Caregivers' Perceptions and Willingness to Utilize Telerehabilitation for Outpatient Consultation and Therapy for Pediatric Patients in a COVID-Referral Center in a Developing Country: A Cross-sectional Study

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ABSTRACT

Background. During the COVID-19 pandemic, social isolation and quarantine measures set to control the spread of the infection paved for the increased utilization of virtual methods of consultation and follow-up. Telerehabilitation allows access to rehabilitation services despite distance and makes possible the continuation of rehabilitation services despite the lack of face-to-face interaction. This is difficult for pediatric patients who are dependent on their caregivers for understanding and making decisions regarding their health. Loss of continuity of rehabilitation services led to poorer outcomes in children with disabilities. Although advantageous for them, pediatric patients may not benefit from telerehabilitation if caregivers have negative perceptions of the process and are unwilling to utilize the service.

Objectives. This study determined caregivers' perceptions and willingness to participate in telerehabilitation as a method of outpatient follow-up for pediatric patients admitted to a COVID-referral center in a developing country.

Methods. The study utilized a descriptive cross-sectional design. Respondents were adults (≥19 years old) caring for pediatric patients admitted at non-COVID wards of the Philippine General Hospital and who were referred for rehabilitation services. A survey tool adapted from a previous study on willingness to utilize telemedicine among caregivers of pediatric patients was translated into the Filipino language and used in the study. A dataset from Excel was imported in STATA 16 (StataCorp, Texas, USA) and was exhaustively checked for completeness, accuracy, and consistency before analysis. The association between patient characteristics and willingness to utilize telerehabilitation for any app was determined using Pearson's chi-squared test or Fisher's exact test, as appropriate. The latter was used when more than 20% of the cells had an expected value of less than or equal to five. A *P* value of less than 0.05 was considered significant for all tests.

Results. Of 123 respondents, 92 (75%) reported willingness to utilize telerehabilitation for outpatient consultation and therapy using video calls or a

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customized telerehabilitation app when available. Among 31 (25%) respondents who were not willing or unsure of participation, the main reasons identified were preference for face-to-face, lack of financial resources/load, poor connectivity, and doubt about the effectiveness of telerehabilitation.

Patients with younger age (Fisher's exact test, *P*=0.023), low usage of video call service (Fisher's exact test, *P*=0.020), and lack of available devices (Fisher's exact test, *P*=0.015) significantly reduced willingness to utilize telerehabilitation. Caregiver age, sex, educational attainment, estimated monthly income, number of devices used, speed of internet connectivity, and technological behaviors did not show statistical significance in association with willingness to participate in telerehabilitation.

Most caregivers recognized the usefulness of a service allowing transmission of health data to and from the hospital, consultation with a doctor in case of an emergency, sending of reminders for medical visits and therapy, and provision of a list of home exercises and nutritional recommendations. Telerehabilitation was perceived advantageous, but concerns regarding privacy, trust, lack of human contact, and technological difficulty were also present.

Conclusion. With high levels of willingness among caregivers, telerehabilitation is a viable method of providing rehabilitation services for the continuation of management after inpatient admission among pediatric patients. Limitations in its utilization include technological issues including the lack of devices, low level of service use, and slow internet connectivity. Although well perceived as advantageous, there are concerns regarding loss of human contact, difficulty in using technological devices, and trust and privacy issues that may affect utilization.

Keywords: perceptions, willingness, telerehabilitation, caregivers, pediatrics, children with disability, COVID-19, developing country

INTRODUCTION

The COVID-19 disease challenged the global health system to modify the way it delivers health services. During the pandemic, social isolation and quarantine measures set to control the spread of the infection paved the increased utilization of virtual methods for consultation and follow-up.[1] This occurrence greatly strengthened telemedicine, and all its forms, as a method of health service delivery.

In the Philippines, as a response to the effects of COVID-19, the government released guidelines on the application of telemedicine, encouraging its use for the management of chronic illnesses and when a licensed physician is not accessible for follow-up.[2] Although promoted, telemedicine was stated as not the gold standard for clinical care.[2]

Rehabilitation consult and services which mainly rely on face-to-face physical assessment and personal interaction during consultation and therapy have been particularly difficult during the pandemic, more so for pediatric patients who are unable to express themselves and rely on their caregivers for understanding their health and making decisions for them. It has been reported that among children with physical disabilities, the disruption in regular rehabilitation interrupted the improvement in motor skills and achievement of functional abilities with an increased risk of complications from the lack of physical activities.[3] Furthermore, isolation from the COVID-19 lockdown resulted in a decline in mental health and an increased frequency of domestic violence among this population.[4] Among parents, there was a reported increase in the mental load because of the increased requirement for parents to do rehabilitation care, which previously was provided by a multidisciplinary team, on top of them coping with the physical and mental health challenges associated with having a child with disabilities.[3] Improving access to rehabilitation services to prevent these situations can be done with telerehabilitation. However, caregiver participation is necessary for the pediatric population. It is reported that caregiver engagement is the most important factor for effective telemedicine among pediatric patients.[5] The objective of this study is to determine caregivers' willingness to utilize telerehabilitation as a method of outpatient follow-up consultation and therapy, and their perceptions regarding telerehabilitation. Specifically, it aims to determine the sociodemographic and technological profile of caregivers of pediatric patients referred for rehabilitation, determine their willingness to use telerehabilitation, and their perceptions regarding telerehabilitation.

MATERIALS AND METHODS

This is a cross-sectional study involving caregivers of pediatric patients admitted at the non-COVID charity wards of the Philippine General Hospital.

Inclusion criteria were: 19 years old and above, caregiver of a patient aged 0-18 years who was referred to the Department of Rehabilitation Medicine (DRM) for consultation and therapy services, and able to read, understand and speak the Filipino language. Caregivers who turned out positive for COVID-19 or whose patients turned out positive for COVID-19 and have not completed isolation based on the assessment by the Infectious Disease Service, were excluded from the study to ensure the safety of the investigators and to limit contact and possible transmission of the infection.

Limited admissions due to the PGH being a COVID referral facility affected referrals to Rehabilitation Medicine.

Hence, convenience sampling was done, and all available participants within a three-month collection period who consented to participate in the study were included.

The study instrument was adapted from the survey of Russo et al. which identified the needs and expectations of families with children, regarding the use of telemedicine services and the effect of socio-demographic and technological profiles on their willingness to use a telemedicine app and televisit service.[6] To facilitate a better understanding of its contents, the tool was translated to Filipino by Filipino language expert translators from the UP Manila Sentro ng Wikang Filipino. The tool was pretested among ten caregivers to check for appropriate wording, comprehensibility, and the time required for answering the questionnaire before it was finalized and distributed for data collection.

The data collection form (DCF) has two main parts. Part one contains information on demographic data and the technological capacity of the participants.[7] Part two collected perceptions on telerehabilitation and the willingness to participate in telerehabilitation.

Ethics approval from the University of the Philippines Manila Research Ethics Board (UPMREB), was sought before data collection was initiated. A review of the patient census of referrals to Rehabilitation Medicine was done by the principal investigator to identify pediatric patients referred for rehabilitation services and verify the location of the patients through the hospital's electronic medical records. To limit exposure, a list of patients with updated locations was used for data collection. At bedside, an explanation of the study purpose, process, risks and benefits, participant confidentiality and rights was provided and a written consent form was secured. Questions or clarifications were entertained before they were asked to accomplish a self-administered DCF. Accomplished forms were collected, screened for missed or unclear responses, and no other interaction was done after clarification. Data was manually encoded for statistical analysis.

Data Analysis

A dataset from Excel was imported in STATA 16 (StataCorp, Texas, USA) and was exhaustively checked for completeness, accuracy, and consistency before analysis. Categorical variables were summarized in frequencies and percentages. The association between patient characteristics and willingness to utilize telerehabilitation was determined using Pearson's chi-squared test or Fisher's exact test, as appropriate. The latter was used when more than 20% of the cells had an expected value of less than or equal to five. A *P* value of less than 0.05 was considered significant for all tests.

RESULTS

Sociodemographic characteristics

Most of the respondents were female, young and middle adults, high school graduates, and belong to the lower income class. Table 1 presents the sociodemographic characteristics of the respondents.

Table 1. Socio-demographic Characteristics

Characteristics	Frequency N=123	Percentage %
Age in years		
<20		
20 – 35	64	52.03
36 – 45	38	30.89
>45	21	17.07
Sex		
Female	92	74.80
Male	31	25.20
Educational attainment		
No formal education	5	4.07
Elementary	10	8.13
High school	70	56.91
College/Vocational School	38	30.89
Estimated monthly income		
<P11,000	111	90.24
P11,000-P22,000	9	7.32
P23,000-P43,000	3	2.44
>P43,000		
Child's age		
<1 year	42	34.15
1-5 years	33	26.83
6-10 years	12	9.76
11-15 years	17	13.82
>15 years	19	15.45

Technological Profile

Most of the participants utilize none or a single technological equipment, with the smartphone as the most available device. Facebook Messenger and Viber were most commonly used apps. Five percent of the respondents have no access to the internet, and 50% have an average speed of internet connection. Table 2 presents the technological profile of the respondents.

Willingness to Utilize Telerehabilitation

Table 3 presents the association of willingness to utilize telerehabilitation and the respondents' sociodemographic and technological profiles.

Ninety-two respondents (75%) reported willingness to utilize telerehabilitation for outpatient consultation and therapy. With the availability of a customized app for telerehabilitation, all of those who were willing to participate in telerehabilitation using any app were also willing to use the customized app.

Of the 31 (25%) respondents who were not willing or not sure whether to participate in telerehabilitation using any app, reasons identified were preference for face-to-face (16), lack of financial resources/load (5), poor connectivity (5), doubtful of the effectiveness of telerehabilitation (2), inability to do

Table 2. Technological Profile of the Participants

Characteristics	Frequency N=123	Percentage %
Devices		
Keypad phone	12	9.76
Smartphone	107	86.99
PC (personal computer)	10	8.13
Tablet	8	6.50
None	3	2.44
Technological equipment		
Low (0-1 device)	109	88.62
Medium (2 devices)	12	9.76
High (≥3 devices)	2	1.63
Apps for messaging		
Viber	27	21.95
Skype	4	3.25
Facebook messenger	111	90.24
Yahoo messenger	3	2.44
Telegram	13	10.57
Instagram	11	8.94
Twitter	4	3.25
WhatsApp	2	1.63
Others	2	1.63
None	6	4.88
Use of messaging service		
Low (0-1 service)	93	75.61
Medium (2 services)	15	12.20
High (≥3 services)	15	12.20
Apps for videocalls		
Viber	18	14.63
Skype	0	0.00
Facebook messenger	113	91.87
WhatsApp	3	2.44
Zoom	13	10.57
Google meet	10	8.13
Others	1	0.81
None	4	3.25
Use of videocall service		
Low (0-1 service)	99	80.49
Medium (2 services)	12	9.76
High (≥3 services)	12	9.76
Internet connectivity speed		
Fast	30	24.39
Average	73	59.35
Slow	13	10.57
No access	7	5.69
Technological behaviors		
Ever used an app to communicate with doctor or therapist	49	39.83
Communicated to doctor or therapist through text message or call	71	57.72
Searched for health information	85	69.11

video call using a phone (1), residing near the hospital (1), and unavailability of the caregiver/ caregiver being always at work (1).

Caregiver age, sex, educational attainment, estimated monthly income, number of devices used, speed of internet connectivity, and technological behaviors did not show statistical significance in terms of willingness to participate in telerehabilitation. Caregivers with younger children are less willing to participate in telerehabilitation using any app (Fisher's exact test, P=0.023). Low usage of video call service (Fisher's exact test, P=0.020) and lack of available devices (Fisher's exact test, P=0.015) significantly reduced willingness to utilize telerehabilitation.

Perceptions towards Telerehabilitation

Most caregivers reported the usefulness of a service or app that serves several functions including the transmission of health data to and from the hospital, consulting a doctor in case of an emergency, sending reminders for medical visits and therapy, and providing a list of home exercises and nutritional recommendations. There were high scores for the perceived advantages of telerehabilitation. Around 10% of the caregivers reported increased concerns regarding issues of privacy, trust, lack of human contact, and technological difficulty. Table 4 shows the tabulation of caregiver perceptions.

DISCUSSION

Our findings show that more than half of caregivers of pediatric patients are willing to utilize telerehabilitation. This suggests that telerehabilitation can be offered as an option for follow-up after discharge from the hospital for this population. This is comparable to a national survey in Australia where telehealth was perceived to be moderate to very useful for consultation after the COVID-19 pandemic.[8]

Similar to other studies, willingness to use telerehabilitation was not significantly affected by caregiver age, sex, educational attainment, and estimated monthly income.[6,9] Caregivers with infants and younger children however preferred face-to-face method for outpatient follow-up consults. This may be because infants and young children are deemed more fragile requiring face-to-face evaluation, especially during initial follow-up visits. Open-ended questions revealed that caregivers prefer face-to-face visits because they desired to see firsthand the therapy interventions, they are not sure of the effectiveness of telerehabilitation, and because it is easier for them to understand instructions when delivered in person. Regardless of age, there was a relatively high satisfaction rate with telerehabilitation among caregivers of pediatric patients with neurodevelopmental disabilities during the COVID-19 pandemic.[9]

Previous studies revealed that a high technological profile promoted the use of telemedicine. Limited technological equipment, poor connectivity, and proximity to the hospital were reasons for non-participation in telerehabilitation,

while easy access to technological equipment, familiarity with the use of video calls, messaging, and social networks, and availability of the internet enabled caregivers to engage in telerehabilitation.[6,10]

A systematic review by Leochico et al. classified challenges to the implementation of telerehabilitation in the Philippines into human, organizational, and technical factors.[11] Issues with internet connection were the most cited technological problem. In our study, most of the respondents perceived their internet connectivity to be of average speed, allowing them to do video calls quite clearly with minimal lags or delays. This is a good indication that telerehabilitation

Table 3. Sociodemographic and Technological Profile across Willingness to Utilize Telerehabilitation

Characteristics	Willingness to utilize telerehabilitation (any app)		*P* value
	No, n=31 (%)	Yes, n=92 (%)	
Age in years			
<20			
20 – 35	17 (54.84)	47 (51.09)	0.937[a]
36 – 45	9 (29.03)	29 (31.52)	
>45	5 (16.13)	16 (17.39)	
Sex			
Female	21 (67.74)	71 (77.17)	0.296[a]
Male	10 (32.26)	21 (22.83)	
Educational attainment			
No formal education	2 (6.45)	3 (3.26)	0.580[b]
Elementary	3 (9.68)	7 (7.61)	
High school	15 (48.39)	55 (59.78)	
College/Vocational School	11 (35.48)	27 (29.35)	
Estimated monthly income			
<P11,000	27 (87.10)	84 (91.30)	0.740[b]
P11,000-P22,000	3 (9.68)	6 (6.52)	
P23,000-P43,000	1 (3.23)	2 (2.17)	
>P43,000			
Child's age			
<1 year	10 (32.26)	32 (34.78)	0.023[b]
1-5 years	13 (41.94)	20 (21.74)	
6-10 years	5 (16.13)	7 (7.61)	
11-15 years	2 (6.45)	15 (16.30)	
>15 years	1 (3.23)	18 (19.57)	
Devices			
Keypad phone	1 (3.23)	11 (11.96)	0.292[b]
Smartphone	26 (83.87)	81 (88.04)	0.547[b]
PC (personal computer)	5 (16.13)	5 (5.43)	0.120[b]
Tablet	1 (3.23)	7 (7.61)	0.678[b]
None	3 (9.68)	0 (0.00)	0.015[b]
Technological equipment			
Low (0-1 device)	28 (90.32)	81 (88.04)	0.502[b]
Medium (2 devices)	2 (6.45)	10 (10.87)	
High (≥3 devices)	1 (3.23)	1 (1.09)	
Apps for messaging			
Viber	5 (16.13)	22 (23.91)	0.365[a]
Skype	1 (3.23)	3 (3.26)	1.000[b]
Facebook messenger	28 (90.32)	83 (90.22)	1.000[b]
Yahoo messenger	1 (3.23)	2 (2.17)	1.000[b]
Telegram	2 (6.45)	11 (11.96)	0.514[b]
Instagram	1 (3.23)	10 (10.87)	0.288[b]
Twitter	0 (0.00)	4 (4.35)	0.571[b]
WhatsApp	0 (0.00)	2 (2.17)	1.000[b]
Others	1 (3.23)	1 (1.09)	0.442[b]
None	1 (3.23)	5 (5.43)	1.000[b]
Use of messaging service			
Low (0-1 service)	25 (80.65)	68 (73.91)	0.827[b]
Medium (2 services)	3 (9.68)	12 (13.04)	
High (≥3 services)	3 (9.68)	12 (13.04)	
Apps for videocalls			
Viber	1 (3.23)	17 (18.48)	0.041[b]
Skype	-	-	-
Facebook messenger	27 (87.10)	86 (93.48)	0.269[b]
WhatsApp	1 (3.23)	2 (2.17)	1.000[b]
Zoom	2 (6.45)	11 (11.96)	0.514[b]
Google meet	0 (0.00)	10 (10.87)	0.064[b]
Others	0 (0.00)	1 (1.09)	1.000[b]
None	1 (3.23)	3 (3.26)	1.000[b]
Use of videocall service			
Low (0-1 service)	30 (96.77)	69 (75.00)	0.020[b]
Medium (2 services)	1 (3.23)	11 (11.96)	
High (≥3 services)	0 (0.00)	12 (13.04)	
Internet connectivity speed			
Fast	6 (19.35)	24 (26.09)	0.564[b]
Average	18 (58.06)	55 (59.78)	
Slow	4 (12.90)	9 (9.78)	
No access	3 (9.68)	4 (4.35)	
Technological behaviors			
Ever used an app to communicate with doctor or therapist	8 (25.81)	41 (45.05)	0.059[a]
Communicated to doctor or therapist through text message or call	15 (48.39)	56 (60.87)	0.224[a]
Searched for health information	20 (64.52)	65 (70.65)	0.523[a]

[a] *Pearson's chi-squared test*; [b] *Fisher's exact test*

Table 4. Perceptions towards Telerehabilitation and Perceived Advantages

Perceptions	None n (%)	A bit n (%)	Sufficient n (%)	Moderate n (%)	Much n (%)
Attitude towards telerehabilitation – perceived usefulness of:					
An app allowing communication with other parents of children	11 (8.94)	17 (13.82)	35 (28.46)	20 (16.26)	**40 (32.52)**
A diary for recording the child's health status	17 (13.82)	9 (7.32)	36 (29.27)	24 (19.51)	**37 (30.08)**
An app for scheduling medical visits	14 (11.38)	9 (7.32)	43 (34.96)	**20 (16.26)**	37 (30.08)
A service for tele-visits	18 (14.63)	14 (11.38)	38 (30.89)	**18 (14.63)**	35 (28.46)
A tele-monitoring service	15 (12.20)	15 (12.20)	30 (24.39)	27 (21.95)	**36 (29.27)**
A service for transmitting tele-monitoring data to the doctor	15 (12.20)	14 (11.38)	30 (24.39)	23 (18.70)	**41 (33.33)**
A service for consulting a doctor in case of emergency	8 (6.50)	13 (10.57)	38 (30.89)	19 (15.45)	**45 (36.59)**
Reminders for medical visits	8 (6.50)	7 (5.69)	39 (31.71)	25 (20.33)	**44 (35.77)**
A service providing transmission of health data from the hospital	9 (7.32)	11 (8.94)	33 (26.83)	23 (18.70)	**47 (38.21)**
Reminders for therapy or exercises	11 (8.94)	12 (9.76)	37 (30.08)	19 (15.45)	**44 (35.77)**
A newsletter on health promotion	17 (13.82)	15 (12.20)	34 (27.64)	**25 (20.33)**	32 (26.02)
A list of home exercise program	11 (8.94)	15 (12.20)	37 (30.08)	20 (16.26)	**40 (32.52)**
A copy of nutritional recommendations	15 (12.20)	10 (8.13)	35 (28.46)	19 (15.45)	**44 (35.77)**
Perceived advantages of telerehabilitation					
Time saving	6 (4.88)	24 (19.51)	30 (24.39)	24 (19.51)	**39 (31.71)**
Cost saving	4 (3.25)	22 (17.89)	36 (29.27)	21 (17.07)	**40 (32.52)**
Improves access to Rehabilitation Medicine services	3 (2.44)	14 (11.38)	40 (32.52)	22 (17.89)	**44 (35.77)**
Able to comply more with follow-up schedule	4 (3.25)	17 (13.82)	34 (27.64)	21 (17.07)	**47 (38.21)**
Avoids tiring travels	5 (4.07)	25 (20.33)	29 (23.58)	19 (15.45)	**45 (36.59)**
Empowerment of patients to take care of their own health	2 (1.63)	13 (10.57)	38 (30.89)	19 (15.45)	**51 (41.46)**
Empowerment of families to take care of their family's health	1 (0.81)	10 (8.13)	34 (27.64)	21 (17.07)	**57 (46.34)**
Concerns on telerehabilitation					
Lack of trust	28 (22.76)	**38 (30.89)**	24 (19.51)	20 (16.26)	13 (10.57)
Loss of human contact	26 (21.14)	**31 (25.20)**	29 (23.58)	26 (21.14)	11 (8.94)
Privacy issues	**48 (39.02)**	23 (18.70)	24 (19.51)	16 (13.01)	12 (9.76)
Difficulty in using technological devices, n=122	31 (25.41)	**35 (28.69)**	22 (18.03)	21 (17.21)	13 (10.66)

can be utilized in this population for outpatient follow-up. However, nearly 17% of caregivers reported having slow speed of internet connectivity or none at all. This sample of the population would likely follow up via in-person visits or not at all. The provision of continued rehabilitation services for these patients would have implications for the Philippine health system in terms of improving access to rehabilitation services in far-flung communities and/or improving internet coverage and speed throughout the country. It is notable that although with a limited internet connection, two-thirds of the caregivers are willing to participate in a telerehabilitation visit.

With regard to the usage of apps for messaging and video calls, the majority of the population used at least one app, the most common of which is Facebook Messenger followed by Viber. This reflects the results of the survey done by the Statistica Research Department in 2021, which reported that 98% of adult internet users in the Philippines use Messenger, and Viber at 5%.[12] Use of these apps for telerehabilitation however must be balanced with privacy concerns. During the COVID-19 emergency, the US Department of Health and Human Services allowed the use of Apple FaceTime, Facebook Messenger, Google Hangouts video, Zoom, and Skype for video chats with patients, without penalty for noncompliance with the Health Insurance Portability and Accountability Act (HIPAA) rules. But with this, providers were also encouraged to inform their patients of the risks in privacy using these formats and to enable all encryptions and privacy modes during video consults.[13] A comparative study of Viber, WhatsApp, and Telegram messaging services, noted that Telegram provided the best security features among the three and is capable of synchronization, with super fast service and reliable backup features.[14] In our study, nearly half of the participants were minimally or not at all concerned about privacy issues with telerehabilitation. Frigerio et al. reported a high satisfaction rate for various platforms including Skype, WhatsApp, Meet, and Zoom used in telerehabilitation.[9] Our study also showed that utilization of video call services was associated with willingness to participate in a telerehabilitation visit.

Camden and Silva presented several factors to be considered when deciding whether to recommend telehealth or in-patient visits to families with pediatric patients.[15] Establishing therapy or relationships with young children, interventions requiring specialized equipment and hands-on approaches, and the need for in-depth assessment of tone and spasticity, leaned more toward in-patient visits, while lack of access to technology, unavailability of equipment,

and geographical proximity to the hospital together with low levels of rehabilitation service capabilities were best fit for telemedicine.[15]

For most caregivers in our study, a service or app that will allow communication with other caregivers and doctors, transmit data to and from the healthcare provider, schedule and remind therapy and medical visits, record their child's health status and provide home exercise programs, nutritional recommendations, and health promotion information is sufficiently useful. This suggests a high recognition of the purposes of electronic methods of health service delivery.

In this age of technology where gadgets are easily accessible, there is an abundance of apps developed for varied purposes. Apps have been utilized to augment therapy allowing active patient roles in health management among young children and individuals with depression.[16,17] Aside from supplementing therapy, apps have benefits in maintaining a connection with patients, enhancing patient awareness and improving their functioning, providing support for practice management, and gathering data for improvement of practice.[18] In the availability of a customized app for telerehabilitation, most participants in our study (74.79%) expressed willingness to use it. This can be one area of research in facilitating electronic health services in the Philippines.

The National Health Service (NHS) of England promotes several health apps for use in different conditions including rehabilitation and recovery.[19] These apps were tested clinically by patients and clinicians to ensure safety, reliability, and clinical assurance. Links to other apps for physical therapy, assessment, screening, and teaching are also provided by Physiopedia.[20] However, not all of these are provided for free and some are not accessible in certain global regions. In the Philippines, the government has not developed, promoted, or approved any app for purposes of telemedicine or telerehabilitation for local use, although it recognizes the value of eHealth in facilitating universal access to quality and affordable health care.[21] Developing countries like the Philippines may have challenges in improving electronic health services because of limited resources and varied government priorities.

Although many studies report the benefits of telemedicine/telerehabilitation, 16% of the participants in our study perceived telerehabilitation to have no advantage in terms of saving resources, improving access to rehabilitation services, improving follow-up consults, and empowering patients and families. Hameed et al. studied the telerehabilitation experiences of parents with children with special needs and found that most parents encountered significant difficulties during telerehabilitation.[22] Common challenges noted were behavioral issues of the child, reduced effectiveness compared to direct interventions, logistical issues, presence of multiple disabilities, and children's lack of interest in mobile phones.[22] Fears of carrying all the responsibility and having to cope on their own coupled with fears of losing progress in their child's therapy because of no access to equipment and other activities during telemedicine were some other concerns shared by other parents.[15] A study in Brazil revealed that despite fears of their children contracting the virus and developing complications, caregivers opted to go for face-to-face consults given the vulnerable conditions of their children and fears of the children becoming worse during their time away from health services.[23] These challenges and limitations encountered with telerehabilitation were also reported in the Philippines.[11]

With recognized limitations in telemedicine, the Medical Informatics Unit of the University of the Philippines Manila presented guidance to telemedicine as a support to the government's COVID-19 response.[24] Minimum competencies for practitioners and minimum set-up requirements for telemedicine were stated. The Pan American Health Organization (PAHO) also listed some considerations when using telerehabilitation which includes training regarding the use of technology by both health professionals and the users or people with disabilities, adaption, and integration of telerehabilitation into the framework of digital health, automation of administrative processes associated with telerehabilitation services, having back-up plans in case of difficulties, the adaption of educational and interventional materials, and setting up protocols for referrals to therapy whether virtual or in person.[25]

Our study has several strengths. First, it adds to the knowledge about telerehabilitation perceptions among caregivers of pediatric patients in a developing country, and presents associated sociodemographic and technological factors that influence their willingness to participate in a telerehabilitation visit. Moreover, our study included open-ended questions that allowed us to further understand caregiver concerns for their non-willingness to engage in a telerehabilitation visit.

There are also limitations in our study. The study was conducted at a COVID-referral hospital in the Philippines during the time of the COVID-19 pandemic. Due to this, there was a reduced number of admissions influencing the number and type of referrals to the Rehabilitation Medicine Department which may have affected the results of this study. This may also have influenced the types of caregivers who were available in the hospital during that time. Caregivers were required to have negative SARS-CoV-2 results on reverse transcription polymerase chain reaction (RT-PCR) testing, and have at least two doses of vaccinations against COVID-19, to avoid the risk of infection and sustain the duration of patient admission in the hospital. Distant relatives or non-relatives may have been asked to care for the patients, especially if parents have been infected with SARS-CoV-2 or were unable to stay in the hospital for other reasons. Further studies can be done to include the relationship of the participants with the patients, as this may affect their willingness to participate in telerehabilitation. Further studies can also be done to analyze how caregiver perceptions are

affected by their sociodemographic and technological profiles as these were not included in the study.

Although the questionnaire mentioned telerehabilitation consultation and therapy, it did not distinguish the caregivers' willingness to do telerehabilitation for either purpose. Differences in responses might arise if the reasons for doing telerehabilitation are differentiated, whether they are done as an initial consultation, initial monitoring after discharge, or therapy sessions.

Though greatly utilized for inpatient and outpatient rehabilitation services during the pandemic, it is uncertain what role telerehabilitation will play during the post-COVID-19 era. Current efforts towards increasing vaccinations and practicing safety protocols to combat transmission have reduced cases of the infection, and health systems are slowly shifting back to in-person visits. Further research on protocols and policies regarding its use and to address the concern on privacy, limited physical evaluation, safety, and technological issues among others need to be studied and established. Regardless, a high level of willingness to utilize telerehabilitation for the continuation of services among caregivers of pediatric patients suggests continued utilization of this method. Future studies could also conduct validity and reliability testing of the original questionnaire.

CONCLUSION

With high levels of willingness among caregivers, telerehabilitation is a viable method of providing rehabilitation services for the continuation of care after inpatient admission among pediatric patients. Limitations in its utilization include technological issues including a lack of device, low level of service use, and slow internet connectivity. Although well perceived as advantageous, there are concerns regarding loss of human contact, difficulty in using technological devices, and trust and privacy issues that may affect utilization.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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REFERENCES

1. Monaghesh E, Hajizadeh A. The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence. BMC Public Health. 2020 Aug 1;20(1):1193. doi: 10.1186/s12889-020-09301-4. PMID: 32738884; PMCID: PMC7395209.
2. Department of Health, National Privacy Commission. DOH-NPC Joint Memorandum Circular No. 2020-001 [Internet]. 2020 [cited 2022 Dec]. Available from: https://www.privacy.gov.ph/wp-content/uploads/2020/10/DOH-mc2020-0016.pdf
3. Cacioppo M, Bouvier S, Bailly R, Houx L, Lempereur M, Mensah-Gourmel J, et al. Emerging health challenges for children with physical disabilities and their parents during the COVID-19 pandemic: The ECHO French survey. Ann Phys Rehabil Med. 2021 May;64(3):101429. doi: 10.1016/j.rehab.2020.08.001. PMID: 32818674; PMCID: PMC7434423.
4. UNICEF, Council for the Welfare of Children-Subcommittee on Children with Disabilities. Situation of children with disabilities in the context of COVID19: Results of a rapid online survey in the Philippines [Internet]. 2021 [cited 2022 Apr]. Available from: https://www.unicef.org/philippines/media/2476/file/Situation of Children with Disabilities in the Context of COVID-19.pdf
5. Hall JB, Woods ML, Luechtefeld JT. Pediatric physical therapy telehealth and COVID-19: Factors, facilitators, and barriers influencing effectiveness - a survey study. Pediatr Phys Ther. 2021 Jul 1;33(3):112–8. doi: 10.1097/PEP.0000000000000800. PMID: 34086621; PMCID: PMC8212883.
6. Russo L, Campagna I, Ferretti B, Agricola E, Pandolfi E, Carloni E, et al. What drives attitude towards telemedicine among families of pediatric patients? A survey. BMC Pediatr. 2017 Jan 17;17(1):21. doi: 10.1186/s12887-016-0756-x. PMID: 28095894; PMCID: PMC5240275.
7. Albert JRG, Abrigo MRM, Quimba FMA, Vizmanos JF V. Poverty, the middle class, and income distribution amid COVID-19 [Internet]. PIDS Discussion Paper Series. 2020 [cited 2022 Mar]. Available from: https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps2022.pdf
8. Isautier JM, Copp T, Ayre J, Cvejic E, Meyerowitz-Katz G, Batcup C, et al. People's experiences and satisfaction with telehealth during the COVID-19 pandemic in Australia: Cross-sectional survey study. J Med Internet Res. 2020 Dec 10;22(12):e24531. doi: 10.2196/24531. PMID: 33156806; PMCID: PMC7732356.
9. Frigerio P, Del Monte L, Sotgiu A, De Giacomo C, Vignoli A. Parents' satisfaction of tele-rehabilitation for children with neurodevelopmental disabilities during the COVID-19 pandemic. BMC Prim Care. 2022 Jun 7;23(1):146. doi: 10.1186/s12875-022-01747-2. PMID: 35668377; PMCID: PMC9170348.
10. Mahmoud K, Jaramillo C, Barteit S. Telemedicine in low- and middle-income countries during the COVID-19 pandemic: A scoping review. Front Public Health. 2022 Jun 22;10:914423. doi: 10.3389/fpubh.2022.914423. PMID: 35812479; PMCID: PMC9257012.
11. Leochico CFD, Espiritu AI, Ignacio SD, Mojica JAP. Challenges to the emergence of telerehabilitation in a developing country: A systematic review. Front Neurol. 2020 Sep 8;11:1007. doi: 10.3389/fneur.2020.01007. PMID: 33013666; PMCID: PMC7505991.
12. Statistica Research Department. Most commonly used instant message platforms among adult internet users in the Philippines as of September 2021 [Internet]. 2021 [cited 2022 Mar]. Available from: https://www.statista.com/statistics/1271473/philippines-most-popular-instant-message-platforms/
13. US Department of Health and Human Services. Notification of enforcement discretion for telehealth remote communications during the COVID-19 nationwide public health emergency [Internet]. 2021 [cited 2022 Oct]. Available from: https://www.hhs.gov/hipaa/for-professionals/special-topics/emergency-preparedness/notification-enforcement-discretion-telehealth/index.html

14. Sutikno T, Handayani L, Stiawan D, Riyadi MA, Subroto IMI. WhatsApp, Viber and Telegram which is best for instant messaging? Int J Electr Comput Eng. 2016 Jun;6(3):909–14. doi: 10.11591/ijece.v6i3.pp909-914.
15. Camden C, Silva M. Pediatric teleheath: Opportunities created by the COVID-19 and suggestions to sustain its use to support families of children with disabilities. Phys Occup Ther Pediatr. 2021;41(1):1-17. doi: 10.1080/01942638.2020.1825032. PMID: 33023352.
16. Gindidis S, Stewart SE, Roodenburg J. Psychologists' motivations for integrating apps into therapy with secondary school-aged young people. J Psychol Couns Sch. 2020;30(1):2–12. doi: 10.1017/jgc.2019.22.
17. Stawarz K, Preist C, Tallon D, Wiles N, Coyle D. User experience of cognitive behavioral therapy apps for depression: An analysis of app functionality and user reviews. J Med Internet Res. 2018 Jun 6;20(6):e10120. doi: 10.2196/10120. PMID: 29875087; PMCID: PMC6010839.
18. APA Practice Organization. Benefits and Risks of Apps. GoodPracticeFall. [Internet]. 2015 [cited 2022 Oct];16–18. Available from: https://www.apaservices.org/practice/good-practice/2015-fall.pdf
19. Northern Devon Healthcare. NHS app reviews: Apps for recovery and rehabilitation: For survivors & clinicians [Internet]. 2022 [cited 2022 Oct]. Available from: https://www.my-therappy.co.uk/
20. Physiopedia contributors. Mobile Apps [Internet]. 2022 [cited 2022 Oct]. Available from: https://www.physio-pedia.com/Mobile_Apps
21. Lu JL, Marcelo PG, Lu SF. Policy framework analysis of eHealth and telehealth in the Philippines [Internet]. 2021 [cited 2022 Jul]. Available from: https://mefin.org/docs/Policy-Framework-Anaysis-of-eHEALTH-and-Telehealth-report_FINAL_for-publication.pdf
22. Hameed NT, Satheesan SC, Santhamma JP. Parental experiences of telerehabilitation for children with special needs: An exploratory survey. Ind Psychiatry J. 2021 Jul-Dec;30(2):272-7. doi: 10.4103/ipj.ipj_235_20. PMID: 35017811; PMCID: PMC8709514.
23. Medeiros JPB, Neves ET, Pitombeira MGV, Figueiredo SV, Campos DB, Gomes ILV. Continuity of care for children with special healthcare needs during the COVID-19 pandemic. Rev Bras Enferm. 2021 Oct 1;75(2):e20210150. English, Portuguese. doi: 10.1590/0034-7167-2021-0150. PMID: 34614106.
24. Isip Tan IT, Marcelo A, Sarmiento FI, Traboco L, Fong M, Dahildahil R, et al. Telemedicine: Guidance for physicians in the Philippines [Internet]. 2020. [cited 2022 Apr]. Available from: https://www.philippinemedicalassociation.org/wp-content/uploads/2020/05/1-Telemedicine-for-Health-Professionals.pdf
25. Pan American Health Organization. COVID-19: Digital health facilitating telerehabilitation [Internet]. 2021 [cited 2022 Oct]. Available from: https://iris.paho.org/bitstream/handle/10665.2/53203/PAHOIMSEIHCOVID-19200029A_eng.pdf?sequence=6&isAllowed=y