

Telehealth to improve access to allied health services for older Aboriginal people living in very remote Central Australia: a Participatory Action Research study

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Research Article

Keywords: Aboriginal peoples, Australia, Aged care services, Co-design, Digital health, Implementation science, NASSS, Participatory action research, Telehealth, Technology-enabled health service

Posted Date: June 16th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9974864/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

The intermittent availability of allied health services in remote Aboriginal and Torres Strait Islander communities was a major barrier to older people accessing these services and telehealth was not available. While telehealth has the potential to improve access to allied health services in remote communities, there is a paucity of place-based evidence on how to implement and sustain these services for older people. This study aimed to (1) describe the existing model of care and identify gaps in allied health service provision in a remote aged care setting; and (2) co-design and evaluate the feasibility of a new model of care to address these service gaps.

Methods

A participatory action research (PAR) study in a very remote Central Australian community, where more than 95% of the population identifies as Aboriginal, used interviews and yarning sessions with 23 participants, including patients, carers, allied health professionals, and aged care staff. Deductive analyses applied the Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS) framework and data were also analysed using an inductive approach.

Results

Community-based Aboriginal staff and Allied Health Professionals engaged in a co-design process and proposed a hybrid telehealth model that was tested among service providers and subsequently used for consumer consultations. This hybrid telehealth model was acceptable to Aboriginal Aged Care clients and their families with care provided in partnership with local aged care staff and facilitated by a trusted local Aboriginal staff. While telehealth has the potential to improve access to allied health services in remote communities, challenges for implementation include aged care workforce shortages, gaps in technological skills, and coordination between stakeholder organisations.

Conclusions

A co-designed hybrid telehealth model for older adult allied health services was acceptable and valuable for remote Aboriginal Aged Care clients and Allied Health Professionals. Effective implementation of telehealth as a sustainable mode of service delivery requires strong leadership engagement, dedicated resources, technological capability and capacity, and a stable workforce.

Background

Accessing comprehensive primary care (PHC) in small remote communities faces multiple challenges due to limited availability, accessibility, and affordability issues. While many remote communities in Australia have PHC clinics offering services, access to allied health services are even more limited. Accessing allied health services in small, very remote Northern Territory (NT) communities are generally

provided via outreach programs, with teams of allied health professionals or allied health assistants travelling from regional centres to visit each community a few times a year [1]. When allied health consultations are required between outreach visits, local clinics refer patients to the nearest regional service centre. However, there are often long wait times for an appointment in regional centres, and patients must travel long distances to attend these consultations [1, 2]. In some remote communities, allied health professionals also offer telephone/video calls to provide services in between such outreach visits.

Growing evidence indicates that telehealth could improve access to CPHC for people living in remote and very remote Aboriginal communities in the NT and elsewhere in Australia [3–6]. International evidence from First Nations people in Canada shows that a hybrid care model (mix of face-to-face and telehealth physiotherapy services) that incorporates cultural elements and collaboration to help bridge the digital literacy gap and support cultural safety, was acceptable to First Nations consumers [7].

Centrality of relationship and trust remains at the centre of health services offered to First Nations cultures globally [8]. Technology-enabled models of care, including telehealth for allied health services, must consider how such evolving models ensure cultural safety and acceptability in the remote First Nations communities with limited digital technology exposure and literacy [9]. The feasibility of such telehealth models may be affected by varied patients related reasons such as limited ability of interpret non-verbal cues, technologies making communication less personal, difficulties in navigating technology. For health professionals, digital literacy, ease of use of technology, and potential additional workload can be limiting factors [9, 10]. For any telehealth models to succeed, it is essential to balance among technology, human experience and the context in which patients and remote health professionals live and work [11]. This includes the ability to adapt telehealth initiatives to local workflow, the capability to navigate competing priorities, the ability to manage any intended consequences, and the willingness to make a decision based on a trade-off between potential benefit and risks.

However, there is limited Australian evidence about the feasibility of delivering allied health services via telehealth to Aboriginal people using existing aged care facilities in remote communities, where staff capacity and organisational capability to bridge the digital literacy gap may be limited. This study addresses this knowledge gap by (1) identifying gaps in allied health service provision in the existing model of care in a very remote aged care setting; and (2) co-designing and evaluating the feasibility of a new model of care to address these service gaps.

Methods

Setting

This study was conducted in a very remote Modified Monash Model (MMM) 7 community of approximately 200 residents in Central Australia, where more than 95% of the population identifies as Aboriginal [12]. The community lacks mobile (4G or 5G) connectivity, and most residents do not have

personal access to the internet, landlines, or satellite telephones. Community Wi-Fi is unreliably available. Like most Central Australian remote communities, this community is also severely disadvantaged in terms of access to digital technologies and the skills needed to use them effectively.

There are limited local health services. The Primary Health Care (PHC) clinic is governed by an Aboriginal Community Controlled Health Service (ACCHS) Board. Primary care services were provided by Remote Area Nurses (RAN) with cultural and language support provided by local Aboriginal staff or community members. During the study period, a GP also resided in the community and provided in-person services three days/week (travelling to another remote community to provide GP services two days/week).

Allied health services were mainly provided face-to-face via an outreach model, except for podiatry and dietitian services which were provided in the PHC clinic via a hybrid outreach model (face-to-face and telehealth). Community residents experience significant challenges accessing other types of healthcare, such as medical specialist care, diagnostic imaging, and other types of allied health care (e.g. physiotherapy, speech pathology, occupational therapy) for which they often had to travel over 200 kilometres out of the community to the nearest regional service centre [13].

Regional Council provides Aged and Disability Services in the community [14]. Aged care facilities include a small office, kitchen, storeroom, and a common room; there are no residential aged facilities (Fig. 1). At the time of the study, this service supported 15 older adults and their families. Regional Council employed an aged care coordinator who supported remote aged care services in two different remote communities and travelled to the community twice a week to provide operational and technical support, as well as capacity building and training local staff. The four locally based aged care staff comprised one progressing towards a relevant VET qualification (Certificate III in aged care) and two support staff (a kitchen assistant and cleaner). This team provides day care and home care services, including meal provision, personal care, domestic assistance, transport assistance, shopping support, social engagement, and equipment coordination [14]. The aged care service has telephone and internet services and functions as a central contact point, receiving phone calls and messages from the local clinic, visiting health services and specialists thereby supporting coordinated services for its clients.

Study design and participants

Participatory Action Research (PAR) [15, 16] was the overarching methodological approach, chosen because it ensures strong consumer and other stakeholder engagement. Iterative cycles of PAR involved researchers engaging with Aged Care clients and their carers, health service providers and other key stakeholders such as the Regional Council's Aged Care service to co-design, implement, and evaluate a model of care to improve access to allied health services. The study was guided by the locally developed 'Doing it Right' (i.e., the *Aremella Arratyenye-ileme: Doing It Right*) research guideline, which was published by Central Australian Aboriginal Congress to ensure principles of culturally appropriate research with Aboriginal peoples of Central Australia were understood [17]. Participants, including Allied Health Professionals (physiotherapists and allied health assistants/occupational therapy assistants) employed

by NT Health, staff employed by the local Regional Council who were involved in managing or providing direct services within the Aged Care service, Aged Care clients and their carers, and staff employed by the telehealth portal technology provider (Healthdirect), were consulted and contributed throughout the co-design, implementation, and evaluation phases.

Digital Health Initiative

The research team met with participants to explore health service gaps and potential technological solutions. Several gaps were identified and prioritised, and a hybrid allied health telehealth model comprising a mix of both face-to-face and telehealth consultations, was designed to address the gaps in access to allied health services. Aged Care staff provided client-end support for consultations. Unsurprisingly, not all consultation types were thought to be suitable for telehealth. Telehealth was not considered an appropriate mode of delivery for many occupational therapy (OT) services, however evidence suggested that a hybrid telehealth model could improve access to physiotherapy consultations for some conditions [9, 18] and the allied health physiotherapy and aged care teams were supportive of testing feasibility.

First, a Healthdirect telehealth call was tested between the Healthdirect team (based in a capital city; MMM 1) and researchers (VK & DR), and one aged care coordinator and two local staff (located in the very remote community; MMM 7). Second, a telehealth induction session was held for aged care coordinator based in Alice Springs (MMM6). Third, a further telehealth call was tested with the aged care coordinator and staff in the community and was vital to this pilot project. Finally, a third test call was conducted between Healthdirect staff (MMM 1) and the NT Health allied health team (MMM 6). This was followed by onboarding training for the allied health team on the Healthdirect telehealth platform. Once the allied health team felt comfortable trialling the telehealth portal for the remote community, a further test call was conducted between the allied health team based in Alice Springs (MMM 6) and the aged care service staff in the remote community (MMM 7). Local Aboriginal aged care staff, a visiting coordinator (non-Aboriginal), and two researchers (VK & KW) were on the receiving end of the telehealth call using the Healthdirect platform (Fig. 2). Following the successful telehealth test call, further discussions were held among the regional council's aged care team, the allied health team, and the researchers. The allied health team made multiple visits to the remote community to build relationships with local aged care staff and older adult clients. Subsequently, the allied health team found that using their own Healthdirect virtual clinic (created for the project) offered greater flexibility.

(photo taken and used with consent)

Tools and data collection

Semi-structured interviews and yarning tools were adapted from previously published work [19] and refined iteratively. During the co-design phase, researchers asked about existing access to allied health

services in the community. During the implementation phase, questions focused on perceptions regarding the implemented telehealth model, and later during evaluation, on enablers and barriers, factors impacting feasibility, and future opportunities.

Participants were recruited between June 2024 and October 2025 and interviewed virtually or in person. To support cultural appropriateness, all data collected from Aboriginal Aged Care clients, their carers, and Aged Care staff occurred in person. Aboriginal community-based researchers (HB and FD) provided cultural guidance, interpreted local language, and facilitated recruitment and interviews with Aboriginal participants [17]. VK, and HB or FD conducted all interviews and yarning.

Data analysis

All interviews were audio-recorded with participants' written consent, transcribed by a professional transcriber, and checked for accuracy by the researchers. Transcripts were imported into NVivo (version 14; Lumivero, 2023) for analysis. Access to services and co-design process were coded inductively. For feasibility evaluation, a deductive approach to data analysis was taken, guided by the Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS) framework [7, 11], which is a theory-informed methodological framework for examining the successes and failures of technological innovations in complex settings [20–22]. Data were thematically analysed following the six steps as outlined by Braun and Clark [8]. All transcripts were analysed independently by two researchers, VK and JC. VK, JC and ES met multiple times during the coding process to finalise the codes and themes. Since study participants were from small professional teams, potentially identifying attributes such as job titles and gender are not provided when quoting participants.

Ethics

Ethics approval

for the study was granted by the Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research (HREC: 2022–4275). Approvals were also sought from the Central Land Council, the NT Health Research Governance Office, and the research subcommittee and Board of the Aboriginal Community Controlled Health Service providing PHC services in the community.

Results

Twenty-three individuals participated in interviews/yarning or group discussions (Table 1). Participants were mostly female; there was similar representation from external and local service providers; three participants were Aged Care clients or their carers.

Table 1
Demographic characteristics of interview/yarning participants

Category	External service providers	Local service providers	Aged Care clients or carers	Total
Biological Sex				
<i>Male</i>	2	3	1	6
<i>Female</i>	7	8	2	17
Participant Role				
<i>Aged Care client (Aboriginal)</i>			2	2
<i>Carer (Aboriginal)</i>			1	1
<i>Allied Health staff (individual)</i>	4			4
<i>Allied health staff (OT, and physiotherapist in group)</i>	3			3
<i>Aged care (Aboriginal staff)</i>		4		4
<i>Aged care (non-Aboriginal) staff</i>		4		4
<i>Aged care staff (in group)</i>		3		3
<i>Technology providers (in group)</i>	2			2
Total Participants	9	11	3	23

Eight themes were identified across the co-design (Themes 1 and 2), implementation (Theme 2), and feasibility evaluation (Themes 3–8) phases (Table 2).

Table 2
Themes identified and explanation of each theme

Themes	Explanation
Co-design	
Theme 1: Access to care – the usual pathway	This describes usual care pathways, highlighting the challenges in access to healthcare services for older people in the remote community.
Co-design and implementation	
Theme 2: Technology-enabled solution	Describes the co-designed and implemented telehealth initiative, and the process of initial testing and implementation in the very remote community.
Feasibility evaluation	
Theme 3: Perceptions about when allied health telehealth is appropriate	Describes health and aged care staff members' perceptions about the circumstances in which allied health telehealth is appropriate. This theme includes health conditions and activities supported by the telehealth initiative. (NASSS Domain one: Condition).
Theme 4: Individual technological capability	Comprises availability of devices, aged care and allied health service provider's ability to use technology and platforms, communication channels for using technology, and IT infrastructure (NASSS Domain two: Technology).
Theme 5: Value of telehealth-enabled allied health services	The extent to which aged care and allied health service providers, Aged Care clients and their carers and Aged Care staff find the telehealth-enabled service useful (or not) or perceive value in using it (NASSS Domain Three: Value proposition).
Theme 6: Workforce capacity and capability	The capacity and capability of system users, including aged care staff and allied health service providers to coordinate and manage telehealth, e.g., workload, staff shortage, and staff turnover (NASSS Domain Four: The Adopter system).
Theme 7: Readiness (or reluctance) to adopt changes: including individual, organisational, and leadership	Individual and organisational confidence and willingness to use the telehealth service. This includes Aged Care staff, allied health service providers, aged care clients and their carers and the directions staff receive from senior organisational leaders. It also encompasses balancing these with the nature of technology adoption, the extent of work required to use the technology, and shifts in work culture (NASSS Domain four: The Adopter system, and Domain Five: Organisation).
Theme 8: The future of telehealth for allied health service in remote Central Australia	Key action areas required to deliver telehealth effectively in this context included enhancing community WiFi, training for a local support person and the aged care workforce, and ensuring stable internet connectivity (NASSS Domain Six: The wider system; and NASSS Domain Seven: Embedding and adapting over time).

Theme 1: Access to care – the usual pathway

Older people in the community rely on limited allied health services provided through the local aged care facility and the PHC clinic. Physiotherapy and OT services were reported to be provided in-person by NT Health outreach services to the community two to three times a year for one or two days each visit. There were no other physiotherapy or OT services provided in the community and residents would have to travel to Alice Springs (the nearest regional service centre) for any additional allied health care between visits:

'Physio will go only...once in three months or something, to every community.' (Male, non-Aboriginal).

Scant resourcing of the service relative to the vast service footprint add to the challenges for the small public PHC physiotherapy and OT workforce in Central Australia.

'...it poses a massive challenge... well, one, the main thing is that we can't get out to these communities very often because of our lack of time, resources availability, but in most communities, it's only about twice a year.' (Allied Health Professional)

'...we're a very small team and I think there's maybe 7 or 8 Allied Health Professionals in our team who go out remote and we're covering the regions of Central Australia and Barkly [NT regions with a combined area of ~ 890,000 km²]....The physical land size of this coverage is the equivalent of multiple countries in Europe [e.g. Sweden, Norway and Denmark area ~ 878,000 km²]....' (Allied Health Professional)

Outreach visits were also challenging due to community members' cultural and family obligations which often necessitate travel between remote communities. On the few occasions each year when the outreach teams are in the community, members of the community may not be there.

'...people are moving around communities...We will often go to a community, and there might only be 50 percent of the clients who have been referred to us who are in the community at that time.' (Allied Health Professional)

Aged Care clients in the community found it difficult to maintain engagement with needed allied health services in Alice Springs:

'I had physio [physiotherapy] once but I haven't gone back [to Alice Springs] after that.' (Consumer, Aboriginal).

Travelling to Alice Springs presented major challenges, including distance, transport, and the costs of travel and accommodation. Older patients find travel exhausting and often uncomfortable. Overnight stays may be required before returning home:

'We've got our clinic transport. And [they] take them to physio [in Alice Springs]. It's a long journey because, like the travelling and it's really, really tired with the travelling.' (Aged Care staff, Aboriginal)

Theme 2: Technology-enabled solution

Aged care staff identified that clients' health status could change quickly and it would be beneficial to be able to consult allied health providers, particularly OTs and physiotherapists in between outreach visits. Telehealth appointments led by Alice Springs-based physiotherapists and OTs for clients of the aged care facility were suggested as a possible solution to this high-priority unmet need (from meeting notes).

'...the first thing that comes to my mind is video calls ... it'll be mostly video calls or video conference...'(Aged Care Coordinator, non-Aboriginal)

'...we can use our aged care for video calls with the family.. Never been done, only at the clinic. But we want it to happen here.' (Aged care staff, Aboriginal)

The research team worked with the allied health and aged care staff to test the technology and its suitability for telehealth calls. Virtual telehealth clinics were created on the Healthdirect portal for both the aged care and allied health teams. As explained in the methodology section, the successful test calls were followed by further in-person allied health team visits to the aged care services in the community, and subsequently to the initiation of an allied health (physiotherapy) tele-consultation. A hybrid telehealth model (i.e., a mix of in-person visits and telehealth) was considered most suitable for the Central Australian context. Having a local Aboriginal staff member present during telehealth consultations was also considered extremely important because they could translate messages between English and the local language. Initially, an aged care coordinator had responsibility for setting up the telehealth equipment for the local Aboriginal staff and Aged Care clients. This continued until the local Aboriginal staff developed the confidence to do the setup independently. The council provided a device (tablet) and a partition wall (for privacy) to allow staff and clients to attend telehealth consultations from the office or from other spaces within the aged care service:

'We have begun using a telehealth service [via] Healthdirect occasionally with clients. If the community has either the clinic or the aged care set up to assist the person in organising them. Yeah, I think when it's done right, it can be incredibly useful one to try and action our referrals a bit quicker.' (Allied Health Professional)

Theme 3: Perceptions about when allied health telehealth is appropriate

Allied health professionals identified that telehealth would be useful for follow-up appointments after their community outreach visits, and for contacting newly referred clients for initial consultations, so that their care could be effectively prioritised. For instance, pre-outreach telehealth consultations could help the physiotherapists and OTs identify who were the most critical clients for them to provide face-to-face services to on their upcoming outreach visits:

'I think we've tried to respond to our referrals more quickly by using telehealth or at least phone call and contacting the referrer as well as the client more rapidly.' (Allied health professional)

Aged care staff perceived that telehealth technology was suitable for engaging family members living in other communities, when decisions needed to be made about client care:

'Family meetings. ...because instead of going to the clinic, we can use our aged care [space] for video calls with the family...[it has] never been done [here], only at the clinic. But we want it to happen here.' (Aged Care staff, Aboriginal)

Aged care staff also perceived that telehealth was especially suitable when a more timely allied health review of patients was needed:

'...at least if they [Allied Health Professionals] can review it using the technology, and with the help of our staff, at least something is getting done.' (Aged Care Coordinator, non-Aboriginal)

Theme 4: Individual technological capability

While video telehealth was a very new concept to the aged care staff, they were already using various digital technologies in their day-to-day work in limited ways. Although the local Aboriginal staff stated that they sometimes had difficulty with tech, they were able to use digital technologies to check their emails and make telephone calls. Digital literacy was generally low amongst community-based Aboriginal staff:

'It's very limited. We struggle every day with local staff being able to even turn on a computer, and for us [non-Indigenous person in cities], we were growing [up with technology]. In remote communities, ... I think it's just a lack of education, a lack of knowledge.' (Aged Care Coordinator, non-Aboriginal)

Although telehealth calls were supported by an Aged Care coordinator who would set up the technology and assist both Aboriginal Aged Care staff and Aged Care clients, challenges remained. Community-based Aboriginal staff reported that they preferred having ongoing technical support. For clients, technology skills presented a significant barrier, highlighting that, in general, digital technology skills across the community were limited.

'...we work with local Indigenous peoples that haven't been educated so much on digital technology and how to use computers and laptops and everything.' (Aged Care Coordinator, non-Aboriginal)

Training local Aboriginal staff in the operational aspects of telehealth use was challenging. This was partly because of the large costs involved with delivering in-person training in very remote communities. Training organisations are generally either based in Alice Springs or in other cities and have limited capacity to travel large distances to deliver in-person training in very remote communities.

Allied health professionals were more familiar with digital technologies. Two onboarding sessions, each approximately 30 minutes in duration, were organised for allied health personnel at different stages of the project. This training supported the team's ongoing use of telehealth and even its extended use into the future. The allied health team perceived that they had sufficient technological infrastructure and capabilities and found Healthdirect to be a well-designed and easy to use telehealth platform:

'I mean the IT, not from our team, I think there was a very clear understanding and training and how we could use the telehealth technology.' (Allied Health Professional)

Allied health professionals felt that there was a need for additional resourcing in communities to establish and support a hybrid telehealth model. It was thought that allied health assistants in very remote communities could be employed and trained to coordinate and support telehealth service delivery:

'And we've got, yeah, appropriate technology to do it from our end. It's probably more at the clinic and the aged care, in the community I think probably needs more investment there than in our offices.' (Allied Health Professional)

Theme 5: Value of telehealth-enabled allied health services

Aged care staff perceived that telehealth was beneficial for their consumers, as video calls allowed their consumers to see the health professionals, hear them clearly, and enabled an Aboriginal staff member or family member from the community to be present with the clients to help interpret when needed:

'The client was really happy when she was sitting on the camera and we was sitting there explaining to her. And she's little bit understanding and looking at it, it's easy..., it's (sound and picture quality) really clear.' (Aged Care staff, Aboriginal)

Aged care staff felt that using telehealth meant that the physiotherapist or OT could visually inspect the client's body and their functioning (e.g. walking), which were substantial improvements on telephone conversations, when no visual information was available to the health professional:

'It's like clear, see each other. I don't know, probably bruise or something, instead of going to Alice, a long trip, we want a video call. Easy... I'm really happy that we had this for video call for our aged care. It's really good. Better way to see it on the camera, yeah, yeah, and see what's happening there with the body. Their legs or face or something, yeah.' (Aged Care staff, Aboriginal)

'It went well. So they will ask them to just do a bit of walking and, "Stretch your legs," and show... [Allied Health Professionals] can assess them from there [Alice Springs]...so it is working well.' (Aged Care Coordinator, non-Aboriginal)

Aged care staff also felt that telehealth would be useful for continuity of clients' care with the allied health team following an outreach visit:

'And we need more [video calls] after visit [to] our clients. Well, if we're continuing using this video call, the clients will be more comfortable.' (Aged Care staff, Aboriginal)

Aged Care clients' experiences of telehealth consultation were also positive provided that a trusted local Aboriginal person provided support and translated for them during the consultation:

'She thinks it's all right. She got that pusher [4-wheeled walker]. She wants to talk to them [Allied Health Professional] on the video call. Yeah, if there's someone with her helping her... Yeah, someone who can speak in language.' (Telehealth User, Aboriginal, interpreted by Aboriginal researcher).

Positive consumer experience was also reported by Aboriginal Aged Care staff who supported the telehealth consultation, *'The client was really happy when she was sitting on the camera and we was [were] sitting there explaining to her...it's easy..., it's (sound was) really clear.'* (Aged Care staff, Aboriginal)

Telehealth enabled one Aged Care consumer to more quickly access the mobility support that was required for them to be able to get around safely in the community:

'She's happy with that. When she first got it [4-wheeled walker based on the telehealth consultation...she was happy and smiling. "I've got it now. I'm happy with this." She went and showed it to...everybody.' (Telehealth User, Aboriginal, interpreted by Aboriginal researcher).

Theme 6: Workforce capacity and capability

A range of workforce challenges affected the capacity and capability of both Aged Care staff and allied health service providers to implement the co-designed hybrid telehealth allied health care model.

Not only do the community Aged Care service Aboriginal staff have a heavy workload within the Aged Care service, they also have multiple cultural and social roles and responsibilities within their community, which sometimes necessitated time away from the Aged Care service:

'she [the Aboriginal staff member who supports Allied Health consultations] has got a lot on her plate; she's into everything....because she's, now she's going to ...meeting...and everything; she'll be away [from the community]. (Aged Care Coordinator, non-Aboriginal)

Participants recognised the need to increase local Aboriginal workforce capacity through recruitment and training of additional community-based Aboriginal staff, but also perceived that it was difficult to identify suitable applicants in small communities:

'You know especially like for [the local Aged Care] team, if they had a few extra staff who were like capable and trained in what they were doing, were looking for extra ways to upskill, I think that would have been great. I think it requires staff who have the interest and the want to develop those skills and be participating in that [telehealth]. Which I think can sometimes be limited in a community.' (Allied Health Professional)

The limited success with recruiting and retaining a local Aboriginal workforce in Aged Care was hampered by significant sociocultural and systemic barriers. New recruits' experiences with how job demands were balanced with the resources available to support staff eventually led to limited completion of training and high dropout rates:

'...giving too much responsibility to one person [referring to the local Aboriginal Aged Care staff] overwhelms them a little bit. So then again, that demotivation comes...[which can lead to] not wanting to come to work because they're too stressed or got too much on.' (Aged Care Coordinator, non-Aboriginal)

Recruiting a regional Aged Care coordinator to regularly visit the community and support community-based Aboriginal staff (e.g. with learning and navigating the telehealth workflow) was a particular

challenge. Over the course of the research project, the regional Aged Care Coordinator role changed several times, with vacancies in between appointing new staff:

'... staffing is a big issue. Being able to access [employ staff]. In future, the only challenge is that I don't have a coordinator in there...' (Aged Care Coordinator, non-Aboriginal)

When coordinator vacancies arose, an interim coordinator stepped in to provide limited support. However, this stretched their role to providing support to a total of five Aged Care services in very remote communities instead of the usual two. The interim coordinator's excessive workload meant that no telehealth support and training was available to Aboriginal staff in the Aged Care facility in the study community. Recruitment to the vacant coordinator position continued for many months, through to the conclusion of the project and this vacancy was a major reason that the hybrid telehealth model was unable to be sustained:

'Massively, massively [affected the continuity of telehealth]...due to staff shortages that capacity, like, there was less priority around the project ... And, yeah, I think workforce limitations and staff shortages had the biggest negative impact for sure.' (Allied Health Professional)

Recruitment challenges were also present at the community level. For those interested, meeting the requirement, such as relevant clearance, associated fee for those documents, and identity check, which is the essential part of recruitment process, was perceived as a barrier:

'...if there's even a small offence it's considered as a negative impact on the client, and the other thing is identification, points of ID, 100 points of ID. ...sometimes they don't have enough documents after they [are] interview [ed].' (Aged Care Coordinator, non-Aboriginal, Male)

Workforce capacity issues experienced by the Alice Springs-based allied health team further compounded the workforce supply issues of the Aged Care service. The NT Health Allied Health primary health care team is a small team of six to eight staff is tasked with delivering allied health services across the vast regions of Central Australia and the Barkly region, which together cover approximately 900,000sqkms. Although telehealth models improve access and support the delivery of much needed services to remote communities, the limited number of allied health providers and the travel time required to provide in-person outreach services as part of a hybrid model of care negatively impacted on the availability of services:

'What the major problem with allied health people is...they don't have many people to do this [allied health consultations]. ...there's a huge turnover with employment, and the waiting time for a client that has to be reviewed, sometimes it will take three to four months.' (Aged Care Coordinator, non-Aboriginal)

Theme 7: Readiness (or reluctance) to adopt: individual, organisational, and leadership factors

Local community Aboriginal Aged Care staff and clients were keen to continue using a hybrid telehealth model because the journey to Alice Springs for older people was exhausting:

'We've got our clinic transport. And [they] take them to physio [in Alice Springs]. It's a long journey because, like the travelling and it's really, really tired with the travelling.' (Aged Care staff, Aboriginal, Female)

Telehealth also meant there was a greater chance of having an Aboriginal support person available during the consultation (compared to travelling to Alice Springs for a consultation) and this was perceived as a considerable advantage. The local Aboriginal Aged Care staff also valued being able to attend the telehealth consultations where they could get direct and immediate information from the allied health professional about ongoing management, including medications, for their clients:

'I'm really happy..., when you're done the camera instead of talking on the phone, you got to look each other, what's going to happen, what's going on, like what sort of medication you on with you.' (Aged Care staff member, Aboriginal)

Despite the willingness of local Aboriginal Aged Care staff to use hybrid telehealth with their clients, there was agreement that it would take time to provide the necessary supports and build their confidence to manage the telehealth technology and workflow:

'We want to see a person sitting there, explaining. Yes, how to do it [telehealth], yes.' (Aged Care staff member, Aboriginal)

Participants observed that older clients quickly became accustomed to telehealth:

'So older people are getting used to the idea [telehealth] that was introduced there, and a bit sort of familiar with the technology, which was really, really good.' (Allied Health Professional)

A range of issues and potential solutions were identified during the implementation phase. Many of these required management and leadership support and resourcing, which wasn't always readily available or an organisational priority:

'Yeah, I think probably there was a bigger [unmet] need for there to be management involved and leadership from our organisation, [and] the Council, so you know maybe like [Aged Care service] managers.' (Allied Health Professional)

Theme 8: The future of telehealth for allied health service in remote Central Australia

Community-based Aged Care staff, clients, and allied health service providers each perceived that telehealth, with the right supports, was extremely useful and beneficial for allied health service delivery, now and into the future:

'Given the remote nature of where we live, it's a long way to travel. And yeah, if it's [telehealth is] something that the client is happy to do and the clinics can provide, or the clinical Aged Care can provide, then yeah, I think it's a really valuable tool.' (Allied Health Professional)

However, the ongoing use of telehealth was hampered by insufficient communication between these key stakeholders across the different locations:

'And yeah I mean I think there was, you know, probably a lack of communication or understanding of what was happening within the Council and the aged care.' (Allied Health Professional)

A further perceived barrier to future telehealth use related to the seemingly intractable nature of remote health workforce issues and staff capacity and time to set up telehealth appointments and provide or attend telehealth consultations with clients:

Ideally, it's going on a regular basis, but yeah, the main barrier that is just it takes up more resources of the staff time.' (Allied Health Professional)

Upskilling of the community-based Aboriginal Aged Care workforce by implementing digital technology training was identified as the most important way of ensuring future sustainability of telehealth models of care in the Aged Care service as this would enable local Aboriginal Aged Care staff to know how to support their clients to attend telehealth without having to rely on a visiting coordinator:

'Yes, someone from the community who's a bit more trained in health and they could also bring one person along and maybe there's more informal ways. That would work. That's don't require a formal certificate, but that would still be [helpful].' (Allied Health Professional)

'Yeah, we need a training. Yes. And we need more [video calls] after visit [to] our clients. Well, if we're continuing using this video call, the clients will be more comfortable.' (Aged Care staff, Aboriginal)

Likewise, growing the PHC allied health workforce employed by NT Health was also deemed important to relieve the excessive workload experienced by physiotherapists and occupational therapists:

'If we could grow that workforce ...ideally if there was an AHA [Allied Health Assistant] that was connected with every community, it would be great, and then people could almost theoretically take that call and then do a bit of an interview and then there could be some follow-up done by the Allied Health Professional.' (Allied Health Professional)

Allied Health Professionals employed by NT Health felt that improvements were needed in the training they received when commencing employment. Telehealth training materials could support greater and sustained uptake of telehealth:

'I think, ...when we reached out to you [researchers] and said well we don't really know what telehealth looks like in an allied health setting, we haven't been educated about that,..So I think if there was maybe even like more videos, like access to like a video about using telehealth in allied health and how all the different allied

health provisions can utilise it. ... in an ideal world, there'd be more education specific to telehealth in remote communities. (Allied Health Professional)

Allied health team members explained how the project related induction and exposure have given them opportunity to explore further for telehealth model beyond the pilot community:

I think ...it [the pilot] just brought our attention to Healthdirect and using telehealth more was a bit more in the forefront of our minds.' (Allied Health Professional)

And it has definitely been implemented and used a lot more over the past 12 months than it was [before]. ... I would say I do see Allied Health Professionals doing telehealth calls with remote clients on a weekly or fortnightly basis.' (Allied Health Professional)

However, for such telehealth model to mature and become sustainable, a need for better leadership engagement was noted as essential for the future:

'I mean leadership and management I guess the more involved they are the more they allow the staff below them to prioritise telehealth...' (Allied Health Professional)

Discussion

This study assessed the feasibility of telehealth for delivering allied health services in an aged care facility to address service gaps in a very remote Aboriginal community of Central Australia using the NASSS framework. The findings highlight key learnings related to feasibility and acceptability, and the necessary factors for embedding telehealth into the service delivery model.

Telehealth was acceptable to aged care clients and carers, staff, and Allied Health Professionals when delivered by professionals in partnership with local aged care staff and supported by trusted local Aboriginal staff. Aged care clients wanted more Allied Health Professional visits to the community, which aligns with prior literature [7, 9]. They perceived that a hybrid telehealth model was an acceptable alternative and that telehealth consultations had important advantages over the alternative of aged care clients and their carers having to travel to Alice Springs for physiotherapy and occupational therapy care in between outreach visits. Advantages included increased timeliness of advice, immediate feedback to aged care staff about changes in client care, better availability of trusted Aboriginal community members to translate during the consultation, and clients and their carers not having to leave the community. Hybrid telehealth models have been reported as useful in other studies conducted in both remote and non-remote settings [9, 19]. In the current study, the hybrid model contributed to building increased trust and relationship continuity between aged care clients and local staff and the allied health team. The telehealth component also increased access to services when there was no face-to-face outreach service in the community and when travel into Alice Springs wasn't possible or acceptable. This suggests that hybrid telehealth models implemented in Aged Care facilities may enhance equitable access to allied health services for older Aboriginal people in remote Central Australian communities.

This aligns with a major recommendation in the recent First Nations Aged Care Interim Commissioner's Report [23], which calls for immediate action to ensure equitable access to services for older Aboriginal and Torres Strait Islander peoples.

Co-designing the hybrid telehealth model played a key role in ensuring telehealth was acceptable for remote Aboriginal Aged Care staff and clients in our study. It has been well established that trust, ongoing relationships, and a hybrid model of telehealth improved the acceptability of technology-enabled health services in remote settings [9, 24, 25]. Consistent with other studies, this study identified that it was essential to have a support person (or persons) available to help older clients with technology, overcome hesitation in engaging with service providers, and translate information to and from their own languages [18]. The availability of a support person was a considerable enabler of improved acceptability of the telehealth service for aged care clients and their carers. Providing allied health services through the aged care service, which already had internet access and was a familiar and safe space for older people in the community, minimised fear of the unknown which otherwise may have had negative impacts on the use of telehealth. There was no resistance to the initiative from either clients or staff. These factors have also been reported as crucial for implementing telehealth in other studies [10, 11, 25, 26].

Embedding telehealth into the service delivery model

One of the most notable findings of this study was that the hybrid telehealth model required a minimum level of workforce stability to function and be sustained over time, as different individuals employed in different roles collectively brought the necessary mix of skills to the table. In this study, turnover and vacancy of the Aged Care Coordinator role were associated with cessation of telehealth, as there was no one with the digital technology skills to provide support in the Aged Care facility in the community. It is not inconceivable that turnover and vacancy in other key positions, such as the physiotherapist (clinical and digital skills) or Aboriginal Aged Care manager (cultural, relational and language skills) could similarly lead to cessation of telehealth services. Issues of health workforce supply fragility and vulnerability in small, remote NT settings have been previously described [27, 28].

This study also identified an unmet need to improve technological capability of staff working in remote Aged Care and health services. Other studies have shown that staff often have varying levels of technical skills and confidence, which significantly impacts the success and sustainability of telehealth in remote settings [24]. Some studies [9, 18, 24, 29, 30] have further suggested that digital technology upskilling is extremely important for implementing telehealth, which is consistent with our findings. The technological skills required of Allied Health Professionals in our study differed from those needed by local Aboriginal Aged Care staff. The National Digital Health Strategy 2023–2028 [31, p.30] states that healthcare providers should be instructed at every stage of their training and working careers to effectively use digital health tools. However, there is a lack of contextually adapted digital training content and limited modalities available for ongoing digital skills training for health professionals

working in remote NT Aboriginal settings. Ideally, such training should be co-developed with the local workforce and services so that place-based uniqueness and local complexities are considered.

A further challenge is that the introduction of telehealth can increase the already heavy workloads for all staff involved, unless additional resources are incorporated into the hybrid telehealth model [9, 24, 32]. Most participants in this study felt that telehealth could reduce travel and save resources (especially client travel time and health system and personal costs associated with client and carer travel). For this to be realised, significant time and effort must be invested at the user end [18] where the service providers (e.g. Aged Care staff) actively coordinate the service, identify client needs, and set up telehealth consultations [6]. Task shifting by utilising the skills and competencies of allied health assistants and allied health administrative staff, and resourcing the community-based Aged Care team at the user end (e.g. provision of iPad, extra support from Aged Care Coordinator) with increased and flexible funding, was crucial in this study as it has been in other studies elsewhere [18].

The involvement of senior leadership and management, of both Aged Care and health service, proved crucial to implementing the hybrid telehealth model. They were able to support or respond to issues of allocating resources, creating a flexible work culture to adopt technology [33]. These issues can only be addressed if organisational management is engaged and actively working to prioritise and embed telehealth into practice [19]. Leadership involvement can help facilitate work practices and expectations from offering 'only face-to-face services' to 'hybrid telehealth services' [6, 19]. While doing so, the senior management must include the community-based leaders and staff at all stages of design and implementation [34].

This study has significant strengths. The use of the PAR method [16] with co-designed and culturally safe community engagement approaches [17] is a key strength of this study. The use of these strengths-based methodological approaches ensured significant participation of Aboriginal community members, health providers, aged care service clients, and other stakeholders. Aboriginal researchers or community team leaders led all discussions with Aged Care clients and their carers to ensure cultural appropriateness, and the telehealth initiative was designed to fit within the existing service structures. Given the nature of work in the remote community, a careful, iterative approach was adopted to understand, test, and follow up findings as they emerged. Our capacity to quantitatively explore impact on client outcomes (e.g., improved mobility or quality of life) were limited because of the small size of the Aged Care service and the relatively short study timeframe. We were also unable to test the use of teleconferencing with family members who did not live in the community. There were also some aspects of funding models and financial sustainability of telehealth that were not explored in this study. Further health economic evaluation of the Aged Care-Allied Health hybrid telehealth model would be valuable for guiding further practice and policy. Notwithstanding these limitations, this study has provided important new findings that strengthens the existing evidence for the use of telehealth in remote Aboriginal communities.

Conclusions

This study demonstrated that an allied health hybrid telehealth model for older adults living in very remote Aboriginal communities was acceptable to Aged Care clients, carers and staff members as well as to Allied Health Professionals. Adopting a hybrid telehealth model (combining telehealth with face-to-face care) and confirming support from organisational leaders as well as local Aged Care staff and clients is important for supporting acceptability. Workforce availability, digital skills capability and training, and capacity challenges remain and require suitable resourcing. Nevertheless, moves towards telehealth becoming business-as-usual, has potential to improve equity of access to needed allied health services for remote Aboriginal peoples.

Abbreviations

ACCHS

Aboriginal Community Controlled Health Service

AHA

Allied Health Assistant

AIHW

Australian Institute for Health and Welfare

CPHC

Comprehensive Primary Health Care

DHTs

Digital Health Technologies

GPs

General Practitioners

MMM

Modified Monash Region

NASSS

Non-adoption, Abandonment, Scale-up, Spread, and Sustainability

NT

Northern Territory

NTG

Northern Territory Government

NT Health

Northern Territory Department of Health

OT

Occupational Therapy

PAR

Participatory Action Research

PD

Position Description

PHC

Declarations

Ethics approval and consent to participate

The research project was reviewed and approved by the Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research (HREC Approval Number: 2022–4275) in accordance with the Declaration of Helsinki. Administrative approval was also obtained from the Research Governance Office, NT Health (EFILE2023/8720), the Boards of the participating ACCHS and respective Land Councils. All participants signed a consent form after reading the participant information sheet.

Consent for publication

A written consent was obtained to use in reports and publications for Fig. 2.

Competing interests

The authors declare that they have no competing interests.

Funding

The current project is supported by the Digital Health CRC Limited (DHCRC). DHCRC is funded under the Australian Commonwealth's Cooperative Research Centres (CRC) Program. This is a collaborative project among multiple partners in Australia: the Australia Government Department of Health, Disability and Ageing, Department of Health - Northern Territory Government, Primary Health Care Network Northern Territory, Aboriginal Medical Services Alliances Northern Territory, Healthdirect, Australia Digital Health Agency, Menzies School of Health Research, and The University of Sydney.

Author Contribution

DR, VK, ES and TS conceived the study design and developed the methods. VK and JC analysed the data under the mentorship of ES. VK wrote the first draft of the manuscript with significant contributions from KW and JC. All authors, including KW, NN, HB, JC, KC, AP, AH, SN, MM, MD, ST, PB, TC, JR, DR, DE, AL, TM, JW, TS, and DR, provided significant input in drafting, and finalising the manuscript. VK and ES share equal contributions as the lead authors, and TS and DR are the co-leads of this project and share equal contributions as senior authors. All authors have read and approved the final version of the manuscript.

Acknowledgement

We acknowledge all project partners and participants for their time, engagement, and the valuable insights shared through interviews and ongoing discussions. Their formal and informal contributions have been central to the progression of this implementation project. The involvement and support from the regional council that manages the aged care service, and the Allied Health Team of Central Australia (NT Health) have been crucial to this project's co-design, implementation, and evaluation. We also recognise the continued guidance, wisdom, and support provided by our community-based colleagues and cultural mentors, and community members, whose perspectives have strengthened the integrity and relevance of this work. We also acknowledge the support of the Land Council, the Local Authority, and the Health Board for their support and the opportunity to work in the community.

Data Availability

Relevant data generated or analysed are included in this article. All de-identified qualitative data have been used in this manuscript, and further data cannot be provided due to the information they contain that could compromise research participants' privacy and consent.

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Figures



Figure 1

Aged Care Service in the very remote Central Australian community

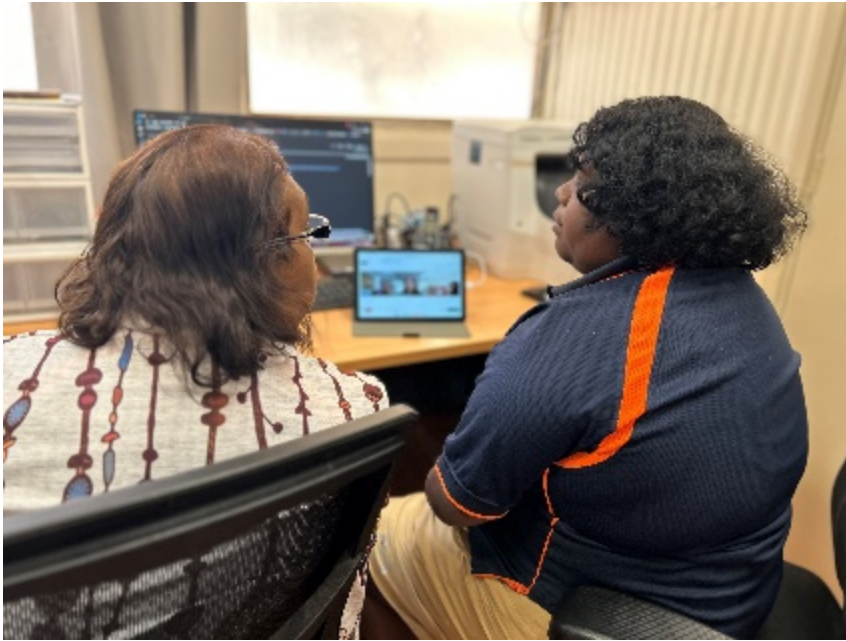


Figure 2

Aboriginal staff (in the community) on Healthdirect test call
(photo taken and used with consent)