majority of participants, it may be beneficial to offer an in-person option as well for those who prefer it and feel that it facilitates more organic or creative participant interactions [39].

#### 4.1. Study strengths and limitations

This study is limited by its small sample size, narrow age range of older adults, and lack of diversity among participants. Interviews included 6 older adults between the ages of 61–67, who all identified as “European American”. The COVID pandemic exposed health disparities through the disproportionate rates of COVID-19 cases among Black and Hispanic populations in the United States [40]. This makes it crucial to include these populations in future studies—especially older adults from these populations who may experience double vulnerability due to both their age and racial background [11,40]. More diverse

representation, especially with regard to race, ethnicity, language, and care setting, is needed to see if specific adaptations better meet the needs of subpopulations of older adults.

Populations missing from this analysis include adults in long-term care facilities, adults with limited English proficiency, and adults over the age of 70. It is unclear what proportion of adults in long-term care facilities could participate in IMGV, and to what extent, due to the high prevalence of cognitive disability, but this is an important population to consider as they also experienced high morbidity and mortality from COVID-19 [41] which predicts a higher disease burden from Long COVID [3,4]. In addition, there are likely older adults who have not been diagnosed with Long COVID or considered it due to their (or their healthcare provider's) lack of awareness of this emerging condition. It is also possible that some older adults did not participate or may have been discouraged because the group was delivered virtually.

Because a pre-condition for participating in the study was access to an internet-enabled device and connection, we did not include individuals without access to virtual platforms and technology. However, prior research indicates that at least 10% of Americans lack the appropriate internet platform and/speed to access telehealth services [42,43]. Individuals from low- and middle-income countries experience even higher rates of inadequate infrastructure for telehealth [44,45]. Innovative models of care are needed globally to close this digital divide and improve access for those who lack the technological infrastructure to access telehealth services [45]. Despite its limitations, this pilot study helps fill an important gap in the IMGV and Long COVID literature. IMGVs for Long COVID are a novel virtual intervention, which previously has not been adapted for Long COVID. Thus, this study builds on qualitative studies previously conducted on IMGVs that included older adults with other chronic conditions. The study design also incorporated interviews before and after the intervention, which allowed the research team to analyze the baseline perspectives of patients and observe any changes after IMGV participation.

## 5. Conclusion

This study provides evidence that the virtual delivery of IMGVs for patients with Long COVID appears to be an acceptable and feasible intervention for both younger and older adults. Both younger and older adults were seeking integrative health approaches and a support system. They found the virtual IMGV to be a convenient way to engage in both of these goals. Special considerations for older adults with Long COVID include prevalent comorbidities and aging-related changes that may contribute to the potential for (under) recognition of Long COVID symptoms in older adults [18,19]. Further study of interventions targeting individuals of all ages with Long COVID symptoms is needed, with consideration for addressing the needs of older adults in particular.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1**

Characteristics of patients who participated in the pre-interviews ( $N=21$ ).

Category	Sub-category	N%	Mean	Range
Age	Younger adult	16 (76.2)	43.375	32–59
	Older adult	5 (23.8)	64	61–67
Gender	Female			
	Male			
Race/ethnicity	African American	3 (14.2)	–	–
	Asian/Pacific Islander	1 (4.8)	–	–
	European American	16 (76.2)	–	–
	Other	1 (4.8)	–	–

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**Table 2**

Characteristics of patients who participated in the post-interviews ( $N = 18$ ).

Category	Sub-category	N%	Mean	Range
Age	Younger adult	11 (64.7)	44.83	22–59
	Older adult	6 (35.3)	63.83	61–67
Gender	Female			
	Male			
Race/ethnicity	African American	3(16.7)	–	–
	Asian/Pacific Islander	1(5.6)	–	–
	European American	12(66.7)	–	–
	Other	1 (5.6)	–	–
	Unknown	1 (5.6)	–	–

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