Evidence-based fall prevention program adaptations for remote delivery: Impacts on reach and access

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Abstract

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Evidence-based fall prevention programs are important for preventing injury and death among older adults. During the COVID-19 pandemic these programs were forced to cease in-person classes and pivot to remote delivery due to safety and social distancing guidelines. As new variants continue to arise and remote delivery continues to be used in many settings, it is important to investigate how the remote delivery adaptation is impacting reach and access for these important programs, and what future adaptations might be necessary to promote equitable access. We conducted interviews and surveys with staff involved in the remote delivery of these programs about changes they observed in the populations being reached. We found that remote delivery comes with unique barriers, but also can overcome barriers specific to in-person delivery and reach previously underserved populations.

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Introduction

Falls are the leading cause of unintentional injury death for individuals over 65 years of age, resulting in tens of thousands of deaths every year.[1,2] This trend is increasing: there has been a 30% increase in fall deaths among older adults since 2007.[3] Further, nonfatal falls have health impacts, resulting in millions of emergency room visits each year and leading to serious injury for 1 in 5 cases.[2,3] Additionally, experience with past falls and fear of future falls can result in older adults limiting their daily activities and leading less full lives.[4]

To address this important problem, evidence-based fall prevention programs (EBFPPs) have been implemented across the United States. These programs are rigorously tested, led by trained facilitators, and focus on reducing fall risk in older adults through education and physical exercise.[5,6] This study will focus on four EBFPPs: A Matter of Balance (AMOB), Stepping On (SO), Tai Ji Quan: Moving for Better Balance (TJQ), and EnhanceFitness (EF). EF and TJQ reduce falls through balance and strength improving exercises. SO and AMOB combine education, strategies for reducing falls, and exercises to improve balance and strength.

Previously these four programs were offered exclusively in-person, but in response to COVID-19-driven changes in state and federal social distancing and safety guidelines these programs were forced to close down in-person delivery. However, the need for fall prevention programs did not go away. In fact, it was further exacerbated by the COVID-19 pandemic, as many older adults have reported increased isolation and decreased physical exercise during this time, putting them at greater risk for falls.[7] In response to this concern, programs were motivated to quickly pivot and adapt their programming to be remotely accessible. With the rise of new variants, it's unclear when remote programming will no longer be necessary within the pandemic context, but an end to the pandemic does not necessarily mean an end to the use of remote programming. As will be discussed in this paper, some organizations intend to continue offering remote options for at least part of the year regardless of changes in the pandemic. Given all this, it is important to investigate how these remote adaptations are impacting access to these crucial programs and what further adaptations may be needed to ensure equitable access.

Remote delivery has the potential to reach some traditionally underserved populations and improve equitable access among groups that face barriers to in-person services. Persons with mental health conditions, mobility issues, or chronic health conditions are sometimes forced to cancel or delay appointments due to the difficulties of going to a physical location for services.[8] Residents of rural areas often don't have specialists or health programs in their area and must travel miles away in order to access these services in person.[9,10] Remote delivery of health-related services removes the barriers of distance and brings medical appointments or health promotion programming to the individual's home.[8-10] However, in order for remote delivery to be utilized to promote equity, its unique barriers must also be considered and addressed.

The research that has been done around equitable access and reach for the remote delivery of health programs, both prior to and during the pandemic, has warned that as remote delivery becomes more widely used, the digital divide could reinforce and exacerbate existing inequities

and health disparities unless efforts are made to address barriers to access.[11] The barriers to digital access are wide-ranging, and those most at risk for being left behind by remote delivery - older adults, rural communities, individuals with low socio-economic status, and racial minorities – are often those most in need of these services.[11,12] One of the biggest barriers to remote access is broadband internet and device access. A Pew research survey completed in early 2021 found that among adults with a household income lower than $30,000 a year, 24% didn't own a smartphone, 41% didn't have a computer in their home, 59% didn't have a tablet, and 43% didn't have broadband internet.[13] Other research has shown that many older adults do not use the internet in their daily lives.[14,15] This lack of familiarity with the internet and technology can lead to a steep learning curve, and combined with low technological literacy and discomfort with technology, can prevent older adults from accessing these programs.[11,15]

Crucially, equity-focused adaptations can help overcome some of these barriers. A remote community healthcare worker intervention found that participants benefited from digital training before the program started, and studies examining EF's remote program found that older adults benefited from the presence of an additional staff member to help troubleshoot technology issues during classes, which reduced technology-related frustration and discomfort.[16,17] These studies also found that the need for technology assistance decreased markedly after the first two or three weeks.[17,18]

The study detailed in this paper will be one of the first studies to examine multiple EBFPPs' remote adaptations, and investigate who was reached, who was missed, and what implementation decisions may have impacted reach and access during the COVID-19 pandemic. By doing this study across multiple EBFPPs we get a chance to see how similar adaptations work across a range of settings and programs and get a better sense of the transferability of our findings. The results of this study can be used by EBFPPs and other evidence-based programs to make informed decisions about whether or not to continue offering remote once in-person delivery is possible, what barriers to access they need to consider, and what facilitators they might want to implement to promote equitable access.

Methods

Design

We used a descriptive, convergent mixed-methods study design to explore the implementation of remote delivery adaptation among EBFPPs and its impacts and outcomes. We chose this design for the purpose of triangulation, by attempting to answer the same questions through different data sources we can better ensure the validity of our findings.[19] This study was determined to be exempt from University of Washington Institutional Review Board review under Category 2 program evaluation and quality improvement. We used semi-structured interviews and a self-administered online survey. Both the qualitative and quantitative data collection were completed in the context of larger projects that aimed to address a wide range of questions about remote EBFPP delivery and effectiveness; however, this study will be focusing only on the data related to reach and access.

Programs

As mentioned previously, four EBFPP programs participated in our evaluation All of these programs were originally offered only in-person and transitioned to video conference-based remote delivery during the pandemic. The four EBFPPs we worked with were all focused on

preventing falls and had an exercise component, but they differed in their approaches. EF is an hour-long class that is offered 3 times a week, either in 16-weeks sessions or as an ongoing class, with fitness checks at baseline, 16 weeks, and then regular intervals from there.[20-21] EF classes are focused on exercise to improve balance and strength and involve a mix of aerobic exercises, strength training with weights, balance exercises, and stretching.[20-21] TJQ uses traditional Tai Ji Quan movements to improve older adults' stability, range of motion, coordination, and body awareness. These classes are conducted twice a week for 24 weeks and each session lasts 60 minutes with warm-ups, exercises, and cool downs.[22] AMOB's remote program mixes seated exercise activities with group discussion, problem-solving, and skill building to reduce falls. The remote program includes 9 two-hour classes with two trained facilitators.[23] SO is a 7 week program with one 2-hour session offered per week that focuses on strategies for positive lifestyle changes and education. Each session focuses on a different topic, including home hazard identification, safety and footwear, vision and falls, and medication management. Exercises are also part of every class.[24]

Quantitative

Participants

Any organization that delivered one of the four EBFPPs remotely between May 2021 and March 2022 was eligible. We asked staff at these organizations who either managed the EBFPP for their organization (program managers) or were directly involved in leading the EBFPP classes (instructors) to fill out our survey. Those who submitted surveys without answering any of the questions or filled out the survey but indicated that they had not led or been involved in offering one of the four EBFPPs remotely were excluded. Participants were compensated $10 for their time. We used convenience sampling when recruiting for the online survey. Organizations were invited to participate via EBP listservs, national partner listservs, and webinars. All organizations that agreed to participate in data collection were emailed links to the survey or communicated with by phone.

Data Collection

EBFPP instructors and managers filled out a survey asking about the reach, effectiveness, and implementation of remote delivery during the pandemic between October 2021 and March 2022. Items were created using the RE-AIM framework and qualitative data that was collected during the 2020 Evidence-Based Leadership Conference's (EBLC's) Remote EBP online survey. The EBLC survey was put together immediately following the pivot to remote delivery, it was designed to find out which organizations were doing what to offer remote delivery, and how they were doing it. This survey also gathered data related to reach, facilitators, barriers, and adaptations using open-ended textboxes. The survey was analyzed and used to write a grant for wider evaluation of remote delivery and used to create the multiple-choice responses for the survey used in this study. This paper will focus on seven of these questions related to reach and access. [Appendix A]

Data Analysis

Survey responses were analyzed using descriptive statistics of categorical variables to examine which answers were selected most frequently. Study data were collected and managed using REDCap electronic data capture tools hosted at the Institute of Translational Health Sciences.[25]

REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Qualitative Data

Participants

In order to be eligible participants had to be coordinating the delivery of one of the four EBFPPs or leading one of the EBFPP classes remotely between Feb 15, 2021 and Sept 30, 2021. We used purposive sampling to encourage recruitment of organizations serving traditionally underserved older populations including communities of color, people living with disabilities, and/or in rural settings. EBFPP administrators reached out to organizations that had offered their EBFPP class during the specified time window and sent them a link to our survey to gauge interest and determine eligibility. EBFPP administrators also emailed our invitation to participate directly to their list of program managers and instructors. Our goal was to complete at least four interviews per EBFPP program and to speak to at least one organization per program that had reported struggling with remote delivery or being forced to drop remote classes. We anticipated this being enough to achieve saturation given past research.[26]

Data Collection

We created our interview guide to evaluate remote EBFPP using the Framework for Reporting Adaptations and Modifications-Expanded (FRAME) adaptations framework (Wiltsey-Stirman, 2019) and Rabin et al.'s assessment of adaptations. Our questions focused on adaptations to in-person EBFPPs for remote delivery, including what was changed, how, by whom, and what the impacts and outcomes of those changes were. The portions of our interview guide that were meant to evaluate reach and equity were developed using Shelton et al.'s extension of the RE-AIM framework.[27] These additional questions asked what new populations were being reached by remote delivery that hadn't previously been reached, who was not reached by remote programming who had been previously reached by in-person delivery, what adaptations to remote delivery might be needed to promote equity, and what equity issues organizations were concerned about. We completed semi-structured zoom interviews with EBFPP staff members and instructors between August and September of 2021. Each interview took between 30 to 60 minutes and were video recorded.

Data Analysis

Interviews were analyzed using a rapid analysis framework due to time constraints that made traditional thematic analysis from transcribed interviews untenable.[28] Instead of verbatim transcription, interviews were summarized, and the written summary was divided up and entered into a coding matrix. The matrix rows were organized around the interview questions and participant characteristics. After all the interviews had been summarized in the matrix, the relevant rows were reviewed to create thematic coding memos based around key research questions. A subset of interviews were reviewed by two team members to confirm they were summarized and coded consistently. Areas of disagreement were discussed until consensus was reached. The remaining interviews were entered into the coding matrix by one team member.

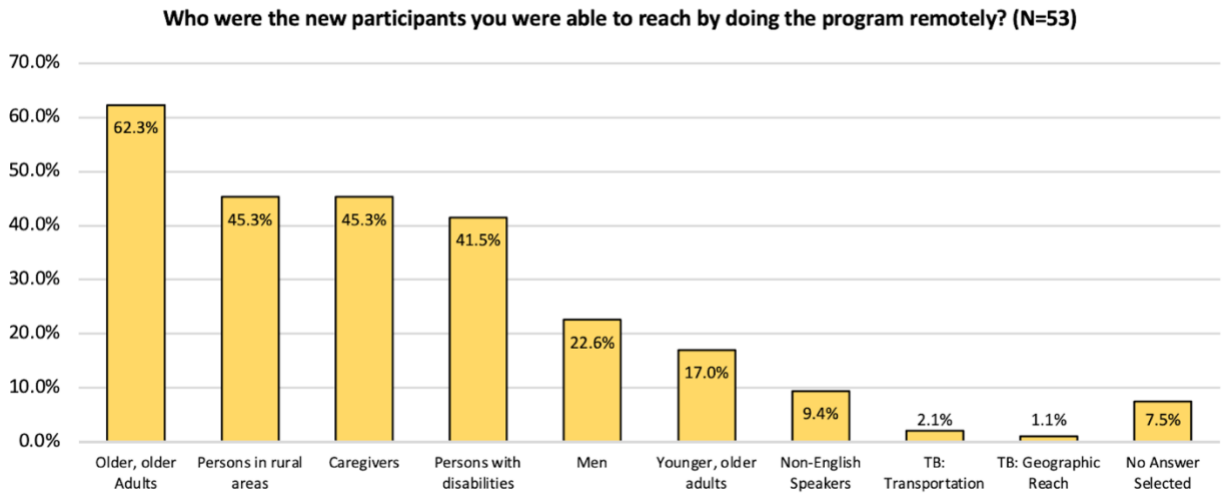
Results

Quantitative Survey

Our survey was completed by 101 respondents, 51 of which were leaders and 50 of which were program managers. Twenty-six surveys were removed for not meeting the eligibility requirements, either indicating that they had only delivered the class in-person or not answering any of the questions. This left us with 74 unique respondents (40 leaders and 34 program managers) and 81 surveys (45 leader surveys and 36 organization surveys), as 6 respondents offered multiple EBFPPs and completed a survey for each one. These respondents were from 24 states, 32 came from non-profit or service-based organizations, 13 from medical organizations, 5 from governmental organizations, 5 from foundations, and 18 from "other" or a combination of these categories. There was no overlap between leader and organization respondents. The majority of surveys were filled out for AMOB (67), followed by EF (11) and TJQ (3).

New Populations Being Reached

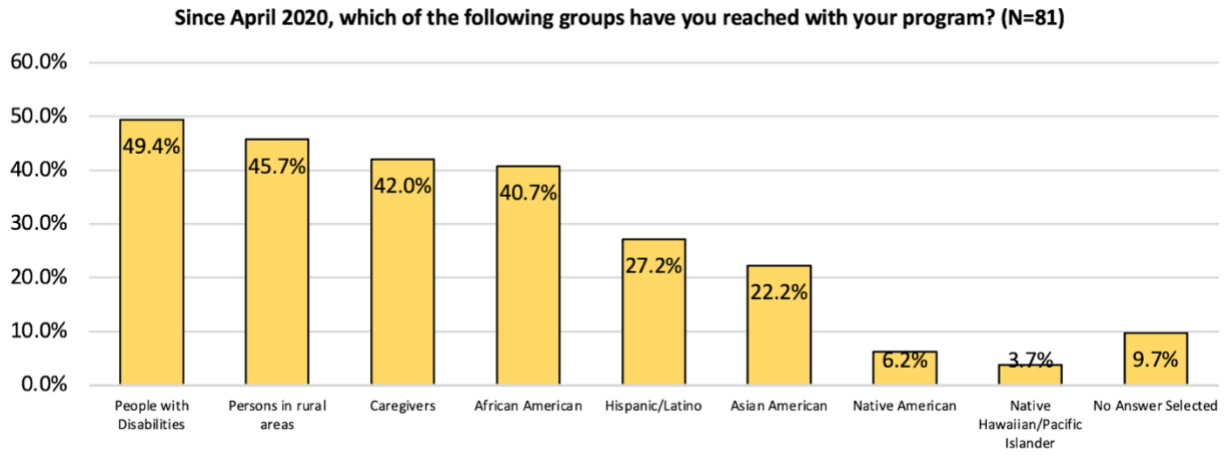
When we asked survey respondents to pick the top three things they liked best about remote delivery, 65.4% of surveys picked reaching clients that they had not reached before. The respondents who picked this answer were asked a follow up question about which new populations they had reached. Of these, 62.3% picked older, older adults, 45.3% picked persons in rural areas, 45.3% picked caregivers, 41.5% persons with disabilities, 22.6% men, 17.0% younger older adults, 9.4% non-English speakers, and 7.5% didn't answer. In the textbox for this question 4 respondents mentioned reaching persons with transportation barriers and 2 mentioned reaching people outside of their usual geographic area.



In a separate question, 70.4% of all those who took our survey reported reaching people outside of their usual geographic area with remote delivery.

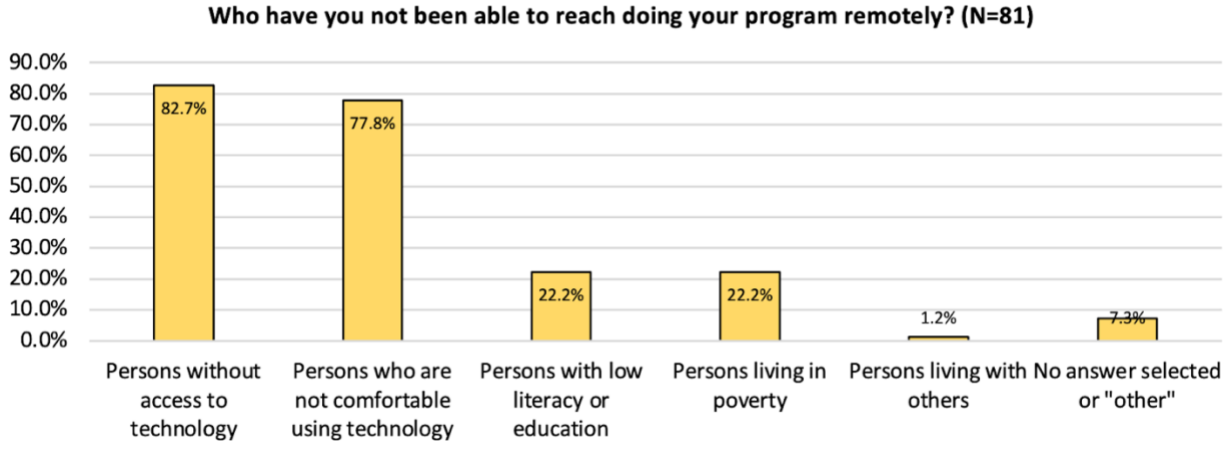
When asked to select all listed underserved populations that they had reached since April 2020, the most frequently selected population reached was people with disabilities (49.4%) , 45.7% picked persons in rural areas, 42.0% picked caregivers, 40.7% picked African Americans, 27.2%

picked Hispanics/Latinos, 22.2% Asian Americans, 6.2% Native Americans, and 3.7% picked Native Hawaiian/Pacific Islanders.

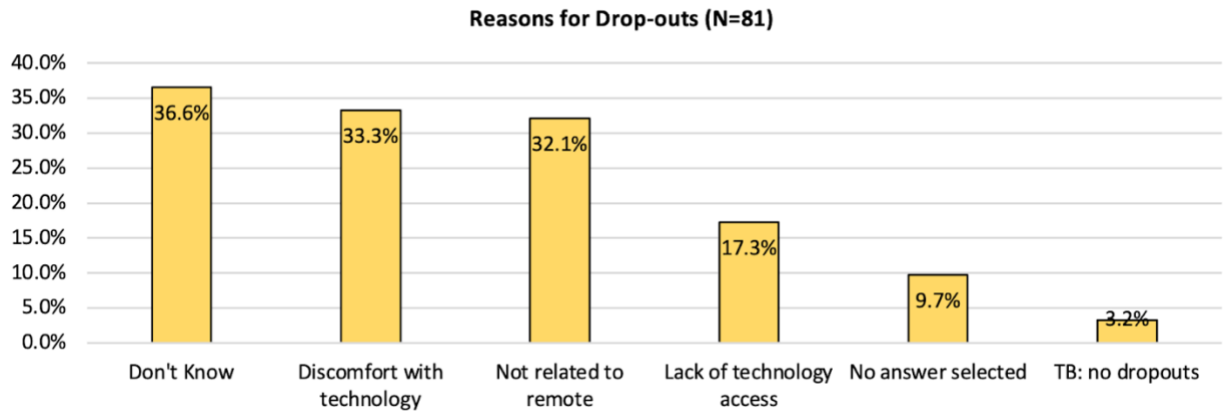


Populations Being Missed

We asked respondents which populations they had not been able to reach with remote programming and offered a list from which they could choose all that applied. The most frequently chosen answer (82.7%) was persons without access to technology, followed closely (77.8%) by persons who are not comfortable using technology, persons with low literacy or education (22.2%), persons living in poverty (22.2%), and persons living with others (1.2%).



Survey respondents were also asked about the reasons clients gave for dropping out of classes. Respondents could pick all that applied from the options available as well as write in a textbox if they didn't see the answer they wanted. The most selected answer was "I don't know why [clients] dropped out" (36.6%), followed by discomfort with technology (33.3%), answers unrelated to the remote adaptation (32.1% - health issues, basic needs, something happened during the class), and lack of access to technology (17.3%). Twelve didn't answer and four respondents indicated in the textbox that they had no dropouts.



When asked what they most wanted to change about remote delivery, the most selected answer (51.9%) was that they would change technology access for clients, and the next most selected (43.2%) was that they would change technology training for clients.

Finally, only 7.4% surveys reported offering EBFPPs in languages other than English.

Qualitative Interviews

We completed semi-structured interviews with 19 EBFPP staff members and instructors [5 AMOB, 6 SO, 3 TJQ, 5 EF] from 17 organizations in 11 states. Seven of the respondents were program managers, 4 were instructors, and the remaining 8 served in both roles at their organization. Most of our respondents (9) worked at non-profits such as YMCAs or senior centers, 3 worked at healthcare related organizations, 3 in government organizations, 2 at foundations, 1 for a for-profit business, and 1 at a university. There was no population overlap between survey respondents and interviewees, but two of the interviewees work at the same organizations as the survey respondents.

New Populations Being Reached

Those who have a hard time leaving their home: Transportation barriers, health and mobility issues, and caregivers

In the interviews we conducted with EBFPP instructors and program managers we heard that remote delivery was reaching new populations that hadn't been reached by in-person delivery. Clients who faced barriers related to transportation or had difficulty leaving their homes due to chronic illnesses, disabilities, mental health issues, or caregiving responsibilities benefited from being able to bring the program directly into their homes.

> *"I do see that there are other advantages that have cropped up, like those who don't have transportation or are homebound, they now have ready access to this virtual environment. That is a really nice asset of the virtual." – Instructor and Program Manager [110]*

For organizations in areas of the country with extreme winter weather, transportation was a seasonal barrier for both clients and staff. Many of the staff members we spoke to were interested in remote delivery as a way of ensuring their programming could continue year-round.

"Winter in [our state] we have bad weather, and we'd have to cancel classes, and then you have to reschedule. And that's been a nice consequence, that we don't have that issue so we can basically plan that those classes are going to happen." -Instructor [103]

Caregivers were another group that was frequently mentioned. Previously caregivers would have had to find a respite caregiver in order to take the time to attend class, but now they could either go without a respite caregiver or could hire one for a shorter time period since they didn't need to factor in travel time.

"I believe this helps to remove any of those social determinants of health around transportation, time, needing- some who might take care of other members of the family, being either adults or children, this made it easier for them to participate in the program." – Program Manager [114]

Although the remote option was a more convenient option for some clients with disabilities, people with certain disabilities, such as those who were hard of hearing, needed additional adaptations to make the class accessible to them. Some of the instructors we spoke with described working with American Sign Language interpreters to create a few hand signals for things like "stop" to make communication easier over zoom, and other organizations invested in automated closed captioning services.

"We also- because of like I mentioned trying to make things more accessible, we added- to more than just [the EBFPP], but there's a service called REV that adds closed captions to Zoom, so we added that on to our zoom accounts. Some instructors used it more than others, but it was something that we have available." – Program Manager [116]

Persons in rural areas and new geographic reach

Program managers and instructors told us that remote programming opened up their organizations' ability to reach new areas geographically, and especially increased their ability to reach rural clients. Those we spoke to suggested that when classes were offered in-person these clients may have lived too far away to easily drive to the nearest EBFPP class and may have lacked the population density needed to sustain their own class.

"One of the things that we're experiencing because of virtual, we're able to kind of spread our fingers out more and reach those communities that don't have access to these programs. And then they can be put in a group with folks 50 miles apart and become best friends." – Program Manager [114]

In fact, with remote delivery, some organizations with low sign-up rates were able to partner with other organizations that had long waitlists to ensure that both organizations could meet the minimum number of clients required to host classes and more clients could receive services.

"The ability to help balance out classes across different regions has been a really huge plus, because, you know, like I say we have some areas of [our state] where they have really long waitlists and they can't get enough people- it's a happy problem, right? They have more participants than they can handle. And then we may have other places [in the state] that are more rural, that have less people to choose from or to recruit from. The pool is much smaller. And so having one class that's able to say, 'yeah we can take five participants from your overcrowded area.' And that allows us to then have enough participants to run a 10 person class. That's been a huge, huge plus." – Program Manager [115]

Organizations that didn't see this increase in geographic reach reported being unable to open up their classes to individuals from other counties because of funding requirements or limited staffing.

"It depends on the funding source, so we have grants through our area agencies on aging so sometimes we were limited to you know the counties that those agencies covered." – Instructor and Program Manager [113]

Who is not being reached?

Although we heard that new populations were being reached by the remote adaptation, we also heard that some clients who had previously been reached by in-person delivery, were now faced with new barriers.

Technology Access

Some of the leaders and program managers we spoke to reported that some of their clients were unable to participate in the remote program because they did not have a computer or tablet, or the device they had was too old to have a camera in it. This especially impacted clients who were of lower socioeconomic status (SES). Additionally, because these are exercise classes, participants weren't able to use publicly available computers such as those in public libraries.

"We're three very rural counties, so technology and internet are very limited in our counties. That was probably the biggest issue that we had. And a lot of people didn't want to go to like a library to do the program, because again it's interactive, we're talking you're getting up to move around." – Instructor and Program Manager [102]

Some individuals were unable to participate because they did not have broadband internet in their homes. The issue of broadband internet access came up frequently for clients with low SES who couldn't afford internet, and persons who lived rurally, as they faced unique infrastructural barriers.

"I think the rural counties overall it's been more difficult for them to figure out this virtual delivery. Unfortunately, because some of them are so spread out like the virtual component seems like a really good idea, because people wouldn't necessarily have to figure out how to get across these regions, you know? But alternatively, then the Internet connectivity is not as good, and the people don't tend to have as much comfortable-ness or familiarity with using tablets or computers." – Program Manager [115]

Some organizations reported formal and informal device-sharing as a way to make the program accessible to those without devices.

"We created a lending library so we could get tablets or laptops out to people to use for a 6- or 8- or 10-week period to participate." – Program Manager [101]

"We worked within our organization and asked if any of our employees had a tablet or a laptop just sitting around that they didn't need." – Program Manager [116]

Making the remote program accessible to persons without internet was more challenging than overcoming the lack of devices. With the right funding and support, organizations were able to create ways of sharing devices with clients, but those organizations that reported giving clients hardware that could create a Wi-Fi hotspot were mostly unsatisfied with the result and found it did not really solve the problem. One organization created a "zoom room," a space within their organization's building where a participant without internet or a device at home could come and participate with the organization's own Wi-Fi and computer setup.

"Even if they didn't have internet at home or a computer or something that they could use, we have a room here [at our organization], we call it our "zoom room," that was made available with a laptop, with a webcam, could connect to our work's internet, so that they could still join

and participate, even if they didn't have the tools at home to do so." – Instructor and Program Manager [105]

Discomfort with technology and lack of technological literacy

Although many of the instructors we spoke to reported that the older adults participating in their program exceeded their expectations in being able to adapt to using new technology, they also believed that for some clients, remote delivery would never be a realistic option. Some of the clients they worked with were too uncomfortable with technology, or found it too difficult or frustrating to use, and were unable to access the program at all during the pandemic.

"There are some folks that I spoke to that just- it wasn't necessarily that they couldn't afford to get a computer or laptop or tablet, but they just personally didn't feel comfortable using technology and so didn't want to participate in a virtual class because of that reason." – Instructor [103]

Some reported encountering clients who were uncomfortable with the idea of being on camera or having their home be seen over zoom. Those we spoke to weren't sure if this discomfort came from distrust of the internet, which was a concern they heard from other clients as well, privacy concerns, or something related to fears around their house being presentable. Unfortunately, because instructors needed to be able to see if clients were doing the exercises correctly, and because there were safety concerns, it wasn't possible to allow clients to keep their cameras off or use a zoom background.

"[Participants would say] 'I don't want you in my house, I don't want you looking into my house.'" – Instructor and Program Manager [102]

These barriers were reportedly sometimes ameliorated by the presence of family members who could assist their older adult relatives, meaning that those who were more isolated may have been more impacted by this barrier.

"I would say, for me, it's the people who are more isolated, reaching those people. The ones who maybe don't have the family support. Quite a few people who take the class had family members who were able to help them get their technology setup, or who participated in their little training that we did with them to get them up to speed. So the people who don't have that extra support [are who aren't being reached]." – Instructor and Program Manager [119]

Anticipating this issue, most EBFPPs required organizations to hold a "session zero" meeting with clients either one-on-one or as a group before the class formally began, walking them through how to use the technology among other safety checks. Some of the instructors we spoke to felt that these meetings weren't necessary for every client, as some were already very familiar with zoom, but overall session zeros were seen as an important part of successful remote delivery.

"I think having those one-on-one sessions with folks really helps them to feel more comfortable than just logging in for the class and we can make sure that everything is working for them, and that you know, they know how to adjust their camera and that kind of thing. So those are really, really valuable. So I think that's one piece that we really want to make sure that we continue moving forward, those one-on-one tech sessions with folks." – Instructor [103]

Some programs also required or recommended the presence of a technology assistant or monitor who could observe the participants for safety concerns or technology issues while the main instructor ran the class. These assistants could call a client who was having technology trouble

by phone and resolve the issue without interrupting the class. Just like with session zeros, some of the instructors we spoke to didn't feel that a technology assistant was needed for the entire length of the program, as technology issues came up less frequently as the class went on, but overall it was seen as a valuable addition to remote delivery.

> *"Often if someone was having trouble logging on, the tech person would help that person and give them individual support while the class went on, so that the instructor didn't have to focus on that." – Program Manager [116]*

Although the addition of a technology assistant was useful, it also significantly added to the cost of delivery for some organizations, unless they were able to use volunteers or existing full-time staff members. Some organizations were also serving significantly fewer clients, because either they couldn't afford to host as many remote classes as they could in-person classes or because they were now limited in the number of clients who would sign up for a class. Some EBFPPs kept the same or similar upper limits on class sizes, but others significantly downsized to accommodate the realities of how many clients could fit on a computer screen. Together this meant that for some organizations the cost per person increased considerably with remote delivery.

> *"The cost has gone up. Even though- and that's the thing, we're not reaching as many people, but the cost of you know per person has gone up. We have to staff an instructor and a [technology assistant]." – Instructor and Program Manager [113]*

Those who were not being reached with in-person programs

We heard from instructors and program managers that many of the populations that were previously underserved, such as racial minorities and non-English speakers, continued to be under-represented with remote programming, and were sometimes those most impacted by remote-specific barriers. These clients might not have the financial means to purchase a device or pay for broadband internet, they might not have space in their homes to participate in an exercise program there, and they were reported to be less likely to be comfortable with technology.

> *"Like I had mentioned, we're just starting to kind of reach out to the Spanish speaking populations that we serve. Folks that don't have access to wifi or a tablet or laptop or computer. Folks that just do not feel comfortable using technology. I feel like those kind of groups we're not able to reach at this point." – Instructor [103]*

Offering both in-person and remote delivery going forward

Many of those interviewed expressed a desire to offer both remote and in-person classes in the future, even after the pandemic was no longer a concern. These instructors and program managers felt that by offering both modalities they could continue to serve those populations that were being newly reached by remote programming, while still serving those who were not able to access remote classes.

> *"I feel like we do have some folks who really do not want to do virtual classes. And so I feel you know, some of those folks are just waiting until we can offer an in-person class, but I feel we are reaching some folks that would not have taken an in-person class, so I think that there's a little bit of give and take there. Ideally, I think moving forward, it would be great if we could offer both options, so that we could kind of meet folks whatever way they're most comfortable taking a class. So offer some virtual classes, as well as some in-person classes, when it's safe." – Instructor [103]*

"I'm a strong believer in both virtual as well as in-person, because I think it captures a group that was falling through the cracks before." – Instructor and Program Manager [110]

Discussion

The aim of our study was to evaluate how EBFPPs' pivot to remote delivery impacted reach and access through qualitative interviews and surveys of staff members delivering the programs. We found that remote delivery allows organizations to widen their geographic reach and has the potential to increase reach among populations that face barriers to in-person programming. These populations include clients who are homebound, caregivers, clients with disabilities, clients with chronic or mental illnesses, and persons living in rural areas. Many organizations want to continue offering remote delivery alongside in-person delivery going forward in order to continue reaching these groups. We also heard that remote delivery comes with its own barriers related to technology comfort and literacy, and the accessibility of necessary devices and broadband internet. Specific adaptations are needed to promote equitable access to remote programs for groups that cannot access in-person programs.

In order to make sure that the clients who are faced with the most barriers are not being left behind, issues of technology access, comfort, and literacy must be addressed when offering remote delivery. Whether or not someone has electronic devices in their home or access to broadband internet is inseparable from socioeconomic status.[13,14] Likewise, digital literacy, a key component for comfort with technology, has been found to be lower among older, less educated, less affluent, and rural populations.[29] Our survey showed this too–persons with lower levels of education were among those considered to be not reached by the remote program. We saw from both our surveys and the interviews that populations such as racial minorities and non-English speakers, who were already underserved with in-person delivery, continued to be so with remote delivery. Very few of our survey respondents indicated that they offered an EBFPP in a language other than English, and our interviewees suggested that the barriers caused by the digital divide, such as comfort with technology, may be higher for these groups.

Organizations that continue offering remote delivery will need to find ways to address these barriers, and we saw that many organizations are already making attempts to do just that. Although the issue of devices could be resolved with grant funding to allow organizations to purchase and lend out tablets or laptops to clients, the issues of internet access and comfort with technology were problems that were more difficult to solve. Training sessions on how to use video conferencing platforms and technology assistants available during classes help address usability and technology literacy issues, but they were not enough to completely overcome clients' discomfort with technology, as we saw that this was still the main reason for client dropouts. No perfect solutions were found for clients without broadband internet access who were unable to access in-person services. Additionally, some organizations found that adding a training session and an additional staff member to classes to serve as a technology assistant significantly increased staff hours and the cost of delivering the program. This was not seen by all organizations, as it depended on their staffing situation, but the organizations that did reported substantial increases in cost.

Strengths, Limitations and Future Research

A strength of this study was the mixed method design. By looking at the quantitative and qualitative data together, we were able to achieve a fuller picture of remote EBFPP reach and

access than we would have been able to achieve with one methodology alone. The qualitative interviews provided a richer exploration of why these changes were being seen, and what organizations were doing to address barriers, while the quantitative surveys gave us a clearer idea of how prevalent these changes were.

There were also several limitations to this study. Our quantitative data was not evenly representative of all four EBFPPs, with AMOB being overrepresented and SO not being represented at all. This may have been allayed somewhat by the more even distribution of our qualitative interviews. Since we were limited to the reported experiences and opinions of EBFPP program managers and instructors, it would be impossible to say that this study captured the full picture of who was not reached by remote delivery. Those delivering these programs may have a sense of who they saw before, who they are not seeing now, and clients who initially signed up for the program but later dropped out, but they do not necessarily have the full picture of who is not being reached.

Comparing pre-pandemic data to the data we collected during the pandemic was outside the scope of our evaluation design, timing, and funding, but would be a good avenue for future analysis to more directly understand how reach may have differed between these periods. In addition to directly examining changes in demographic data, future research could also engage with EBFPP clients directly to learn about their experiences with remote delivery. This could further refine and improve our understanding of what facilitators are most needed and useful, and what areas of remote delivery could be improved.

Implications for practice

These findings have implications for EBFPPs administrators, organizations delivering these programs, and organizations funding the delivery of these programs. Although this study was only evaluating four EBFPPs, this research may also be useful to those involved in the delivery of other types of evidence-based programs, especially those targeting populations that face barriers to in-person delivery, such as older adults with chronic illnesses. The decision to end remote delivery when the pandemic no longer requires it may not be as simple as it originally seemed, given that remote delivery "captures a group that was falling through the cracks before," clients who will not necessarily be reached by in-person programming if remote delivery is abandoned. Organizations that choose to end remote delivery must consider how they will reach those populations that we now know are not being served by in-person classes. Those organizations that decide to continue offering remote delivery will need to address the barriers that were brought up in this study. Remote delivery is not inherently equitably accessible, and some of those who may most benefit from the removal of barriers to in-person classes are those least able to take advantage of a remote program. Adaptations such as those described in this paper are needed to promote equitable access. Cost is an organizational barrier when it comes to remote delivery, even more so when these equitable adaptations are implemented, and that means that in order for remote to be offered in the future, funders may also need to make changes. Grant funders must recognize that remote delivery is uniquely valuable in addition to in-person delivery, but it is also expensive and that the facilitators that help make it more equitable are sometimes what's most expensive about it. Finally, given many organizations' intention to continue offering remote delivery in the future, regardless of changes in the pandemic, it is necessary to conduct efficacy testing to ensure that these programs are still able to provide their intended benefits via remote delivery.

Conclusion

This was the first time any of the programs involved in this study had attempted to implement remote delivery, and although it was implemented out of necessity and under unique circumstances, many organizations found that remote delivery could be useful outside of the pandemic context. Remote delivery provides a way for health promotion programs to reach clients who find it difficult to attend in-person programs, including traditionally underserved populations. It also comes with its own challenges to equitable access that need to be addressed going forward.

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Appendix A

Survey Questions and Answers

Question	Response Format	Answer Options
If you had any participants drop out after the first session, what did they tell you their reasons were for doing so?	Choose all that apply from 6 answer options, with a textbox for additional answers	1. Did not have access to the technology required for the remote program 2. They were not comfortable using the technology required for the remote program 3. Something happened in the class that turned people off 4. Health issues (COVID-19 or otherwise) 5. Social needs issues (e.g. housing, food, other) 6. I don't know why participants dropped out
Which things did you like best about doing the program remotely?	Choose up to 3 answers from a list of 6, with a textbox for additional answers	1. Continuing to provide the program to older adults during the pandemic 2. Reaching participants who we did not reach before 3. Connecting participants to each other 4. Connecting participants to other services and supports 5. Learning how to use technology 6. Being able to work or volunteer during COVID
Who were the new participants you were able to reach by doing the program remotely?	If respondents picked "Reaching participants who we did not reach before" in the previous question, they were given this question and asked to pick all that apply from 8 answer options, with a textbox option for additional answers	1. Older older adults 2. Younger older adults 3. People who speak languages other than English 4. Men 5. People with disabilities 6. Caregivers 7. Rural Participants 8. Other
What things would you change with doing the program remotely?	Choose all that apply from 9 answer options, with a textbox for additional answers	1. Program content (e.g. add/remove some things you teach) 2. Program format (e.g. allow phone delivery without video screen; mail materials) 3. Program duration/frequency (e.g. more sessions + shorter sessions) 4. Program personnel (e.g. add a second leader to manage tech) 5. Technology training for leaders 6. Technology training for participants 7. Technology access for leaders (e.g. giving people tablets, computers or wifi hotspots) 8. Technology access for participants (e.g. giving people tablets, computers, or wifi hotspots) 9. Other
We are interested in whether remote programs reach underserved older adults. Since April 2020, which of the following groups have you reached with your program?	Choose all that apply from 9 answer options, with a textbox for additional answers	1. Hispanic/Latino 2. American Indian/Native American 3. Asian 4. Black/African American 5. Native Hawaiian/Pacific Islander 6. Persons in rural areas 7. Caregivers 8. Persons with disabilities (physical, sensory, emotional) 9. Other
Did you offer your program in	Yes/No option, with a textbox to specify which language	Yes/No

languages other than English?		
Who have you not been able to reach doing [your program] remotely?	Choose all that apply from 6 options, with a textbox for additional answers	1. Persons without access to technology 2. Persons who are not comfortable using technology 3. Persons with low literacy or education 4. Persons living in poverty 5. Persons living with others 6. Others
Were you able to reach people outside your geographic area with remote programs?	Yes/No option	Yes/No

Appendix B

Qualitative Interview Guide

Intro blurb

We would like to learn more about you and your experience with remote-delivered evidence-based fall prevention programs. This interview will take approximately 60 minutes.
I have four quick things to tell you about the interview before we get started:
1. First, the purpose of the interview is to learn about how your evidence-based fall prevention program is being delivered remotely. We will not report any individual identifiable responses but rather summarize what we learn when we share findings.
2. Second, you are welcome to skip any questions you do not want to answer, and you can stop the interview at any time.
3. Third, all of your responses are confidential, which means we will not share your individual responses with your co-workers, manager, or others at your organization, or outside our research team.
4. And forth, there are no right or wrong answers, we just want to hear about your experience
Thank you for taking the time to talk with me! We really appreciate it.

Participant consent to be recorded:

Now, if it's ok with you, I'd like to make a recording of our conversation today. We have a lot to learn from you, and this will help me focus on what you say, rather than on taking notes.
Is this ok with you?
Do you have any questions for me before I start the recorder?

Time of interview (in minutes)_____

Study contact info, if needed during interview: Marlana marlana@uw.edu

[Interviewer START recorder]

INTERVIEW GUIDE AND SUMMARY SHEET

ADAPTATIONS[a:] The first set of questions are about what changes you have made to <INSERT PROGRAM> to deliver it remotely.

Construct	Coding	Summary from interview	Quotes
1a. WHAT component or part of the intervention was changed in this adaptation? e.g., was change to program content, format, delivery mode, staff delivering it, patients eligible, where, when or how it was delivered, or what?	• **Content** (modifications to the content itself, or that impact how aspects were delivered) • **Context** (modifications made to the way the EBFPP is delivered) – Format – Setting (*specify what "remote" means*) – Personnel – Population – Safety (*specify process/protocol)* • **Training and evaluation** (modifications made to the way that staff are trained in or how EBFPP is evaluated)		
For each adaptation listed in 1a, ask 1b – 1h accordingly (OK if duplication)			
1b. **WHAT type of change** was made? e.g., was something added, deleted, changed to better fit the participants, delivered at a different time or in a different way?	– Tailoring/tweaking/refining – Adding elements – Removing/skipping elements – Shortening/condensing (pacing/timing) – Lengthening/extending (pacing/timing) – Substituting – Reordering of EBP modules or segments – Integrating the EBP into another framework (e.g., selecting elements) – Integrating another treatment into EBP (not using the whole protocol and integrating other techniques into a general EBP approach) – Repeating elements or modules – Loosening structure – Departing from the intervention ("drift")		

Construct	Coding	Summary from interview	Quotes
1c. At what **LEVEL OF DELIVERY** / **FOR WHOM?**	– Individual patient level – Group level – Individual practitioner level – Department level – Organization level – Network level – System Level		
1d. **WHEN**: When during the EBFPP project was the adaptation made?	– During planning stages, before intervention began – Early, during first few weeks of intervention – During the middle stages – At or close to the end of project		
1e. **HOW**: How or on what BASIS was this change made?	– Based on our vision or values – Based on a framework (e.g. PCMH) – Based on our knowledge or experience of working with patients – Based on QI data, summary information or results – Based on pragmatic/practical considerations (for example, "this is the only way it would work") – Based on financial incentives/ payment – Based on feedback or suggestions (Practice Facilitator/coach or other) – Other		
1f. WHY: What was the purpose of the adaptation?	– Increase reach, participation, access – Increase effectiveness – Address participant safety – Increase adoption by more settings or make intervention more aligned with organizational goals – Increase implementation/ability of staff to deliver intervention successfully		
1g. BY **WHOM** are modifications made?	– Individual practitioner/facilitator – Team – Non-program staff – Administration – Program developer/purveyor		

Construct	Coding	Summary from interview	Quotes
	– Researcher – Coalition of stakeholders		
1h. **IMPACT**: What are (subjective) short term results of the adaptation?	– Are they positive, negative, no real impact? – Did the changes impact: ○ Reach/participation/access ○ Effectiveness ○ Safety ○ Adoption ○ Implementation/ability to deliver EBFPP successfully ○ Maintenance		

[a] Rabin, 2018; Wiltsey-Striman, 2019 (FRAME)

1. What adaptations might be needed to promote equity and address social determinants of health?

REACH

2. Earlier, I asked you about whether delivering EBFPP remotely impacted program reach. From your perspective:

a) **Who is being reached by remote-delivered EBFPP that were not being reached previously?**
b) **Who is not being reached by remote EBFPP? Why not? (e.g. access to tech, comfort with tech, health issues, etc.)**
c) **What, if any, equity issues are your organization concerned with around reach? Why? (Suggested fixes?)**

IMPLEMENTATION OUTCOMES

3. Let's next talk about how remote EBFPP is going.

a) **How accessible is remote EBFPP for:**
   - your clients?
   - For leaders?
   - For organizations?
   - For whom is it not accessible?
b) **How feasible has it been to deliver EBFPP remotely?**
   - What supports remote delivery? What gets in the way? What needs to be changed going forward?
   - In what ways, if any, is it not feasible?
c) **How has the cost of delivering EBFPP been affected by remote delivery?** (What costs are lower? What are higher?)
d) **What are the unintended consequences of doing your EBFPP remotely?** (consider both positive and negative)

CLOSING

Thank you for taking the time! Is there anything else you would like to share about how remote EBP delivery are working or opportunities for improvement?

If you could please send us any current documentation of your remote delivery protocols, we will include them as part of our review of adaptations.

We will follow up with you with a brief online demographic survey.