

Caregiver Use of the Core Components of Technology-Enhanced Helping the Noncompliant Child: A Case Series Analysis of Low-Income Families

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Children from low-income families are more likely to develop early-onset disruptive behavior disorders (DBDs) compared to their higher income counterparts. Low-income families of children with early-onset DBDs, however, are less likely to engage in the standard-of-care treatment, behavioral parent training (BPT), than families from other sociodemographic groups. Preliminary between-group findings suggested technology-enhanced BPT was associated with increased engagement and boosted treatment outcomes for low-income families relative to standard BPT. The current study used a case series design to take this research a step further by examining whether there was variability in use of, and reactions to, the smartphone enhancements within technology-enhanced BPT and the extent to which this variability paralleled treatment outcome. Findings provide a window into the uptake and use of technology-enhanced service delivery methods among low-income families, with implications for the broader field of children's mental health.

THERE is growing interest in the role of technological innovations to better meet the needs of mental health consumers (e.g., Aguilera & Muench, 2012; Jones, 2014; Kazdin & Blasé, 2011). Enthusiasm regarding the role of technology is multifaceted, but stems largely from its promise to increase engagement and adherence by facilitating efficient communication between clinicians and clients, as well as access to resources to generalize the content of sessions to the client's daily life (see Aguilera & Muench, 2012; Enock & McNally, 2013; Jones et al., 2013, for reviews). In turn, preliminary findings suggest the promise of technology to increase the reach and impact of evidence-based treatments (e.g., Comer et al., 2014; Duncan, Velasquez, & Nelson, 2014; Jones et al., 2014); however, as efficacy research continues to evolve, new questions emerge regarding the real-world acceptability and sustainability of technology-delivered or enhanced service delivery methods (e.g., Nelson, Bui, and Velasquez, 2011; Ritterband et al., 2003; Wu, Steele, Connelly, Palermo, & Ritterband, 2014).

In part, answers regarding acceptability and sustainability depend on supplementing randomized controlled trial (RCT) between-group designs (i.e., standard of care vs. technology-enhanced arms) by elucidating the extent to which levels of use *within* technology-enhanced treatments appear to correspond with variability in treatment outcomes (e.g., Ritterband et al., 2003; Waller & Gilbody, 2009). Such within-group research responds to calls to maximize knowledge generation from the relatively costly research and development in technology-enhanced services research (Riley et al., 2011; Rothwell, 2005; Wu et al., 2006) and further builds upon the long-standing tradition of case series designs in cognitive behavioral and pilot services research (e.g., Coughtrey, Shafran, Lee, & Rachman, 2013; Daughters, Magidson, Schuster, & Safren, 2010; Norberg, Perry, Mackenzie, & Copeland, 2014). This study aims to investigate levels of and attitudes toward technology use, as well as links between use, attitudes, and outcomes among caregivers randomized to one technology-enhanced intervention, Technology-Enhanced Helping the Noncompliant Child (TE-HNC; Jones et al., 2013). Findings from this study have the potential to provide insight into the sustainability and acceptability of technology-enhanced interventions in real-world clinic settings where average differences between groups in RCTs may tell us relatively little about how

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individual clients interface with technology. Preliminary findings from the pilot RCT comparing TE-HNC to the standard of care behavioral parent training (BPT) program upon which it was based, Helping the Noncompliant Child (HNC; McMahon & Forehand, 2003), suggested the promise of cost-effectively improving engagement and boosting treatment outcomes among low-income families of youth with disruptive behavior disorders (DBDs). The TE-HNC intervention used a range of proof-of-concept smartphone components to enhance connection with and support to low-income families between clinic-based sessions. Building upon this foundational work, we believe TE-HNC provides an ideal exemplar for within-group research on technology-enhanced services for several reasons.

First, DBDs, characterized by noncompliance, aggression, and defiance, are the second most common (19.1%) reason for child referral to mental health services, and low-income youth are more likely to be referred than their higher-income counterparts (Heiervang et al., 2007; Merikangas et al., 2010; Merikangas, Nakamura, & Kessler, 2009; also see Forehand, Jones, & Parent, 2013, for a review). Second, the standard-of-care for early onset DBDs, BPT (also called Parent Management Training, PMT), includes a constellation of programs with common history, theory, and treatment techniques firmly rooted in the core tenets of behaviorism, including skill modeling, skill practice in and out of session, and tailored feedback (Abraham & Michie, 2008; Jones et al., 2013; Patterson, 2005; Reitman & McMahon, 2013). Therefore, research on one technology-enhanced BPT program should generalize to other BPT programs and other behaviorally oriented treatments for children as well.

Third, BPT, like other evidence-based treatments, tends to be underutilized by families who may benefit the most from intervention, including low-income families (Eyberg, Nelson, & Boggs, 2008; Gardner et al. 2009; Jones et al., 2013; Shaw, 2013). Barriers to engagement in BPT are varied and complex, but include acute and chronic socioeconomic-related stressors that make navigating time-intensive and demanding clinic-based BPT services (i.e., 12 to 28 session hours, midweek telephone check-ins, daily home practice of skills) more challenging (see Eyberg et al., 2008; McMahon & Forehand, 2003; Reyno & McGrath, 2006; Thomas & Zimmer-Gembeck, 2007, for reviews). Although the digital divide certainly merits some caution in technology-enhanced services research, low-income homes are more likely than other sociodemographic groups to rely entirely on smartphones in particular, given the diverse and relatively cost-effective functionalities bundled into one increasingly affordable platform and service plan options (see Anderson & Subramanyam, 2011; Davies, 2011; Snider, 2011, for reviews).

Accordingly, with the aim of enhancing our understanding of the potential uptake and sustainability of

technology-enhanced service delivery models, the current study builds on previously reported findings comparing TE-HNC and HNC by using a case series design. Specifically, we examine caregiver variability in use of and attitudes toward the smartphone components within caregivers randomized to TE-HNC, as well as the extent to which this variability corresponds with variability in treatment outcome. Of note, the literature on uptake of treatment, including technology-enhanced treatment, suggests that client-level factors, such as attitudes, influence both use and engagement (e.g., Reed, Messler, Coombs, & Quevillon, 2014; Venkatesh, Morris, Davis, & Davis, 2003; Waller & Gilbody, 2009). Accordingly, it is expected that there will be variability in use of and attitudes toward the range of smartphone components within and between caregivers randomized to TE-HNC, that higher levels of use of each smartphone component will parallel more positive attitudes toward the component, and that use and attitudes will correspond with improvement in disruptive behaviors at posttreatment, as well as the efficiency with which families complete the mastery-based HNC program.

Method

Participants

Low-income (i.e., adjusted gross income did not exceed 150% of the federal poverty limit) caregiver-child dyads were included in the pilot RCT if they had a 3- to 8-year-old child (i.e., range for which HNC was developed and tested) and the child met or exceeded clinical cutoffs on the Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999). Families were excluded if the child had a developmental or physical disability that precluded the use of HNC (e.g., physical disability precluded use of time-out), the caregiver had a *current* diagnosis of substance abuse/dependence, mood, or psychotic disorder; and/or the family was involved with Department of Social Services related to abuse/neglect.

Interested and eligible families were randomized to HNC ($n = 11$) or TE-HNC ($n = 11$). Of the 11 families randomized to TE-HNC, two served as practice cases for project therapists, resulting in 9 families for these analyses (see Table 1). Caregivers in TE-HNC were 91% female, 91% biological parents, 64% married or in a long-term relationship, and on average 33 years old ($SD = 6.71$). Nearly half (45%) of youth in TE-HNC were male ($M = 5$ years old, $SD = 1.18$).

Procedure

Families were recruited through agencies (e.g., schools, YMCAs, churches), doctors' offices, advertisements (e.g., university-wide informational emails, bus displays, brochures), and word-of-mouth (e.g., participants telling other families about the project). A brief phone screen to determine initial eligibility on key criteria (i.e., 3- to

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