



Caregiver satisfaction with the use of telemedicine in the neurodevelopmental evaluation of children at the Philippine Children's Medical Center

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OBJECTIVES: This study aims to assess caregiver satisfaction with the use of telemedicine in the evaluation of children referred for neurodevelopmental evaluation at the Philippine Children's Medical Center (PCMC) Neurodevelopmental Pediatrics Clinic.

MATERIALS AND METHODS: : A survey was conducted on caregivers of pediatric patients aged 3 months to 18 years and 11 months old for neurodevelopmental evaluation. A questionnaire to determine the demographic and clinical data and Parent/Caregiver-Reported Satisfaction Form were administered via email, Facebook messenger or phone call.

RESULTS: Seventy-three caregivers completed the questionnaire. Most (95.9%) were mothers, 47.9% were college graduates with one parent working and 43% have an income of 10,000-20,000. Almost half (47.9%) of the children they care for were ages 3-months to 2-year 11-months, predominantly males, with 35.6% diagnosed with autism spectrum disorder, and 69.9% were new patients. Caregivers were very highly satisfied with telemedicine in all domains (technical functioning, comfort and perceived privacy, access to care and overall satisfaction) as it obtained a mean of 4.51 and median of 5.00. There was no significant difference in the responses based on the age of the child and type of visit.

CONCLUSION: Caregivers showed very high level of satisfaction with the use of telemedicine in the neurodevelopmental evaluation of children at PCMC and holds a significant promise for its use both within the context of the pandemic and beyond.

RECOMMENDATIONS: Further studies on caregivers' satisfaction with the use of telemedicine over a sustained period and comparing telemedicine and in-person assessment are recommended.

KEYWORDS: *Neurodevelopmental Pediatrics, Telemedicine, Satisfaction, Neurodevelopmental Evaluation*

INTRODUCTION

The coronavirus disease (COVID-19) in the Philippines is part of the worldwide pandemic caused by severe acute respiratory syndrome 2 (SARS-CoV-2).¹ To prevent exponential increase in the cases as well as the local transmission of the virus, on March 16, 2020, the government imposed an enhanced community quarantine (ECQ) in Luzon restricting the movement of population except for necessity, work, and health circumstances. Temporary closure of out-patient services of hospitals including the Philippine Children's Medical Center (PCMC) out-patient clinic, was done to prevent further spread of the diseases as well as to reallocate staffing resources to other critical care. The Department of Health (DOH) and the National Privacy Commission (NPC) developed a framework for using telemedicine services for doing medical consultations over the phone, chat, short messaging service (SMS), and other audio and visual-conferencing platforms to improve access to health services in the country. Telemedicine is defined as "the delivery of health care services, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care

providers."¹ PCMC launched their telemedicine service for General OPD last June 22, 2020, and Neurodevelopmental Pediatrics soon followed. Neurodevelopmental Pediatrics involves assessing, evaluating, diagnosing, managing and monitoring children with developmental and behavioral concerns, as well as those with school problems and parent-child challenges. As there is an increase in the number of patients being seen thru telemedicine in our clinic, a better understanding of how satisfied the caregivers feel with its use, becomes increasingly important. Caregiver satisfaction data will provide preliminary evidence for the effectiveness of the use of telemedicine, enabling the section to ascertain whether their expectations are being met as well as exposing areas that require improvements towards set standards since this is an understudied area.

Telemedicine has been used in different areas of healthcare management for several years, and several studies have highlighted its advantages including: (1) reduced waiting time; (2) immediate feedback about diagnosis and course of action; (3) increased access to specialists; and (4) increased access to multiple medical services. .⁵ Most parents expressed a high level of satisfaction and identified decreased stress to them and to their child as well as having a high likelihood of a successful medical examination due to greater cooperation by the child as benefits.⁸

Most studies showed high level of satisfaction with the use of telemedicine on both the provider and the patient's end. However, a study done by Masi et al. viewed otherwise. In this study, it pointed out that some telemedicine services were either unavailable, not feasible or ineffective for some children with neurodevelopmental disabilities.²⁴ Probable reasons identified include technological problems, the quality of the patient-provider relationship, the quality of the examination and care, safety, privacy, and accountability.²⁴ There are a number of limitations that should be taken into account in interpreting the findings of some studies mentioned. Some parents may have been unable to complete the questionnaire due to overwhelming care and work responsibilities and there is a risk of selection bias which would have an impact on the survey results. Of the few studies that have been reported on caregiver's satisfaction with telemedicine aimed at pediatric patients, none has reported in the neurodevelopmental evaluation of children with developmental disabilities in our country since it's not yet widely used in the practice prior to the pandemic.

In this study, we aimed to describe the demographic and clinical profile of caregivers and children for neurodevelopmental evaluation who utilized telemedicine, determine caregivers' satisfaction with telemedicine for neurodevelopmental evaluation in terms of the following domains: technical functioning, comfort (ease of use

and perceived privacy, access to care and overall satisfaction, and compare their responses based on the age of the child and the type of visit. We hypothesize that caregivers are generally satisfied with the use of telemedicine at our OPD.

MATERIALS AND METHODOLOGY

This is a survey conducted in PCMC from May 2022 to August 2022. The study was divided in 4 phases: development of questionnaire, translation and cross-cultural validation, validation and testing, and survey proper. Dr. Kathleen M. Myers, the principal author of the Parent-Reported Satisfaction with Telepsychiatry was contacted and consent for use in the study and translation of the form to Filipino by a linguist was requested and granted. This questionnaire was adapted for this study. The items in the form reflect 4 domains of satisfaction reported to be highly correlated with global satisfaction for pediatric telemedicine patients and these include 1) Technical functioning (items 2, 3, 5, 10); 2) Comfort of patient with the technology and perceived privacy items (items 1, 4, 6); 3) Timely, geographic access to care (items 7, 8, 9) and 4) Overall satisfaction with the telemedicine visit (Items 11 and 17.) Some items (items 12,13,14,15,16) specific for neurodevelopmental evaluation were added in the Parent/Caregiver-Reported Satisfaction Form.

The developed Parent/Caregiver-Reported Satisfaction Form was translated to Filipino by a linguist specialist. Seventeen satisfaction items were rated on a five-point Likert scale [e.g., Very Low (1) – Very High (5)] and each item is rated on how strongly he or she disagrees with the statement, with 1 representing very low satisfaction and 5 representing very high satisfaction. Another questionnaire was developed to assess the demographic and socioeconomic data and clinical characteristics of patients and their caregivers.

The developed Parent/Caregiver-Reported Satisfaction Form was tested for content validity. Four Neurodevelopmental Pediatricians reviewed the developed questionnaire for its validity. This was analyzed thru the item-level content validity index (I-CVI) which is the proportion of the experts who agreed that the item was relevant. All items showed higher than I-CVI 0.80 meaning all items were relevant thus were all included. A face validity testing was then done where each of the item was reviewed by a set of 13 caregivers of patients at the PCMC OPD. At 95% confidence level and 80% power of test, a minimum of 13 respondents was computed based on Bonett formula to have a valid Cronbach's alpha results. The Cronbach's Alpha computed at 0.7 implied that the reliability/internal consistency of the questionnaire was at an acceptable level. Also, removing any item does not increase the reliability to 0.8 or 0.9, hence all items were

retained. The validated questionnaire was administered to another set of 13 caregivers from the PCMC OPD and a retest was done after 7 days to establish the test-retest reliability. Reliability was measured by internal consistency which measures how well each item correlates with other items in the scale. Internal consistency or the relatedness of items within a factor was assessed also using Cronbach's alpha where a value of >0.70 was considered an acceptable internal consistency and reliability. The resulting correlation coefficient obtained was 0.777 which falls on an acceptable level.

All patients 3 months to 18 years and 11 months referred to Neurodevelopmental Pediatrics and those previously seen and scheduled for follow-up were identified. Participants who have not been the child's primary caregiver for at least 6 months were excluded in the study. Target minimum sample of 41 participants was required based on the study of Morgan (2014)¹² where the estimated satisfaction level is around 88%. Additionally, 5% level of significance and 10% desired half-width of the confidence interval. Respondents who met the inclusion criteria were informed about the study. They were then asked if they were willing to participate in this study, and once they agreed the patient's caregiver was then asked to sign a consent form to signify their intention of joining the study. The informed consent was given through several methods, depending on the availability and means of the participants.

The participants were asked to write their consent, affix their signature, and send to an e-mail address that was specifically made for this study as a pdf file or a picture. For caregivers with limited technological capability, informed consent was obtained via a recorded phone call. Once the informed consent was signed and sent, the demographic and socio-economic questionnaire was sent either via e-mail or Facebook messenger or obtained through an interview. After the evaluation, the caregiver was asked to answer the Parent/Caregiver - Reported Satisfaction with Telemedicine Form through interview or via Facebook messenger and e-mail or phone call.

Descriptive statistics such as frequency and percentage were used to present categorical data, while mean and median was utilized for presenting the Likert scale items. In comparing the satisfaction according to the patient's profile, F test through One Way ANOVA was used. Level of significance is at 5%, and Medcalc Statistical software was used to carry out statistical calculations.

RESULTS

A total of 73 caregivers who have participated in telemedicine consults were included in the study. The children that they take care of were from 3 months to 2 years and 11 months (47.9%) while 30.1% were from 3 years to 5 years and 11 months. There were slightly more males (64.4%) and around 70% of them were new patients. Moreover, most of the caregivers were mothers (95.9%), being the primary caregiver themselves. Based on marital status, 60.3% of them were married while 31.5% were common-law. On educational attainment, almost half of them (47.9%) were able to finish their college education, while 26% were able to finish high school. Around 53% of the respondents were unemployed, while 37% were employed. Based on monthly income, most of the respondents earn around 10,000 to 20,000 (43.8%) while 21.9% of them earn less than 10,000. Furthermore, 63% of the patients only have one parent working, while 34.2% have both parents working.

Table 1. Demographic and Clinical Profile of Caregivers and Children for Neurodevelopmental Evaluation Who Utilize Telemedicine

Clinical Profile	Values
	Frequency (%); Mean \pm SD
Age (years)	
3 month to 2 years and 11 months	35 (47.9)
3 to 5 years and 11 months	22 (30.1)
6 to 9 years and 11 months	11 (15.1)
10 years old and above	5 (6.8)
Gender, n, %	
Male	47 (64.4)
Female	26 (35.6)

Classification, n, %	51 (69.9)
New	22 (30.1)
Follow up	
Diagnosis	
Autism Spectrum Disorder	26 (35.6)
Global Developmental Delay	19 (26.0)
Infant at Risk for Development Delay	15 (20.5)
Others	13 (17.8)
Relationship to Child	
Father	1 (1.4)
Maternal Aunt	1 (1.4)
Mother	70 (95.9)
Others: Grandmother	1 (1.4)
Primary caregiver	
Father	3 (4.1)
Helper	1 (1.4)
Myself	46 (63.0)
Myself and Partner	6 (8.2)
Others	17 (23.3)
Marital Status	
Common-law	23 (31.5)
Married	44 (60.3)
Others: Boyfriend	1 (1.4)
Separated	5 (6.8)
Educational Attainment	
College Graduate	35 (47.9)
College Undergraduate	11 (15.1)
High School Graduate	19 (26.0)
Vocational Graduate	6 (8.2)
Vocational Undergraduate	2 (2.7)
Employment status	
Employed	27 (37.0)
Self employed	7 (9.6)
Unemployed	39 (53.4)
Monthly income	
< 10,000	16 (21.9)
10,000 - 20,000	32 (43.8)
20,000 - 30,000	12 (16.4)
30,000 - 40,000	8 (10.9)
40,000 - 50,000	2 (2.7)
50,000 - 60,000	1 (1.4)
Number of parents working	
One	46 (63.0)
Both	25 (34.2)
None	2 (2.7)

Table 2 reveals that the caregivers were very highly satisfied overall with their telemedicine visit as it obtained a mean of 4.51 and median of 5.00. All of the items show mean overall scores above 4.0 on a 5-point Likert across all domains. Similarly, they are also very highly satisfied with their telemedicine visit in terms of its technical functioning as it obtained a median of 5.0 and mean of 4.62. Furthermore, with resulting median of 5.0 and mean of 4.75, parents/caregivers are also very highly satisfied in terms of the comfort of patient and provider with technology, and perceived privacy. On timely, geographic access to care, it also resulted to a median of 5.0 and mean of 4.79 also implying very high level of satisfaction. Among all the items, the highest obtained mean is 4.89 which is being able to understand the specialist's recommendation and sufficiency information about their child's diagnosis given by the clinician. On the other hand, the item having the lowest obtained mean of 4.42 is about telemedicine visit being as good as the regular in-person visit. However, this item remained to have very high satisfaction rating.

Table 2. Caregivers' Satisfaction With Telemedicine For Neurodevelopmental Evaluation

	Median	Mean	Interpretation
Technical Functioning	5.00	4.62	Very High
Nakikita ko nang mabuti ang espesyalista	5.00	4.68	Very High
Naririnig ko nang mabuti ang espesyalista	5.00	4.49	Very High
Naiintindihan ko ang rekomendasyon ng espesyalista	5.00	4.89	Very High
Kasing buti ng karaniwang personal na pagbisita ang pagbisita sa telemedicine	5.00	4.42	Very High
Comfort of Patient and Provider with Technology and perceived privacy	5.00	4.75	Very High
Komportable akong nakapagtatanong sa espesyalista	5.00	4.81	Very High
Tiwala akong hindi naririnig ng ibang nasa kuwarto ang impormasyon ukol sa aking anak	5.00	4.67	Very High
Naramdaman kong komportable ang espesyalista na makita ang aking anak sa harapan ng screen	5.00	4.78	Very High
Timely, Geographic access to care	5.00	4.79	Very High
Dahil sa Telemedicine, nagawang makipagkita kaagad sa isang espesyalista ang aking anak	5.00	4.84	Very High
Kung wala ang telemedicine, hindi makatatanggap ng serbisyo ng isang espesyalista ang aking anak	5.00	4.74	Very High
Makatatanggap ng tulong na kinakailangan ang aking anak dahil sa aming pagbisita sa telemedicine sa isang espesyalista	5.00	4.79	Very High
Overall Satisfaction with Telemedicine Visit	5.00	4.77	Very High
Sa hinaharap, payag akong makita muli ng isang espesyalista ang aking anak gamit ang telemedicine	5.00	4.51	Very High
Nagawang maipaliwanag ng espesyalista kung paano isasagawa ang pagsusuring neurodevelopmental	5.00	4.79	Very High
Isinagawa sa isang maayos na pamamaraan ang pagsusuring neurodevelopmental	5.00	4.68	Very High
Malinaw na ipinaliwanag sa iyo ang resulta ng pagsusuring neurodevelopmental	5.00	4.88	Very High
Nagbigay ng sapat na impormasyon ang espesyalista ukol sa pagsusuri sa iyong anak	5.00	4.89	Very High
Tinalakay ang medikal na pagsusuri at iba't ibang paraan ng panggagamot	5.00	4.81	Very High
Sa pangkalahatan, nasiyahan ako sa kalidad ng mga serbisyong ibinigay ng telemedicine	5.00	4.85	Very High

Table 3 shows that there is no significant difference on the level of satisfaction in terms of technical functioning, comfort and perceived privacy, access to care and overall satisfaction with telemedicine visit when grouped according to age of child, gender of child and classification of patient. A comparison of the responses of the caregivers based on the age of the child and the type of visit also showed no significant difference.

Table 3. Comparison of Satisfaction According to Age of the Child and Type of Visit

Table 3.1 TECHNICAL FUNCTIONING

	Median	Mean	p value
Age (years)			
3 months to 2 years and 11 months	4.5	4.54	0.3448 ^{ns}
3 to 5 years and 11 months	4.75	4.74	
6 to 9 years and 11 months	5	4.73	
10 years old and above	4.75	4.5	
Gender, n, %			
Male	4.75	4.54	0.2394 ^{ns}
Female	4.75	4.67	
Classification, n, %			
New	4.75	4.63	0.8502 ^{ns}
Follow up	4.75	4.61	
Diagnosis			
Autism Spectrum Disorder	4.69	0.36	0.710 ^{ns}
Global Developmental Delay	4.63	0.44	
Infant at Risk for Development Delay	4.53	0.44	
Others	4.58	0.56	
Primary caregiver			
Father	4.75	4.5	0.4018 ^{ns}
Helper	3.5	3.5	
Myself	4.75	4.66	
Myself and Partner	4.88	4.67	
Others	4.75	4.59	
Marital Status			
Common-law	4.75	4.61	0.4219 ^{ns}
Married	4.75	4.63	
Others: Boyfriend	4	4	
Separated	5	4.8	
Educational Attainment			
College Graduate	4.75	4.64	0.2968 ^{ns}
College Undergraduate	4.75	4.77	
High School Graduate	4.75	4.62	
Vocational Graduate	4.63	4.54	
Vocational Undergraduate	3.88	3.88	

Employment status			
Employed	4.75	4.58	0.0422*
Self employed	5.0	4.96	
Unemployed	4.5	4.59	
Monthly income			
<10,000	5	4.75	0.712 ^{ns}
10,000 - 20,000	4.63	4.54	
20,000 - 30,000	4.88	4.56	
30,000 - 40,000	4.88	4.69	
40,000 - 50,000	4.88	4.88	
50,000 - 60,000	4.75	4.75	
Don't know	4.75	4.75	
Number of parents working			
One	4.75	4.63	0.2604 ^{ns}
Both	5.00	4.63	
None	4.25	4.25	

*Significant, ns not significant

Table 3.2 COMFORT AND PERCEIVED PRIVACY

	Median	Mean	p value
Age (years)			
3 months to 2 years and 11 months	5.00	4.68	0.6509 ^{ns}
3 to 5 years and 11 months	5.00	4.85	
6 to 9 years and 11 months	5.00	4.88	
10 years old and above	5.00	4.6	
Gender, n, %			
Male	5.00	4.65	0.6489 ^{ns}
Female	5.00	4.81	
Classification, n, %			
New	5.00	4.75	0.4533 ^{ns}
Follow up	5.00	4.76	
Diagnosis			
Autism Spectrum Disorder	4.79	0.31	0.545 ^{ns}
Global developmental delay	4.76	0.42	
Infant at Risk for Development delay	4.60	0.70	
Others	4.82	0.45	
Primary caregiver			
Father	5.00	4.89	0.9771 ^{ns}
Helper	5.00	5.00	
Myself	5.00	4.72	
Myself and Partner	5.00	4.83	
Others	5.00	4.76	

Marital Status			
Common-law	5.00	4.71	0.0694 ^{ns}
Married	5.00	4.79	
Others: Boyfriend	3.00	3.00	
Separated	5.00	5.00	
Educational Attainment			
College Graduate	5.00	4.77	0.8195 ^{ns}
College Undergraduate	5.00	4.79	
High School Graduate	5.00	4.74	
Vocational Graduate	5.00	4.78	
Vocational Undergraduate	4.33	4.33	
Employment status			
Employed	5.00	4.74	0.1767 ^{ns}
Self employed	5.00	5.00	
Unemployed	5.00	4.72	
Monthly income			
<10,000	5.00	4.71	0.9720 ^{ns}
10,000 - 20,000	5.00	4.75	
20,000 - 30,000	5.00	4.72	
30,000 - 40,000	5.00	4.83	
40,000 - 50,000	5.00	5.00	
50,000 - 60,000	5.00	5.00	
Don't know	4.67	4.67	
Number of parents working			
One	5.00	4.73	0.6310 ^{ns}
Both	5.00	5.00	
None	5.00	4.75	

*Significant, ns not significant

Table 3.3 ACCESS TO CARE

	Median	Mean	p value
Age (years)			
3 months to 2 years and 11 months	5.00	4.81	0.1598 ^{ns}
3 to 5 years and 11 months	5.00	4.82	
6 to 9 years and 11 months	5.00	4.91	
10 years old and above	4.00	4.27	
Gender, n, %			
Male	5.00	4.79	0.9274 ^{ns}
Female	5.00	4.79	
Classification, n, %			
New	5.00	4.78	0.3568 ^{ns}
Follow up	5.00	4.82	

Diagnosis			
Autism Spectrum Disorder	4.81	0.37	
Global developmental delay	4.69	0.42	0.369 ^{ns}
Infant at Risk for Development delay	4.91	0.20	
Others	4.76	0.43	
Primary caregiver			
Father	5.00	4.89	
Helper	5.00	5.00	
Myself	5.00	4.78	0.9707 ^{ns}
Myself and Partner	5.00	4.83	
Others	5.00	4.78	
Marital Status			
Common-law	5.00	4.88	
Married	5.00	4.73	0.2699 ^{ns}
Others: Boyfriend	4.33	4.33	
Separated	5.00	4.93	
Educational Attainment			
College Graduate	5.00	4.80	
College Undergraduate	5.00	4.73	
High School Graduate	5.00	4.84	0.6347 ^{ns}
Vocational Graduate	5.00	4.83	
Vocational Undergraduate	4.83	4.33	
Employment status			
Employed	5.00	4.80	
Self employed	5.00	5.00	0.1421 ^{ns}
Unemployed	5.00	4.74	
Monthly income			
< 10,000	5.00	4.81	
10,000 - 20,000	5.00	4.82	
20,000 - 30,000	5.00	4.69	
30,000 - 40,000	4.83	4.71	0.8520 ^{ns}
40,000 - 50,000	5.00	5.00	
50,000 - 60,000	5.00	5.00	
Don't know	4.67	4.67	
Number of parents working			
One	5.00	4.78	
Both	5.00	4.80	0.9178 ^{ns}
None	4.83	4.83	

*Significant, ns not significant

Table 3.4 OVERALL SATISFACTION

	Median	Mean	p value
Age (years)			
3 months to 2 years and 11 months	5	4.75	0.6665 ^{ns}
3 to 5 years and 11 months	5	4.81	
6 to 9 years and 11 months	5	4.88	
10 years old and above	4.86	4.54	
Gender, n, %			
Male	5	4.69	0.8200 ^{ns}
Female	5	4.82	
Classification, n, %			
New	5	4.78	0.9212 ^{ns}
Follow up	5	4.75	
Primary caregiver			
Father	5.00	4.95	0.6329 ^{ns}
Helper	4.43	4.43	
Myself	5.00	4.73	
Myself and Partner	4.86	4.88	
Others	5.00	4.83	
Marital Status			
Common-law	5.00	4.79	0.3162 ^{ns}
Married	5.00	4.79	
Others: Boyfriend	3.00	3.00	
Separated	4.86	4.89	
Educational Attainment			
College Graduate	4.86	4.71	0.4519 ^{ns}
College Undergraduate	4.71	4.79	
High School Graduate	5.00	4.83	
Vocational Graduate	5.00	4.95	
Vocational Undergraduate	4.79	4.79	
Employment status			
Employed	4.86	4.75	0.0597 ^{ns}
Self employed	5.00	5.00	
Unemployed	5.00	4.75	
Monthly income			
<10,000	5.00	4.78	0.5320 ^{ns}
10,000 - 20,000	5.00	4.77	
20,000 - 30,000	5.00	4.82	
30,000 - 40,000	4.86	4.80	
40,000 - 50,000	4.86	4.86	
50,000 - 60,000	5.00	5.00	
Don't know	4.14	4.14	
Number of parents working			
One	5.00	4.78	0.6329 ^{ns}
Both	5.00	4.75	
None	4.93	4.93	

*Significant, ns not significant

DISCUSSION

Measurement of satisfaction has become an important indicator of the performance and outcome of medical services. The primary purpose of measuring the experience and satisfaction with telemedicine is to inform quality improvement efforts at our clinic especially now that there is an increase in its use. It can also reveal important problems like gaps in provider-patient communications that can have broad implications for clinical quality. Implementing a process of quality improvement can increase the likelihood that telemedicine programs will contribute to patient-centered care and be sustained.¹⁵ While it has previously been reported that there are high levels of patient satisfaction with the use of telemedicine in adult patients, there is limited research exploring caregiver satisfaction among pediatric cohorts, in particular children with complex care needs such as those with neurodevelopmental disabilities since it is not commonly practiced in our healthcare setting until the start of the pandemic.¹³ Research shows that patients who have positive experiences are more likely to adhere to medical advice and treatment plans, and experience better health outcomes increasing engagement in and adherence to care.¹⁴ This paper provided a systemic assessment of caregivers satisfaction with the use of telemedicine in the neurodevelopmental evaluation of children at PCMC.

In this study, the demographic and clinical profile of caregivers and children who underwent neurodevelopmental evaluation thru telemedicine were obtained and questionnaires were accomplished by the caregivers. The age range of most of the children that caregivers attend to were from 3 months to 2 years and 11 months, consisting of 47.9% of the participants, with a slightly male predominance (64.4%.) Most of the caregivers were mothers (95.9%) who were also the primary caregiver. Most of them were married (60.3%) and college graduates. Fifty-three percent (53%) of the respondents were unemployed. For those who are employed, the average income they receive is from 10,000 – 20,000 per month with only one parent working. As expected, the most common diagnosis was autism spectrum disorder followed by Global Developmental Delay.

The results of this study showed that caregivers are generally satisfied with the services provided by telemedicine in the neurodevelopmental evaluation of children at our institution. This study identified four domains of satisfaction reported to be highly correlated with global satisfaction for pediatric telemedicine and these are technical functioning, comfort of patient and provider with technology, perceived privacy, timely, geographic access to care, and overall satisfaction. All the respondents had a high level of satisfaction for all the domains mentioned.

Perhaps these results suggest that caregivers are becoming comfortable with the use of telemedicine. In terms of the caregiver's responses with the use of telemedicine based on the age of the child and the type of visit, there is no significant difference on the level of satisfaction in terms of all domains. This result may not be too surprising, as one of the main reasons for increased use of telemedicine services is driven by necessity since it presented an avenue for the patients to have continuity of care during this unprecedented time. It is bridging the gap between patients, providers, and healthcare systems during this pandemic, enabling communication through virtual channels while staying at home.¹⁶

Findings also have important implications for the feasibility and acceptability of telemedicine, in addition to key factors to consider in optimizing and sustaining telemedicine neurodevelopmental evaluations beyond the COVID-19. In a study done by Vargas et al. on the feasibility and acceptability of telemedicine among caregivers at the PCMC Neurodevelopmental Pediatrics clinic, it has indicated that the participants showed willingness to use telemedicine in their children's evaluation, follow-up and for other medical and allied services. Reasons include reduced cost and time for travel and preparations for the appointment and to limit exposure to infections.¹⁷ As telemedicine symbolizes the feasibility and practicality of an alternative

mode of healthcare in the Neurodevelopmental Pediatrics OPD, caregiver satisfaction needs to be taken into consideration, as this mode of healthcare will be practiced for a long time especially during the time of pandemic.⁶ Telemedicine use and satisfaction are influenced by a number of factors including safety during the pandemic, privacy, convenience and accessibility and availability of more avenues of communication. Hilgart et al. (2012) found common factors of satisfaction with technology, education and information provided, communication and avoidance of patient travel.¹⁹ In a study done by Orlando et al. (2019), patient satisfaction in healthcare has been shown to be closely associated to improved patient engagement and treatment compliance for multiple different chronic and acute healthcare conditions.²⁰ In a local study (Pasco 2016), the findings showed that there was high satisfaction rating by both the healthcare providers and the patients.¹⁸ Some studies viewed that patients were generally satisfied with telemedicine services, with most reporting that this was an efficient and convenient alternative to face-to-face consultations. In a study done by Myers et al. in 2007 on Child and Adolescent Telepsychiatry, they reported that parent's satisfaction was high across patients' age and increased with return appointments which is similar to the findings of our study.²¹ In another large cross-sectional survey study with 1734 patients, 95% were very satisfied

with telehealth quality and found telemedicine to be comparable, if not better than in-office visits with healthcare providers.²²

Other studies involved not only patient satisfaction but also that of the healthcare provider. These studies conducted during the pandemic examined provider satisfaction with neurodevelopmental telehealth evaluation in children and revealed that most providers are satisfied and comfortable with the process.²³ Similar to other studies reviewed, the reasons for their satisfaction include logistical convenience of the telemedicine assessment, ease of administration, rapport with and expertise of the clinicians, and qualification for intervention services.²³ However, the caregiver satisfaction with the telemedicine platform varies, and many of them still reported a preference for in-person visits compared to telemedicine consultation. Our study is only limited to determining the satisfaction of caregivers and not those of the provider. Nevertheless, our result is consistent with studies presented with the participants showing high level of satisfaction with the use of telemedicine services.

Most of the studies reviewed showed high level of satisfaction with the use of telehealth services on both the provider and the patient's end. However, there was one study conducted that viewed otherwise. In a study done by Masi et al. on the Impact of COVID-19 pandemic on the well-being of children with neurodevelopmental disabilities

and their parents, it pointed out that some telemedicine services were either unavailable, not feasible or ineffective for some children with neurodevelopmental disabilities.²⁴ Some respondents from this study had low ratings of effectiveness, satisfaction, and practitioner confidence with telehealth services received. Probable reasons identified include technological problems, the quality of the patient-provider relationship, the quality of the examination, quality of care, safety, privacy, and accountability.²⁴ Technical difficulties related to devices, interfaces and internet connectivity have frustrated both providers and patient families as many families simply do not have reliable internet access.⁴ There are several implications resulting from these findings. It is essential that there is ongoing service delivery for children and families, especially in the event of more future lockdowns. This includes providing families with technological support and training practitioners in the effective use of telemedicine services for children with neurodevelopmental disabilities. Given the impact of COVID-19 on child and caregiver well-being, targeted services supporting children with neurodevelopmental disabilities and their families are clearly needed.

Even if not directly assessed by our study, the direct experience during the pandemic seems to show that telemedicine produces positive effects for both children and their families.

On the patient's side, telemedicine consultation promoted and enabled continuity of care, maintained social contacts with the physician, and reduced the risk of being exposed to the coronavirus. This complements the widely held view that telemedicine can play an important role to avoid the inconvenience of travel and to avoid exposure to the virus.² Given caregivers' satisfaction with telemedicine, health services could feel confident that this form of service enables health care for patients who cannot leave their home because of the restrictions as well as those in rural and remote areas.²⁰ While telemedicine does not replace face-to-face appointments, it does offer an alternative mode that when integrated into an established service could form part of patient choice when clinically safe and appropriate. Aligning a health care service with caregiver' expectations and needs can lead to overall patient satisfaction.

In summary we showed that telemedicine has an overall positive impact on caregivers' satisfaction in the neurodevelopmental evaluation of children at the PCMC Neurodevelopmental Pediatrics OPD. Despite this being the first time that telemedicine was implemented, the results showed high levels of response to this new service. The result offers reassurance to healthcare professionals that appropriate and satisfactory care and support is being provided through virtual means. This form of consultation is a very adaptable measure for

our future service provision.

Given that the current literature of caregiver satisfaction with telemedicine in our country is limited, additional research including comparing the use of telemedicine and in-person assessment can be done, as well as a follow up investigation of caregivers' satisfaction with telemedicine over the long term.

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