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ORIGINAL PAPER

Advancing Home Based Parenting Programs through the Use of Telehealth Technology

Dorian E. Traube[1] · Hsin-Yi Hsiao[1] · Angela Rau[2] · Donna Hunt-O'Brien[2] · Linxi Lu[2] · Nadia Islam[1]

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Abstract

Objectives Home-based parenting programs have demonstrated impact on the prevention of child maltreatment, promotion of child screening and health care, and increased school readiness. However, cost and time resources make access to home-based parenting programs limited. Telehealth delivery systems may help to fill this gap, reducing barriers and expanding the reach of home-based parenting programs.

Methods This manuscript describes a pilot feasibility study focusing on model fidelity for delivering a home-based parenting program (Parents as Teachers) via a university-based telehealth interactive video conferencing technology.

Results Results indicate that the program was able to meet all fidelity measures related to supervision, training, and curriculum delivery. On average, families remained in the program for 5 months and received 11 personal visits, indicating that engagement via a computer mediated program is shorter but more intense than on-ground models.

Conclusion Issues of recruitment and retention are described along with recommendations for using the continuum of care and social media to increase access to home based parenting programs services.

Keywords Home visitation · Telehealth · Parents as Teachers · Engagement · Parenting programs

Significant barriers exist to engaging families in home-based parenting programs, including low levels of involvement, or disengagement (Foulon et al. 2015). Disengagement causes parent support providers to spend valuable and scarce time and resources trying to reengage families. Disengagement, particularly when it occurs early in a program, may also undermine the effectiveness of home-based parent support services. Major engagement challenges include busy work schedules, lack of privacy at home to discuss sensitive issues (Kitzman et al. 2010), other family members refusing visitors in the home (Feil et al. 2005), parents losing interest in services over time, and limited means to connect with other families in the community (Richter et al. 2017). Identifying factors that enhance and promote engagement is essential to meeting the needs of families in home-based parenting programs (Richter et al. 2017).

Research on computer-mediated interventions has shown promising results (McGinty et al. 2006; Tan and Lai 2007). Currently, telemedicine technologies are improving access to hard-to-reach populations and supporting their urgent medical and behavioral health needs (Feil et al. 2008; McGinty et al. 2006; Nieuwboer et al. 2013; Tan and Lai 2007). Parents living in remote areas are receiving needed support with low-birth-weight newborns (Tan and Lai 2007), occupational therapy, and child psychiatric care (McGinty et al. 2006). As such, utilizing telehealth technologies has the potential to ease barriers of engagement and retention by making access and attendance easier for families through schedule flexibility, comfort, and reduced travel barriers.

Because the current generation of parents has an unprecedented level of comfort with web-based technology, telehealth delivery systems may be an important tool to address participation in home-based parenting programs. A feasibility study of web-based parent training showed high rates of engagement and completion with 95% of mothers reporting the program being easy to use (Baggett et al. 2010; Feil et al. 2008). Another feasibility study of a web-

✉ Dorian E. Traube
traube@usc.edu

[1] Suzanne Dworak-Peck School of Social Work, University of Southern California, 669W 34th Street, Los Angeles, CA 90089, USA

[2] Parents as Teachers National Center, St. Louis, MO, USA

based parenting program with low-income, ethnic minority families suggested delivering evidence-based programs via the internet is a viable approach (Breitenstein and Gross 2013). Yet presently, there are no identified home based parenting programs being delivered entirely through a live videoconferencing platform. This manuscript describes the development and feasibility pilot of Parents as Teachers @ USC Telehealth. By adapting an evidence-based home based parenting program for delivery via a telehealth platform, this program has the potential to make services available to more families, giving the program a wide reach and destigmatizing access to an intervention that can improve child developmental outcomes and family well-being.

Advancing Technology in Home Based Parenting Programs

Parents as Teachers

Parents as Teachers (PAT) is one of 20 home visiting models designated as evidence-based by the U.S. Department of Health and Human Services (Sama-Miller et al. 2017). The PAT model (see Fig. 1) includes one-on-one home visits, monthly group meetings, developmental screenings, and linkages and connections for families to needed resources. The goal of the PAT program is to provide parents with child development knowledge and parenting support, provide early detection of developmental delays and health issues, prevent child abuse and neglect, and increase children's school readiness. A recent randomized controlled trial reported significant improvement of maternal and child outcomes for those that received PAT (Neuhauser et al. 2018). Maternal outcomes included increased parenting skills and sensitivity to children, increased social integration, and accessing libraries and community centers more often. Children demonstrated better adaptive behavior, demonstrated higher levels of self-control, scored significantly higher on cognition and language development, and demonstrated greater vocabulary. Furthermore, PAT provides early detection of developmental delays and health issues. PAT children were five times more likely to be fully immunized and were more likely to meet American Academy of Pediatrics well-child visit recommendations (Wagner et al. 2001). Further, children who participate in PAT are less likely to experience child maltreatment. A study of 8000 children showed a 22% decreased likelihood of child maltreatment substantiations for PAT families compared to non-PAT families (Chaiyachati et al. 2018). This confirms earlier evidence that participation in PAT was related to 50% fewer cases of suspected abuse and/or neglect (Chaiyachati et al. 2018). Finally, PAT involved children have demonstrated increases in school readiness and success. A recent analysis comparing children participating in PAT to children who did not receive PAT services found those with PAT participation had significant positive findings on third grade standardized tests English Language Arts, Math, Phonics, Comprehension, and Reading and Language (Lhati et al., 2019). Additionally, absence rates were significantly less for PAT children each year for the last 3 years compared to

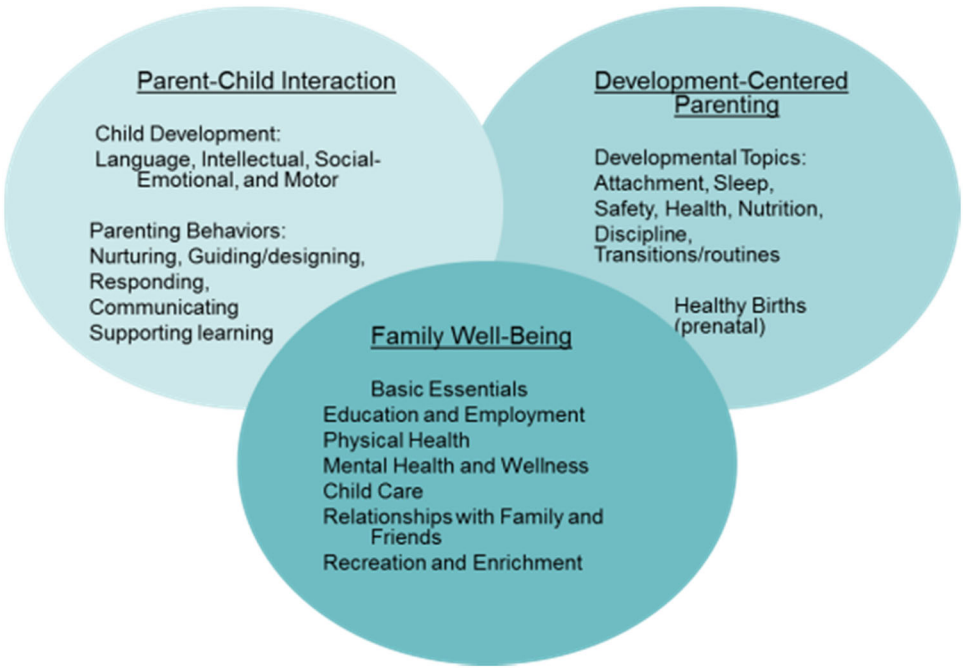

Fig. 1 Parents a Teachers Model

non-PAT children (Lhati et al., 2019). The PAT model (see Fig. 1) includes one-on-one home visits, monthly group meetings, developmental screenings, and linkages and connections for families to needed resources.

USC Telehealth

The USC Telehealth Clinic (USCTH) is a virtual telemental health clinic operated by the Suzanne Dworak-Peck School of Social Work at the University of Southern California. The clinic is a research and teaching unit in the school that is staffed by faculty members who are licensed clinical social workers and social work students who are completing their master's degree in social work and a training placement in USCTH. The clinic also offers navigators who assist clients with making appointments and accessing the videoconferencing technology for their online sessions. Standard services include evidence-based, empirically supported interventions such as cognitive behavioral therapy, motivational interviewing, and Seeking Safety. USCTH has been serving clients since January 2013. USCTH clients meet their mental health provider via live videoconferencing technology that is HIPAA compliant and offers federal-level encryption that protects both the provider and client while connected to the virtual session. USCTH has developed unique and highly effective best practices in the delivery of virtual psychotherapy services from the standpoints of ease of use, building trust and rapport with clients through the telehealth platform, and achieving measurable symptom improvements in clients after engaging in its services.

Curriculum Description and Adaptations

Parents as Teachers @ USC Telehealth

The PAT National Center and USCTH partnered to deliver the evidence-based PAT Foundational Curriculum (Parents as Teachers 2015) for families with children prenatal through 3 years of age entirely through videoconferencing technology. The partnership afforded both organizations the opportunity to test the delivery of an evidence-based prevention intervention in a telehealth clinic. It additionally afforded social work interns the opportunity to be certified in both evidence-based mental health treatments and an evidence-based home based parenting programs model. Additional terms of this partnership included delivery of the PAT model with fidelity, serve families for at least 2 years, and certify all providers as PAT parent educators. To be designated as a PAT affiliate, USCTH completed an application process to determine appropriate staffing, budget, and program design to implement the essential requirements with fidelity and quality.

Training

To become certified parent educators and deliver the PAT curriculum, all USCTH social work interns completed 40 h of PAT Foundational and Model Implementation training. The training was delivered by certified national trainers from the PAT National Center through a hybrid approach of in-person and live, online training using the same video conferencing platform on which parent educators met families. Interns also completed 80 h of telehealth training, including use of electronic medical records, assessment, best standards in practice, crisis management, mandated child maltreatment reporting, and policies and procedures. All telehealth trainings were conducted through live video conferencing.

Fidelity and model integrity were maintained through ongoing technical assistance from the PAT virtual parent education specialist, and director of expansion and implementation. The goal of this assistance was to optimize adherence to the model requirements, support stages of implementation, and allow for necessary adaptations to virtual service delivery.

Service Delivery

To maintain fidelity to PAT implementation standards and preserve model affiliate status, Parents as Teachers @ USC Telehealth provided families personal visits, group connections, screening, assessments, goal setting, and a resource network. These model elements are described in detail below.

Personal visits

Virtual personal visits were designed to last approximately 1 h and occur at least twice a month, but preferably weekly. PAT's research-based foundational curricula and evidence-based practices of partnering, facilitating, and reflecting allowed parent educators to follow the lead of families, thus individualizing content and practices. Parent educators planned and administered virtual personal visits based on parents' individual culture, languages spoken in the home, needs, interests, learning style, input, and behavioral indicators identified through the implementation of the Evolution of a Helping Relationship process (e.g., orientation, acceptance, agreement, and reflection; Parents as Teachers 2015). Every personal visit addressed all areas of emphasis: parent–child interaction, development-centered parenting, and family well-being.

Group connections

Monthly virtual group connections created an environment in which families could expand their social capital and exchange support with other families. Families and parent educators met as a group for approximately 60 min via the telehealth clinic videoconferencing platform. Use of videoconferencing is a novel approach, addressing barriers to transportation and scheduling. Parent surveys and personal visit conversations with parents drove the topics for monthly group connections. Topics have included introducing solid foods, how to find reliable child care options, how to find indoor recreation options during harsh weather, infant massage, lactation support, the importance of play, and targeted groups for Spanish-speaking clients.

Screening

Ensuring that every child, parent, and family is informed by the child's strengths and areas for growth, parent educators administered child health and developmental screenings and connected parents to a provider for their child's hearing and vision screenings. A complete screening includes developmental screening using the Ages and Stages Questionnaire-3 (Squires and Bricker 2009) and Ages and Stages Questionnaire-SE (Squires et al. 2002), along with completion of a health review that includes a record of hearing, vision, and general health status. Parents received verbal and electronic written summaries of developmental screening results, including information about the next stages of development and strategies to promote development. Parent educators monitored and recorded children's achievement of developmental milestones.

Assessments

Family-centered assessments were completed with every family in the Parents as Teachers @ USC Telehealth program. In keeping with the standard recommendations from the Health Resources and Services Administration for Maternal, Infant, and Early Childhood Home Visitation programs, the program uses the Life Skills Progression Model (Wollesen and Peifer 2006) to assess family-level domains including relationships, education and employment, parent and child health, mental health, and substance use, and basic essentials. Parent educators also evaluated the quality of parent–child interactions using the Parenting Interactions with Children: Checklist of Observations Linked to Outcomes tool (Roggman et al. 2009), which assesses domains of affection, responsiveness, encouragement, and teaching. Finally, parents complete the Patient Health Questionnaire 9 (Kroenke et al. 2001) to assess for depression and the Parent Stress Index Short Form (Abidin 1990) to assess for parent stress. See Table 1.

Goal setting

Information gleaned from the screenings and assessments informed parent and family goals, a fundamental component of PAT. Parent educators facilitated goal setting and documented goals with each family.

Resource network

Parent educators provided linkages to web-based and on-ground local community resource networks. Referrals included services for well-baby checks, immunizations, hearing and vision screening, parental mental health, and domestic violence services. Unique to Parents as Teachers @ USC Telehealth program was the ability to refer parents who are experiencing mental health difficulty for free mental health care in the USCTH clinic.

Programmatic requirements

Additional program offerings for Parents as Teachers @ USC Telehealth included requiring parent educators 2 h of group supervision per week and 1 h of individual reflective supervision twice a month. Supervision was used to facilitate case discussions and provide opportunities to address role, ethics, boundaries, skill development, and effective use of PAT curricula. A staff meeting was held once a month to cover program operations issues (e.g., outreach procedures, documentation, group connections planning, etc). Expert consultation with the PAT National Center staff occurred as needed and included topics such as: (1) working with more than one child during a personal visit, and (2) the unique challenges of being a male parent educator. As required by PAT for all affiliates the Parents as Teachers @ USC Telehealth created an advisory committee that included an implementation scientist, a family nurse practitioner, a lactation consultant and postpartum doula, a neonatologist, the clinical director of USCTH, and the director of virtual parent education from the PAT National Center. The advisory committee met quarterly to provide guidance on program delivery, recruitment, expansion, research design, and evaluation.

Adaptation

The most notable adaptation that occurred to deliver PAT through USCTH was the commitment to delivering all components on a videoconferencing platform. Therefore, all personal visits, group connections, assessments, supervision,

Table 1 Parents as teachers @ USC telehealth assessment and screening tools[a]

Service area	Corresponding PAT form, assessments and screenings	When to complete	Domain measured
Family-centered assessment & other assessments	• *Piccolo* (Roggman et al. 2009) • *LSP* (Wollesen and Peifer 2006) • *PHQ-9* (Kroenke et al. 2001) • *PSI* (Abidin 1990)	• Piccolo: frequency when child is at least 4 months; annually thereafter • LSP: within 90 days of enrollment; annually thereafter • PHQ-9: at enrollment and every three months • PSI: within 90 days of enrollment; annually thereafter	• Piccolo: parental affection, responsiveness, encouragement, and teaching • LSP: family-level domains including relationships, education and employment, parent and child health, mental health, and substance use, and basic essentials • PHQ-9: parental depression • PSI: parental stress
Child screening	• *ASQ* (Squires and Bricker 2009) • *ASQ-SE* (Squires et al. 2002)	• ASQ: Sessions 1–4 if child is at least 4–6 months old; 9 months, 18 months, and 30 months • ASQ-SE: Sessions 1–4 if child is at least 4–6 months old; 18 months, and 30 months	• ASQ: motor development, communication, problem solving, personal-social development • ASQ-SE: self-regulation, compliance, communication, adaptive behaviors, autonomy, affect, and interaction with people.
Child health information	• *PAT Health Record*	• Track that child received following visits: 2–5 days old, 1 month, 2 month, 4 month, 6 month, 9 month, 12 month, 15 month, 18 month, 24 month, 30 month, 3 years old	• Well visits, vaccinations, hearing and vision screening

[a]Complies with requirements of HRSA's Maternal Infant and Early Childhood Home Visitation Programs

staff meetings, and advisory group meetings occurred via videoconferencing. To facilitate this approach, families that did not have access to the internet or a computer received a loaned tablet computer with a data plan. The tablet had restricted access to the internet and additional programs to avoid overuse of data. All families also received an activity kit to use during personal visits and developmental assessments. The kit contained books, blocks, a ball, craft supplies to make other activities, and a journal of the most common PAT parent handouts. Parents kept their kit after they completed the program but were asked to return their loaned tablet.

Feasibility Pilot Methods

Parents as Teachers @ USC Telehealth Implementation

Outreach and referral

Parents as Teachers @ USC Telehealth received referrals for participation from the LA Best Babies Network (LABBN), a group that coordinates with 14 hospitals located in communities with critical issues of poverty, high unemployment, and high teen birth rates to recruit and enroll new parents into home-based parenting programs services offered throughout Los Angeles County. Families that do not qualify for on-ground, home-based parenting programs services due to risk factors, geographic location, or preference were eligible for referral to Parents as Teachers @ USC Telehealth. Families were eligible to participate in Parents as Teachers @ USC Telehealth if they met the following criteria: (1) at least one caregiver aged 18 years or older; (2) one child younger than 3 years of age at enrollment; (3) ability to speak English or Spanish. Exclusion criteria included: (1) severe parental psychopathology, (2) a current substance use disorder as determined by referring providers, or (3) current residential instability (frequent relocation or homelessness during 1 year prior to referral). All participants completed an informed consent process by electronically signing consent documents.

To support LABBN in its referral process, Parents as Teachers @ USC Telehealth developed a program-referral workshop for external recruitment sources. In addition to the workshop, which trained referral sources in the referral process, participants received a referral kit that included English and Spanish flyers, referral forms, iPad request forms, and a program demonstration video. Parents as Teachers @ USC Telehealth provided referral sources with status reports and conversion rates, and sought ongoing feedback about the referral process. Once a family was

referred to Parents at Teachers @ USC Telehealth, USCTH client navigators made six outreach phone calls or email attempts to schedule the first personal visit.

Feasibility Pilot Results

Sample Demographics

Over an 18 month period, the PAT @ USC Telehealth program served 74 families. Table 2 displays the demographic characteristics of participants ($n = 84$ for parents; $n = 84$ for children). Eight-six percent of parents were female; mean age was 32.92 years ($SD = 7.94$ years). Slightly more than half were married (54%). The majority of the parents were Hispanic (61%), lived in urban areas (74%), and used English as their family language at home (68%). For children, about half were males (51%); mean age of 9.86 months ($SD = 9.36$ months).

Parent and Family Assessments

Parent and family assessments were collected for all adult participants. These baseline assessments are not intended to be indicative of pilot feasibility but rather describe to population served in this pilot and demonstrate fidelity to the PAT model of assessment. The mean score of parental depression using patient health questionnaire (PHQ-9) was 4.54 ($SD = 4.49$), which suggests minimal depression among parents. In terms of Life Skills Progression (LSP) conducted among each family at baseline (see Table 3), average scores on the majority of measures were within target range including relationships with family and friends ($M = 4.48$, $SD = 0.70$), relationships with children ($M = 4.62$, $SD = 0.42$), relationships with supportive resources ($M = 4.59$, $SD = 0.39$), health and medical care ($M = 4.65$, $SD = 0.48$), mental health and substance use/abuse ($M = 4.68$, $SD = 0.88$), basic essentials ($M = 4.04$, $SD = 0.74$), and infant/toddler development ($M = 4.59$, $SD = 0.40$) except that on education and employment ($M = 3.06$, $SD = 1.05$).

Child Development Assessments

As with the adult assessments, child development assessments are reported to describe to population served in this pilot and demonstrate fidelity to the PAT model of assessment. Table 4 features screening results of child development using Ages and Stages Questionnaires (ASQ-3). The

Table 2 Demographic characteristics of participants

Variables	Parents ($n = 84$)	Children ($n = 84$)
Mean age (*SD*)	32.92[a] (7.94)	9.86[b] (9.36)
Gender (%)		
Male	14.29	51.19
Female	85.71	48.81
Ethnicity (%)		
Hispanic or Latino	60.71	60.71
Non-Hispanic or Latino	25.00	25.00
Asian	1.19	1.19
Marital status (%)		
Single	8.33	
Married	53.57	
Not married but living together with partner	3.57	
Community type (%)		
Urban	73.81	
Suburban	16.67	
Major city	2.38	
Small town/rural	7.14	
Speaks english (%)	85.71	
Family language (%)		
English	67.86	
Spanish	30.95	

[a]Years

[b]Months

Table 3 Baseline assessment for life skills progression (LSP) among families

Areas of life skill development	*n*	Mean (*SD*)
Relationships with children	31	4.62 (0.42)
Relationships with family and friends	42	4.48 (0.70)
Relationships with supportive resources	43	4.59 (0.39)
Education and employment	18	3.06 (1.05)
Health and medical care	29	4.65 (0.48)
Mental health and substance use/abuse	39	4.68 (0.88)
Infant/toddler development (4 months–3 years)	30	4.59 (0.40)
Basic essentials	40	4.04 (0.74)

The variation in sample size is due to variation in time in enrollment in the program

Table 4 Baseline assessment for ages and stages questionnaires (ASQ-3) among children ($n = 33$)

Area of development	Normal (*n*, %)	Follow-up (*n*, %)	Referral (*n*, %)
Communication	25 (75.76)	7 (21.21)	1 (3.03)
Gross motor	24 (72.73)	9 (27.27)	0 (0.00)
Fine motor	26 (78.79)	6 (18.18)	1 (3.03)
Problem solving	24 (72.73)	7 (21.21)	2 (6.06)
Personal social	27 (81.81)	5 (15.15)	1 (3.03)

The variation in sample size is due to the varying age of children at enrollment

results show that compared with average performance of children in the ASQ normative sample, the majority of our sample was developing typically in areas of communication (76%), gross motor (73%), fine motor (79%), problem solving (73%), and social interaction (82%). Between 15% and 27% of our samples' scores fell within the monitoring zone that needed further assessment or follow-up action. Very few children scored below the established cutoff point that required referral for further assessment in developmental areas such as communication (3%), fine motor (3%), problem solving (6%), and social interaction (3%). For the ASQ-SE, the mean score was 22.83 ($SD = 15$).

Fidelity Measures

Families participated for an average of 5 months, despite being offered up to 24 months of service. Sixty-one percent completed their participation within 5 months, 31% participated for 6–12 months, and 8% of participants remained for more than 12 months. Families received 11 personal visits on average and 57% of families received at least one screening assessment. The vast majority of families who ended program participation were discharged because they missed multiple personal visits or were not responsive to reengagement attempts (50%). Families chose to leave services when their child was older than 6 months with 29% leaving when their child was aged 12–18 months, 27% age 6–12 months, 22% age 18–24 months, 20% age 24–36 months, and 7% were older than 36 months and included because they were siblings of index participants. Only 14% terminated while their child was age 0–6 months. No families requested to leave the program due to program dissatisfaction or because they were moving, which is commonly seen in on-ground programs.

Parent Satisfaction

Parents' satisfaction with Parents as Teachers @ USCTH was very high with 80% saying they were "very satisfied with the program." Relationship and rapport with their parent educator was assessed positively with 90% of participants strongly agreed that they felt comfortable speaking to their parent educator, 100% affirming that they felt their parent educator was "genuinely interested in my family", and 100% feeling that their parent educator identified their family's strengths. Ninety percent of participants felt that activities within personal visits strengthened their relationship with their child, that they were encouraged to read to their child, and that their parent educator partnered with them to set goals. All families felt that the program increased their understanding of child development, 90% felt motivated to try a new parenting strategy, and 70% felt less stressed after participating in the program. The most common reasons for enrolling in Parents as Teachers @ USCTH were convenience, privacy, and word of mouth recommendation. Eighty-nine percent of participants said their experience was the same or better than on-ground programs in which they had participated.

Anecdotal Program Highlights

During the pilot of service delivery, several notable anecdotes occurred. First, we identified several clients as qualifying for additional screening for postpartum depression. Clients were referred for mental health care in USCTH and were able to use their borrowed tablet to access free mental health services. Second, we had a client who scheduled her personal visit during a family party. She set the computer up on her dining room table and invited all the party guests to meet the parent educator. Generally, this creates an ethical dilemma in agencies when staff members are invited to family events, but in this context it allowed the parent educator to have a glimpse into greater family dynamics while maintaining professional boundaries. Finally, we detected a potential issue of child maltreatment, made a referral to the child protection hotline, referred the parent for additional services, collaborated with the Los Angeles County Department of Children and Family Services on the investigation, and kept the family engaged in services. These anecdotes demonstrate that the use of telehealth platforms to deliver home based parenting programs allowed for a continuity of care and service coordination that is commensurate with on-ground models of home-based parenting programs.

Discussion

This manuscript describes a pilot feasibility study focusing on model fidelity for delivering a home-based parenting program (Parents as Teachers) via a university-based telehealth interactive video conferencing technology. Parents as Teachers @ USCTH was developed to attempt to address issues of scalability and access to home-based parenting programs. Utilizing videoconferencing via a telehealth platform, this pilot was able to meet or exceed PAT fidelity measures including the provision of individual and group supervision, staff meetings, training, and advisory board meetings. All were accomplished utilizing the videoconferencing platforms of the telehealth clinic. Furthermore, no modifications to the PAT curriculum were needed in order to deliver it by videoconferencing platforms. Families received all elements of the PAT curriculum including parent-child interaction activities, coaching on developmental centered parenting, goal setting related to family well-being, developmental screening, and family assessments as required for

model implementation fidelity. Results from this feasibility pilot of model fidelity indicate that families were generally low-risk, engaged in services for an average of 5 months, and received an average of 11 personal visits. Demographic characteristics of age, ethnicity, and parental involvement were commensurate with on-ground, home-based parenting programs. Families generally discontinued services after missing multiple appointments. Self-reported parental satisfaction was high.

Families who enrolled in the Parents as Teachers @ USC Telehealth program were generally lower-risk than families in on-ground, home-based parenting programs. This is important when interpreting the results of this feasibility pilot of model fidelity. More low-risk families may have enrolled because the referral system adopted with LA Best Babies resulted in the higher risk families being captured into pre-existing on-ground programs. Additionally, low-risk families may have self-selected into a computer mediated parenting program. This is not uncommon in sectors where telehealth programs are generally reserved for less acute needs including medication management, therapy, and briefer compliance check-ins (Dorsey and Topol 2016). Further research is warranted with a sample of higher-risk families to assess the feasibility, utility, and appropriateness of offering computer mediated parenting programs. Additionally, because our sample had fewer high-needs characteristics, it likely impacted the baseline child and family assessments, as few of our participants had identifiable developmental concerns or mental health needs. The sample was consistent with other home-based parenting program populations in its level of ethnic diversity and maternal involvement as engagement of fathers is a well-documented challenge in home-based parenting programs (Azzi-Lessing 2011).

When examining fidelity of Parents as Teachers @ USCTH, we noted that families engaged in the program for shorter periods but received the same target number of visits in that shorter duration. Parents as Teachers asks that programs serve families for up to two years and provide at least 12 visits annually (Parents as Teachers 2018). This seems to indicate that utilization of telehealth modalities may be better indicated for briefer, higher intensity home-based parenting programs. Families also were most engaged with the program when their child was less than 6 months old. This is likely confounded by the fact that the bulk of our referrals came right after the child was born and may speak to the family's attention span for computer mediated interventions. However, it may also reflect that parents generally seek assistance very early in their child's life. Families generally discontinued the program because they became unresponsive or missed multiple appointments. We foresee this being an ongoing challenge in using telehealth modalities because it is much easier to forget to log into a computer than it is to ignore someone knocking on your door, which is what one experiences in home-based programs. The fact that no families discontinued due to moving speaks to the potential gaps that telehealth can fill in offering home-based parenting programs. We were able to follow families through geographic and life transitions that often contribute to service termination.

Overall, parent satisfaction for Parents as Teachers @ USCTH was very high. We believe that the fact that over 90% of families felt that they had a strong relationship with their parent educator and that their parent educator identified their family strengths speaks highly to the rapport that the parent educators were able to build. This rapport likely influenced parents in trying new activities and parenting strategies recommended by the parent educators. Parents indicated that the user experience of a telehealth-based parenting program was commensurate or better than an on-ground experience, and specifically chose this option for the convenience and privacy it offered. These findings viewed in conjunction with fidelity measures of curriculum components affiliate requirements indicate that there is reasonable potential for computer mediated, home-based parenting programs to fill gaps and barriers in this service sector. However, more refinement of challenges identified in this feasibility pilot of model fidelity must also be addressed.

Challenges and Recommendations for the Future

Enrollment in the program was extremely challenging. This is not unexpected given the challenges of recruiting and engaging families in home-based parenting programs. In typical service implementation of home based parenting programs, attrition rates range from 30% to 70% (Drotar et al. 2009; Foulon et al. 2015; Wagner et al. 2001). Despite the potential for telehealth platforms to alleviate barriers to home-based parenting programs, service delivery and high rates of user satisfaction once engaged with telehealth, recruitment into telehealth trials is one of the most difficult aspects of the process (Mair et al. 2006). Survey studies have summarized and quantified some reasons why potential participants are hard to reach or decline to join such trials, including being too busy, discomfort with the technology, belief that the technology will not help them, and a stated preference for in-person services despite the medium's known barriers (Mair et al. 2006). In addition to these telehealth barriers, we believe that the relative new environment of offering a home-based parenting program via videoconferencing may have influenced recruiters' understanding of how it works and families' ability to imagine the experience.

Despite difficulties in enrollment, Parents as Teachers @ USC Telehealth was able to deliver all elements of the PAT evidence-based curriculum with model fidelity. It is important to note that the families enrolled in our program were families that would not have qualified for any other

home based parenting programs services in Los Angeles County because they did not meet inclusion criteria for on-ground programs. Using virtual environments can fill gaps that on-ground services struggle to address. Geographic boundaries for on-ground, home-based parenting programs, eligibility requirement for programs, and the ability to travel with families as they move communities are all addressed by a telehealth application of home based parenting programs. However, evaluating the true impact of delivering the PAT model in a telehealth platform requires time to measure long-term outcomes, additional fidelity monitoring, which is built into the PAT model, and comparison to outcomes with on-ground service delivery models. Addressing this barrier will provide important information to the fields of home-based parenting programs and telehealth, both of which are affected by enrollment issues in research and standard service delivery.

A potential solution to the challenges of enrollment is used of social media. Social media represents an emerging arena for recruitment that may be particularly important for recruitment into telehealth-based service models. More than 40% of the general public reports using social media to learn about clinical research (Center for Information and Study on Clinical Research Participation. 2013). Further, online patient and client communities tend to be representative of the general patient population (Trobisch et al. 2011). Recent studies indicate that social media is accessed by all age groups, with half of people older than 50 and a third of people older than 65 frequenting social networking sites (Smith 2014). Social media is used by 65% of Caucasians, 65% of Hispanics, and 56% of African Americans (Krogstad 2015; Lopez et al. 2013; Pew Research Center. 2014). Social media is also used across socioeconomic strata, with more than half of people living in the lowest-income households using social media (Perrin 2015). Moreover, individuals who are highly engaged in social media may be more apt to engage in telehealth studies based on their overall comfort with internet technology and communication. Further investigation into the use of social media to recruit for telehealth-based programs and home based parenting programs services is an essential step in determining the feasibility of online delivery of home based parenting programs services as a standalone service delivery model. If additional strategies to engaging families in telehealth services are not fruitful, this may be evidence that telehealth services are more suitable as an augmentation of services in which families have pre-established comfort using this technology.

We also encountered challenges to completing all family and child development assessments within the course of the parenting program. This is a common issue experienced by on-ground, home-based parenting programs. The assessments were generally folded into the personal visits and could competed for time allocation with child development activities and family discussions. Future research is warranted to trouble shoot strategies for balancing elements of the personal visit against screening and assessment protocols. Furthermore, specific attention must be paid to developing protocols for the delivery of child development assessments in a telehealth platform as that can impact multiple service sectors including pediatric care, early intervention, and early childhood education.

To date, the vast majority of telehealth services have been in medical settings in which interactions occur between primary providers seeking specialty consultation or as augmentation of services in a direct-to-consumer capacity (e.g., telehealth meetings between in-person appointments with an endocrinologist as part of a diabetes management continuum; DeBlois and Millefoglie 2015). This may be related to the fact that patients and clients are more apt to engage in telehealth services when they already have comfort receiving services or participating in an intervention in a more traditional capacity. To date, no studies have explored if using telehealth to augment on-ground services is appealing because of the ease of recruitment it offers or if this usage is simply a byproduct in the development of the field. Therefore, use of telehealth in home based parenting programs services may also needed to be folded into a continuum of care. This continuum may include families beginning in on-ground services before transferring to telehealth services or families engaging in a hybrid of on-ground and online services.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of University of Southern California Institutional Review Board (UP-16-0089). Informed consent was obtained from all individual participants included in the study. This article does not contain any studies with animals performed by any of the authors.

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