



Original Article

Telerehabilitation for Speech-Language Pathology in Community-Based Rehabilitation in the Philippines: A Feasibility Study

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Abstract

Background: Filipino speech-language pathologists (SLPs) can reach more persons with disabilities across 7,107 Philippine islands through telerehabilitation (also known as teletherapy, telepractice). This study described the feasibility of telerehabilitation for speech-language pathology in community-based rehabilitation in terms of appropriate information and communication technologies (ICT), stakeholder perspectives, and facilitators and barriers. **Methods:** A qualitative descriptive design was employed. Participants were purposely selected as telerehabilitation stakeholders. One metropolitan-based SLP conducted remote and synchronous therapy sessions to two persons with voice disorders (52 and 65 years old) in their homes, assisted by one primary caregiver each and one community-based rehabilitation worker (CBRW). ICT observations were logged as field notes. Stakeholder perspectives were obtained through participant journals and interviews, thematically analyzed using NVIVO, and validated by participants. Facilitators and barriers were derived from data triangulation of field notes, journals, and interviews. **Results:** The best ICT comprised of fastest wireless internet available (7.2 Mbps), MacBook™ laptop, and FaceTime™ videoconferencing application. Stakeholders had varied yet positive perspectives. The SLP focused on ICT requirements and intervention conduct. The families saw telerehabilitation benefits of cost-effectiveness and intervention effectiveness. Both SLP and the families were satisfied as telerehabilitation providers and consumers. CBRW appreciated intervention effectivity. The only barrier to telerehabilitation was low internet bandwidth. Facilitators to telerehabilitation were stronger CBR policies and SLP capacity development. **Conclusion:** Telerehabilitation is feasible in speech-language pathology within community-based rehabilitation in the Philippines, given community-appropriate ICT and positive experiences of stakeholders. It can flourish with faster internet, stronger community health policies, and empowering stakeholders.

Key Words: *Speech-language pathology, Community-based rehabilitation, rural health, Telerehabilitation*

INTRODUCTION

Fifteen in every hundred in the world are persons with disabilities.¹ Rehabilitation is fundamental to improve their functioning.² At least one in every three people worldwide needs rehabilitation.³ The number of rehabilitation professionals is a "proxy indicator" of meeting rehabilitation needs.² Globally, the demand for rehabilitation is much higher than the available services.⁴ In developing countries, there are less than ten healthcare professionals for every 10 million people.² Rehabilitation professionals are extremely few² to serve the world's 80% of

people with disabilities who live in developing countries¹ like the Philippines.

About 16 in every thousand Filipinos have disabilities.⁵ Dwelling in 2,000 out of 7,107 Philippine islands⁶ challenges their accessibility to healthcare⁷ and threatens their health and well-being after disasters.⁶ With more than a fourth of the population living below the poverty line, socio-economic conditions leave Filipinos in poorer health.⁷ The shortage of health workforce compounds health inequities.⁷ In fact, there are

only 672 speech-language pathologists (SLPs) in the country.⁸ With the deepening health inequities, community-based rehabilitation (CBR) is recommended for developing countries to improve access to rehabilitation.

CBR is a strategy within community development that integrates disability in health, education, employment, and social services to promote equality and equity, and eradicate poverty. A community with CBR is empowered⁹ and removed of physical, communication, policy, and attitudinal barriers in all its services.¹⁰ Everyone, therefore, has good health and well-being, lifelong education, decent work, and sufficient social protection regardless of disabilities.^{9,10} Augmenting the rehabilitation workforce is crucial in achieving this.⁴ CBR workers (CBRWs) assist in rehabilitation or even work across health and social services.¹

CBR movement in the Philippines started in 1981.¹¹ Rural and remote communities trained community members to become CBRWs as aides in assessment and intervention¹¹⁻¹⁵ and refer to more specialized services as necessary.^{11,14} Communities can also actualize telerehabilitation (TR) to break down the geographic barrier in health through the use of technology in information and communications (ICT)¹⁶ in CBR.^{16,17}

TR is a way of delivering rehabilitation services of assessment, intervention, and consultation from rehabilitation professionals to clients separated by time and distance through utilizing ICT.¹⁸ Speech-language pathology through TR works with individuals across the lifespan for hearing, speech, language, voice, and swallowing functions.^{18,19} For over a decade, TR has proven to be as effective as face-to-face speech-language services.²⁰⁻²⁴ It answers the challenges in accessibility^{19-21,23,24} and affordability of rehabilitation services.^{19,20,23,24} Patients and their families, and professionals are satisfied with TR.^{19-21,24}

In 2004, the Philippines documented the first delivery of healthcare services through ICT from professionals in the northern region to patients from the south.²⁵ To date, 12 studies from 2008 until 2020 employed ICT to offer medical consultations, rehabilitation, mentoring, and monitoring of Filipinos from far-away

communities about their general health concerns, chronic disease, mental health, orthopedic difficulty, neurologic problem, communication disorder, and cardiac disease.²⁶

With the existence of CBR in Philippine rural communities, this demands information on whether TR can equalize rehabilitation opportunities made inequitable due to geography and poverty. Furthermore, no study has yet established the feasibility of TR within CBR to deliver speech-language services in the Philippines. This study aims to answer, “How can TR deliver speech-language pathology services in CBR in the Philippines?” by describing the best ICT; understanding the perspectives of the SLP, persons with disabilities and their families, and CBRW as TR stakeholders; and identifying facilitators and barriers to TR implementation.

METHODS

Ethical Considerations. This study received ethical clearance from the Ethics Review Committee of the College of Rehabilitation Sciences, University of Santo Tomas. It adhered to the ethical principles in CIOMS of 2016, Declaration of Helsinki of 2013, International Conference on Harmonisation Good Clinical Practice of 2018, and National Ethical Guidelines for Health and Health-Related Research of 2017. The researcher team, composed of six females and one male, was certified with Good Clinical Practice by the Philippine Health Research Ethics Board. The lead researcher with a master’s degree in Reading Education and a bachelor’s degree in Speech-Language Pathology managed the team, as an academic faculty member, with student researchers of an undergraduate program of Speech-Language Pathology.

Study Design. As this is a qualitative study, it utilized a descriptive research design with a phenomenological methodological orientation. Qualitative descriptive design examines a phenomenon by purposely selecting participants to interview and observe, qualitatively analyzing multiple data sources to obtain themes, and straightforwardly describing findings and providing facilitators and challenges.²⁷ This study design was the most suitable to describe the feasibility of delivering speech-language

pathology service through TR in CBR. The ICT infrastructure, TR stakeholder viewpoints, and TR facilitators and barriers were detailed through observing therapy sessions and analyzing journals and interviews with the SLP from the metropolis, persons with disabilities and their families, and CBRW of the far-off community implementing CBR.

Setting. This study's settings considered the disability and rehabilitation factors that influence understanding the TR feasibility within CBR to provide speech-language pathology services. These covered the population of persons with disabilities and SLPs.

Naga City, in the province of Camarines Sur, was chosen as the rural community. It is one of the two regions in the country with the second-highest population of persons with disabilities.⁵ Approximately 7.63% with speech impairment, 10.10% with deafness, and 12.79% with intellectual disabilities⁵ may benefit from rehabilitation services. There was not a single SLP residing in the city to provide for their needs.⁸

Manila City, one of the cities of the country's National Capital Region, was selected as the metropolitan community. Aside from it being the most populous region in the country and with most persons living with disabilities,⁵ it also has the most number of SLPs.

Speech-language pathology TR program in CBR of Naga City. Naga City's CBR program that started in 2014 was co-provided with the local government and the higher-education institution of the research team. It designated at least one CBRW from each barangay or smaller administration under the local government.¹⁵ Part of CBRW training was learning while assisting therapy sessions of persons with disabilities that were provided by supervised speech-language pathology clinical students at their city's health center. This prompted to study the feasibility of TR to deliver speech-language intervention remotely from Manila City to persons with disabilities in their homes with their families and CBRW.

From February 2018 to March 2018, four individualized speech-language TR sessions were provided in real-time from the SLP in

Manila City to the homes of persons with disabilities with their primary caregivers and other family members, and the CBRW of a barangay in Naga City. The SLP employed techniques and strategies directly to the persons with disabilities. The CBRW physically reinforced instructions to support persons with disabilities and facilitate learning of the primary caregivers in their home environment. The SLP, persons with disabilities and their primary caregivers, and CBRW were this study's participants as TR stakeholders. The manipulated ICT in every TR session was this study's equipment.

Participants. A total of four TR stakeholders participated in this study. Three were residents of the rural community, and one was from the metropolitan community.

The only CBRW of a barangay of Naga City was invited to participate. Together with least two from the researcher team, two adult persons with disabilities from the same barangay were recruited to join the study. They must have been at least 18 years old with speech-language disorder/s but with no medical conditions of dysphagia, visual and hearing impairments, neurocognitive disorders, and psychological conditions. One primary caregiver of each was also included as participant. All of them were proficient in Tagalog, their second language to their native Bicolano language. Meanwhile, from Manila City, one SLP with at least five-year experience and Tagalog as primary language served as the TR service provider.

After purposefully selecting all the participants, face-to-face explanations of the study's research team, purpose, procedures, benefits, risks and inconveniences, voluntary participation and privacy and confidentiality, and contact details followed. All recruited participants gave their written consent and participated throughout this study.

Equipment. ICT bridged the approximately 410,000 m distance between participants in the rural community and metropolitan areas (Table 1). Since the National Capital Region has faster and more reliable internet connection compared to Naga City and other rural communities,²⁸ the ICT testing focused on Naga City's available wireless internet and technological resources at the time of the study.

In the rural community, the combinations of internet connections, laptops, and videoconference applications were manipulated every session. All locally available mobile internet services²⁸ of 3G and LTE speeds were utilized. Laptops and software during speech-language pathology TR sessions varied.^{16,22} A Windows™ laptop with videoconferencing

software Skype™, 16,20-23 Google Hangouts™, Viber™, and Facebook Messenger™ was adopted. MacBook Air™ with the same applications was included in the ICT testing, with the addition of the FaceTime™ videoconferencing application. Meanwhile, the metropolitan-based SLP utilized LAN cable internet, MacBook Air™, and all the software.

Table 1. List of ICT used during SLP TR in CBR.

| Internet | | | Laptop | Software |
|------------------------------|-------------------------------|--|---|---|
| Wired LAN internet (10 Mbps) | 3G mobile internet (7.2 Mbps) | LTE mobile internet (120 Kbps to 384 Kbps) | Windows (Windows 10 operating system, dual-core processor, 4 GB of RAM) | Apple (macOS 10.12 operating system, 1.8GHz dual-core processor, 4 GB of RAM) |
| | | | | Skype (Minimum requirements of Windows 7 or macOS 10.9 operating system, 1GHz processor, and 512 MB of RAM) |
| | | | | Google Hangouts (Minimum requirements of Windows 7 or macOS operating system and Quad Core processor) |
| | | | | Viber (Minimum requirements of Windows XP or macOS 10.7 operating system, Dual Core processor, and 1 GB of RAM) |
| | | | | Facebook Messenger (Minimum requirement of 512 MB of RAM) |
| | | | | Facetime (Minimum requirement of macOS operating system) |

Data Collection. The ICT was observed during TR in the homes of persons with disabilities in every TR session and was inputted as field notes. Permutations of wireless internet, laptop, and teleconference software were carried out every intervention session. With the 3G mobile internet, the Windows™ laptop was used to operate Skype™, Google Hangouts™, Viber™, and Facebook Messenger™. The laptop was then switched to MacBook Air™ to control the teleconference applications in the same order with the addition of FaceTime™. The LTE internet connection was next utilized, first with the Windows™ laptop in the exact order of software and then followed by the MacBook Air™ to work with the software in the same flow. The SLP in the urban city consistently used MacBook Air™ and wired LAN to connect to the internet, running the same applications in sync with the remote and rural community.

The experiences of stakeholders were documented in journals at the end of every TR session and were obtained via an interview after

the last TR session. These were gathered in their respective settings in the rural and metropolitan communities. All the participants were provided notebooks to write down their thoughts about TR. Primary caregivers and CBRW journaled their thoughts guided by questions, "Were resources readily available? What are the difficulties that you faced? Do you think this type of intervention is helpful? What are the recommendations you could give?" The SLP documented his thoughts, "How does telerehabilitation differ from the conventional face-to-face rehabilitation? Were the resources readily available? Were there any difficulties that you faced during the implementation of the telerehabilitation? How do you think we could make this intervention more beneficial? How could you think the implementation could be improved?" These notebooks were collected after the last TR session. One-on-one interviews were conducted as well after the last TR intervention session by the lead researcher. The questions "How was your TR experience? What

recommendations can you give to improve TR?" were embedded in a natural 3-minute and audio-recorded interview. Only one interview was conducted per participant to summarize their experiences and share additional insights.

Data Analysis. Multiple data sources of field observation, participant journals, and interviews were analyzed separately to describe the feasibility of speech-language pathology services in CBR through TR.

Field notes documented the fluctuations in internet connectivity and the frequency counts of audio-video delays. These observations were used to identify the best ICT in TR occurring within the far-flung community and distant SLP.

Stakeholders' perspectives from journals and interviews were thematically analyzed²⁹ using NVivo ver. 11 software by the research team. Each journal and audio-recorded interview was transcribed in preparation for an inductive approach to determine general and sub-themes. The themes were subjected to member-checking or participant validation to check for the accuracy of their insights. The findings presented in codes, meaning, frequency count, and select participant statements expounded on their experience stakeholders of TR.

Data triangulation of field notes, journals, and interviews was applied to determine factors that affect TR implementation. This derived the factors that may facilitate or hamper TR delivery

of speech-language services in CBR in a rural community.

RESULTS

Data was gathered from observing TR sessions and interviewing TR stakeholders. Two community-dwelling adults obtained speech-language intervention through TR in their homes with their primary caregivers. One of the two was a 65-year-old female who suffered from a stroke was non-ambulatory and cared for by her children. The other person living with a disability was also a stroke patient. He was 52 years old, ambulatory, and cared for by his daughter. Both were diagnosed to have voice problems due to dysarthria. A distant SLP in a metropolitan city delivered all the synchronous speech-language TR sessions that included respiratory and voice exercises with the assistance of the CBRW. Findings on the best ICT, stakeholder perspectives on TR, and the facilitators and barriers to TR in CBR are discussed in the subsequent sections.

ICT in TR service-delivery of speech-language pathology within CBR. Based on field notes, the most appropriate ICT for the rural and remote community are wireless LTE internet with 7.2Mbps speed, MacBook Air™, and FaceTime™ (Table 2). These presented the most stable internet connection and the least number of audio-video delays.

Table 2. Best ICT combination of internet, laptop, and software.

| Internet | Laptop and software | | | | | | | | |
|--------------|---------------------|-------|-------------------|----------------|----------------|-------|-------------------|----------------|-------------------|
| | Windows Skype | Viber | Google Hangout | Messenger | iOS* Skype | Viber | Google Hangout | Mes- senger | Facetime* |
| 384 Kbps | + | + | + | - | + | + | + | - | - |
| | 4 ^a | | 3 ^a | 3 ^a | 4 ^a | | 3 ^a | 3 ^a | 0.05 ^a |
| 7.2 Mbps* | + | + | + | - | + | + | + | - | - |
| | 3 ^a | | 2 ^a | 2 ^a | 3 ^a | | 2 ^a | 2 ^a | 0.03 ^a |

Note: + with connection issues; - without connection issues; ^a Minimum number of delays between audio and visual images during videoconferencing per minute; * Best combination of internet, computer and operating system, and videoconference software

All rural community ICT issues were easily solved. ICT simply required reconnecting to the mobile internet services in every disconnection, regardless of the laptop and software used. Audio-video delays were dealt with based on noticeable trends in the speed of wireless internet connectivity being used during TR. More

frequent audio-video delays with all videoconferencing applications were logged using 3G compared to LTE wireless internet. Every lag lasted no more than 3 seconds, so TR in the rural community merely waited for the audio-video feedback to stabilize.

Stakeholders' perspectives on TR to receive speech-language pathology in CBR. Based on participant journals and interviews, the perceptions of the SLP, persons with disabilities and their families, and the CBRW revolved around two main themes of technological and clinical aspects of TR. The technological aspect

revealed a minor theme of ICT appropriateness in TR. As for TR's clinical aspect, it unpacked minor themes of service satisfaction, cost-benefit of TR, and effective clinical conduct of TR. A total of four minor themes were illustrated by the specific participants (Table 3).

Table 3. Perspectives of persons with disabilities and their families, CBRW and SLP on TR in CBR.

| Perspectives on TR in speech-language pathology | | SLP | Families and persons with disabilities | CBRW |
|---|--|--|--|---|
| Code | Meaning | Frequency counts and selected statements | | |
| Effective intervention | TR is an effective modality to deliver the speech-language intervention. | 3 – “Similar conduct with face-to-face.” 3 – “Better outcomes with more frequent therapy sessions.” | 4 – “Facilitates improvement.” 3 – “Patient motivation to improve.” | 4 – “Hastens and facilitates improvement.” 2 – “More frequent therapy sessions.” |
| Cost-effective | TR reduces rehabilitation costs. | | 3 – “limited financial resources for healthcare services.” | |
| ICT pre-requisite | ICT is a technological requirement in TR. | 4 – “Improvement in internet signal.” | | |
| Service satisfaction | Consumer/provider satisfaction with TR. | 3 – “Smooth execution with ICT.” | 6 – “No problem with how therapy was delivered.” | |

The SLP focused on ICT pre-requisite and conduct intervention of TR. Cues and prompts were delivered very much like face-to-face therapy sessions (“*Hindi masyadong nagkakaiba ang therapy dahil mainam na naibibigay ang mga tulong at tanong sa pasyente.*”). However, its success depended on ICT, specifically better internet connection (“*Mas magandang signal ng internet [sa komunidad]*”). It can even be as effective with more frequent intervention sessions (“*Mas madalas na pagpapatupad ng therapy.*”). There was overall satisfaction with TR as a rehabilitation provider (“*Maayos nagawa*”).

Persons with disabilities and their families overwhelmingly expressed satisfaction as a consumer or recipient of TR in CBR (“*Walang problema... Maganda... Maayos...*”). Fluctuating internet connection (“*Koneksyon lamang po yung problema*”) didn't hamper their positive reception (“*Wala naman pong naging problema habang ito'y po'y inyong ginagawa*”). They expounded on long-term gains from TR. It was perceived to achieve positive communication outcomes (“*Nakakatulong ito dahil mas*

napapabuti o mas napapadali ang paggaling at mas nagkakaroon ng malaking tyansa sa paggaling nito”) without costing a lot of money. It removes the need for specialized transportation costs to go clinics and hospitals for in-person intervention (“*Sa bahay na lang po kasi syempre mahihirapan din siya kasi ganyan, sa paglalakad niya*”) and out-of-pocket healthcare expenses (“*Kapos para sa gamutan*”). Emphasis was also placed on their crucial role in assessment and intervention during TR, specifically on their motivation throughout the process of obtaining better health outcomes (“*Wag kabahan... Magkaroon ng lakas ng loob na gumaling*”).

CBRW appreciated the advantages of TR in speech-language services and overlooked the internet barrier (“*Mahina yung [internet] signal*”). It timely and effectively provides much needed rehabilitation (“*Mapadali mapabilis ang paggaling*”). Outcomes amplify with generalization given more frequent therapy sessions (“*Sana tuluy-tuloy... Kahit wala na kayo, matuloy ng pasyente*”).

Facilitators and barriers of telerehabilitation in the Philippines. Findings from field notes observations, journals, and interviews indicate that SLP capacity-building on ICT and TR, and community policies on CBR with TR were deemed TR facilitators. The only barrier to TR was the low-bandwidth wireless internet connection in the rural community.

SLP capacity development can sustain TR as an alternative speech-language intervention modality in CBR. All TR sessions were effectively delivered because the SLP was able to operate and troubleshoot ICT. These observed technical capacities assured the SLP of TR similarity with face-to-face therapy sessions that were accentuated in the journal and interview.

Community's CBR policies can enhance the recognized cost-effectivity and intervention effectivity of TR. Existing CBR policies in the community of free rehabilitation services can be strengthened to include TR as another modality to be conducted in homes of persons with disabilities. Continuing CBRW training to include TR can help them assist better during TR sessions and monitor families' attitudes and skills to continue therapy goals independently every day. These can potentially empower persons with disabilities and their families ("*Dapat magtyaga kami*") and create a more accessible rehabilitation ("*Sana di lang samin*").

TR in rural-based CBR is hampered by the slow mobile internet connection in the community. Internet largely dictates which laptop and software in the ICT infrastructure of TR.

DISCUSSION

This study details how speech-language pathology intervention through TR is viable in rural and remote Philippines communities. In addition, it can be incorporated in CBR. It describes the best ICT in terms of internet, laptop, and software infrastructure. It understands the perspectives of the SLP, persons with disabilities and families, and CBRW as stakeholders of TR. And it identifies the facilitators and barriers to sustaining TR implementation in the country.

ICT is imperative but not the core of TR in speech-language pathology. It is one of the many necessary resources that depend on the availability and accessibility in the area where TR is implemented. ICT is adjusted to the various factors within stakeholders and their environments. Contextualizing ICT in this study permits TR in a country with mobile network connection rank of 74th out of 77 countries.^{28,30} ICT's hardware and software also consider the connectivity medium bandwidth.¹⁶ For a rural community like Naga City, Camarines Sur, the faster mobile internet speed is 7.2 Mbps,³⁰ As anticipated, Skype didn't work because of its 10 Mbps bandwidth requirement.^{16,22-24} MacBook Air™ and FaceTime™ prove superior because their technical specifications use lesser internet bandwidth but produce better audio-video quality.³¹ Regardless, technical difficulties in TR are easily resolved and do not impact the quality of service.²² The SLP's attention on ICT confirms technical principles as one of the fundamental TR aspects.¹⁸ ICT flexibility in TR should be carried over in CBR implementation. CBR programs make optimum use of local resources to provide equitable essential services like health while maintaining people at the center of the services.¹ Therefore, the ICT of TR in CBR must also always be person-centered.²⁴ Internet and other equipment in the rehabilitation technological infrastructure within CBR are selected depending on clinical outcomes for persons with disabilities¹⁶ and resources of communities carrying out CBR programs.¹⁰

The core of TR in speech-language pathology remains to be the service for persons with disabilities and their families. TR is an alternate mode for SLPs to provide services across the lifespan and across the continuum of care. It is not different from traditional face-to-face rehabilitation,^{18,19} as the SLP also emphasizes, yet it enhances the quality of care provided.¹⁹ With the mere use of ICT, the concentration of Filipino SLPs in metropolitan areas can potentially be spread to address the rehabilitation needs of persons with disabilities from the rest of the Philippine archipelago. TR improves the dosage of speech-language pathology therapy sessions and outcomes for persons with disabilities. Interventions through TR can be more frequent and done in a more

natural environment, like in homes, which can consequently cultivate the greatest functionality in everyday setting^{19,22} and eventual inclusion with the community. The families echo these positive outcomes. The CBRW mentions how TR addresses impairment and explains further the potential to integrate and participate in the community. TR cost-effectiveness is another sentiment that is consistent with others receiving TR in homes in their distant communities.^{19,20,23,24} It saves time and money due to not having to leave home to receive speech-language pathology intervention from community health centers, private clinics, or hospitals. Stakeholder satisfaction with speech-language pathology TR is also highlighted. The families are satisfied with TR in speech-language services, just like other families in other cultures and geography with TR experience.^{19-21,24} Access to rehabilitation is one of the overarching advantages of TR.^{19-21,23,24} It is important to merge this with cost-effectivity and interpret it in the CBR context. The families also hope that other low-income families can be accorded an equal opportunity to access TR. This can be construed as a seed of empowerment to organize and mobilize as a unit to advocate in the co-creation and sustainability of disability-inclusive policies and programs beyond health.¹ CBRWs and the families become allies. While they assist in bringing TR to where persons with disabilities are, they amplify the voice of persons with disabilities to their local governments.

The implementation of TR in speech-language pathology within CBR stresses the issue of its sustainability in the Philippines. Maintaining the facilitators and improving the barriers tackle this. Low internet bandwidth is the primary technical factor^{20,26} that deters organizations from integrating technology in health.²⁶ Even with this perceived and observed barrier, numerous facilitators from this experience can push TR towards the utility in the profession, sustainability in practice, and social equity in health outcomes for Filipinos. Policies on disability, like those in the rural community,^{14,15} must respect equal health rights and provide equitable health services to break the poverty-disability cycle.¹⁻³ CBR policies in the country must be revisited, given the positive impact seen on international communities in other

developing countries.⁹⁻¹² CBRWs should receive government-funded mid-level training to perform multipurpose or assist in discipline-specific TR, and third-level training to manage health and social services.⁹ Continued CBRW capacity-building^{4,9} can directly impact the functioning of persons with disabilities,² through frequent TR in their homes that can eventually increase the likelihood of community life and participation of persons with disabilities and, thereby, achieve disability inclusion in the development of their communities.⁹⁻¹⁵ Building the technological capacity of SLPs to integrate ICT in service delivery is also another facilitator of TR. Passing on the technological capabilities of ICT operations and troubleshooting to other TR stakeholders is also vital.²⁴ Lastly, delivering TR in the homes of persons with disabilities efficiently trains and coaches families and easily generalizes treatment into the most natural living conditions results in optimum functionality of persons with disabilities.^{19,21,24}

CONCLUSIONS

TR in CBR to deliver speech-language pathology in Philippine rural and remote communities is feasible. ICT must be community-appropriate yet person-centered. Stakeholders have similar positive perceptions of TR. TR in speech-language pathology within CBR can flourish despite low internet bandwidth in the country through strengthening disability and CBR policies, empowering stakeholders, and facilitating the ability to provide rehabilitation in homes of persons with disabilities.

This study is limited to TR in rural and remote communities. Peripheral ICT of headphones or cameras wasn't tested. Nevertheless, the feasibility of SLP TR in CBR on its technological aspects, stakeholders' experiences, and related factors can be applied, monitored, researched, and improved in the current TR practice of Filipino SLPs that had seen growth in dire COVID-19 pandemic circumstances.

Individual author's contributions

J.A.P.: conceptualizing, supervising, co-designing the paper; co-acquiring, -analyzing, and -

interpreting the data; co-drafting and -revising the paper for intellectual content, approval of the final version for publication, and accountable for all the aspects of the paper; E.G.O.: co-designing the paper; co-acquiring, -analyzing, and -interpreting the data; co-drafting and -revising the paper for intellectual content, approval of the final version for publication, and accountable for most aspects of the paper; C.T.: co-designing the paper; co-acquiring, -analyzing, and -interpreting the data; co-drafting and -revising the paper for intellectual content, approval of the final version for publication, and accountable for most aspects of the paper; J.C.: co-designing the paper; co-acquiring, -analyzing, and -interpreting the data; co-drafting and -revising the paper for intellectual content, approval of the final version for publication, and accountable for most aspects of the paper; M.F.D.: co-designing the paper; co-acquiring, -analyzing, and -interpreting the data; co-drafting and -revising the paper for intellectual content, approval of the final version for publication, and accountable for most aspects of the paper; J.N.A.: co-designing the paper; co-acquiring, -analyzing, and -interpreting the data; co-drafting and -revising the paper for intellectual content, approval of the final version for publication, and accountable for most aspects of the paper; B.C.C.: co-designing the paper; co-acquiring, -analyzing, and -interpreting the data; co-drafting and -revising the paper for intellectual content, approval of the final version for publication, and accountable for most aspects of the paper.

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Conflicts of interest

The authors of this paper declare no conflicting interest.

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Supplementary Material

[Supplementary Material A. COREQ \(COnsolidated criteria for REporting Qualitative research\) Checklist.](#)

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14. An ordinance providing for and establishing a Naga City Comprehensive Sustainable Rehabilitation Program for persons with disabilities (PWDs) with focus on the Community-Based Rehabilitation (CBR) Approach, thru institutionalization of the Naga City Physical Therapy and Rehabilitation Center and thru empowerment of the barangays in addressing disability issues, providing funds therefor, and for other purposes, Ordinance No. 2018-053 (Aug 7, 2018).
15. Directing all barangay councils thru the punong barangays (PBs) in the City of Naga to assign a permanent Barangay Health Worker (BHW) to be designated as a Community-Based Rehabilitation Worker (CBRW) in their respective barangays Executive Order No. 2014-024 (Jul 18, 2014)
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