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Perspectives on caregiver-focused MHealth Technologies to improve mental health treatment for low-income youth with ADHD

Janet R. Cummings, Ph.D.^a, Laura M. Gaydos, Ph.D.^a, Augustina Mensa-Kwao, M.P.H.^b, Minna Song, M.P.H.^b, and Sarah C. Blake, Ph.D., M.A.^a

^aDepartment of Health Policy and Management, Rollins School of Public Health, Emory University

^bDepartment of Behavioral Health Sciences and Health Education, Rollins School of Public Health, Emory University

Abstract

Objective: To examine stakeholder perspectives regarding: (1) whether mobile health (MHealth) tools can improve the mental health (MH) treatment process for low-income youth with ADHD in safety net settings; and (2) what functions would be helpful to improve the treatment process.

Methods: This study analyzed qualitative data from a larger project that collected information from key stakeholders at four safety-net clinics across Georgia. We conducted five focus groups with caregivers who had a Medicaid-insured child receiving treatment for ADHD, and 17 semi-structured interviews with clinic administrators and providers. Stakeholders shared their perspectives on strategies to improve the MH treatment process, including the use of mHealth tools. Caregivers also completed a brief survey about technology use. We present findings from a thematic analysis of the qualitative data and descriptive findings from the survey.

Results: Participants in each group of stakeholders expressed interest in mHealth tools that would: (1) deliver reminders for caregivers (including appointment and medication refill reminders); (2) help caregivers obtain information about ADHD symptoms and treatment options; (3) help caregivers track information about their child's symptoms and treatment progress; and (4) facilitate communication between caregivers and providers. While more than three-fourths of caregivers had a smartphone, providers and administrators expressed concern that access to mHealth technologies may be inconsistent if low-income families are unable to pay cellular phone bills.

Conclusions: Caregivers, clinic administrators, and providers were supportive of enhanced mHealth technologies to improve MH care for this population.

Keywords

mHealth; mental health services; children; safety-net providers

Corresponding Author: Janet R. Cummings, Ph.D., Dept. of Health Policy and Management, Emory University, 1518 Clifton Road NE, Room 650, Atlanta, GA 30322, jrcummi@emory.edu, (p) 404-727-9198, (f) 404-727-9198.

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Introduction

Mental health (MH) disorders are prevalent among children, with up to one in five experiencing a severe mental disorder at some point during their life.^{1,2} Yet, less than half of those with a MH disorder receive any MH treatment,^{1,3} and among those who initiate services, quality of care is poor⁴ and rates of treatment drop-out are high.^{5,6} These challenges are compounded for children living in poverty who experience an increased risk of MH problems^{7–9} and face greater logistical-and systems-level barriers to receiving MH treatment than children from families with more socioeconomic resources.^{10–12}

Medicaid and the State Children's Health Insurance Program (CHIP) are public programs that provide health insurance to low-income and disabled children.¹³ In 2016, these two programs provided health insurance coverage to nearly 46 million children in the U.S.¹⁴ A number of studies have documented challenges associated with MH treatment continuity and quality of care among youth in public insurance programs that receive psychosocial services, psychotropic medication, or both.^{15–20} For example, a recent study using Medicaid data from multiple states reported that three-fifths of youth initiating ADHD medication discontinued medication and nearly half disengaged from treatment during the 10-month follow-up period.¹⁵ Prior studies have identified MH treatment barriers at the family level (e.g., health beliefs, transportation),^{5,10,21} the provider level (e.g., patient-provider communication),^{22,23} and the health systems level (e.g. geographic availability of Medicaid participating MH providers)^{24,25} for Medicaid-enrolled youth.

Mobile health (mHealth) tools have emerged that offer capabilities intended to facilitate different aspects of *mental health care delivery* and/or *chronic disease management* activities.^{26–28} mHealth tools are delivered through mobile communication technologies (i.e., cellular phones and smartphones) or other wireless technologies, such as iPads, tablets, laptop computers, personal digital assistants (PDAs), and similar other devices.²⁹ Although there is a growing body of research on the usability, feasibility, acceptability of mHealth tools to improve mental health treatment and outcomes, few studies have focused on the child and adolescent population.³⁰ A recent systematic review of the literature identified eight studies on mHealth interventions for youth with MH disorders, all of which focused on mHealth technologies to enhance psychotherapy services among adolescents -- including therapeutic activities or self-monitoring symptom trackers.³¹ To date, however, little is known about key stakeholders' perspectives on whether mHealth tools would be of interest to *caregivers* managing their child's MH treatment, especially among low-income populations.

To address this gap in the literature, we analyzed data from a larger project that collected qualitative and quantitative data from key stakeholders at four safety-net clinics in Georgia that serve publically-insured youth with MH disorders. Using these data, we provide descriptive information about cellular phone and smartphone ownership and usage among caregivers recruited from these safety-net settings. Second, we use the qualitative data to describe caregiver, health care provider, and clinic administrator perspectives regarding the potential of mHealth tools to help caregivers manage their child's MH treatment process, including specific functions that would facilitate this process.

Methods

Data collection

The qualitative data analyzed in the current study were obtained from a larger mixed-methods project that examined barriers to and facilitators of MH treatment received by Medicaid-insured youth. Data were collected from four safety-net clinics. As defined by the Institute of Medicine (IOM), the safety net comprises “providers that organize and deliver a significant level of health care and other health-related services to uninsured, Medicaid, and other vulnerable patients.”³² We collected data from three community-based MH clinics and one federally qualified health center (FQHC) located in three regions of Georgia (metropolitan Atlanta, Northern Georgia, and Southern Georgia). The inclusion of these four safety-net clinics ensured that the study sample included representation of sites that served both urban and rural communities. All of the clinics provided mental health services to children and adolescents, and more than half of the youth served at each clinic were enrolled in the Medicaid program.

The research team collected qualitative data through open-ended semi-structured focus groups with caregivers and in-depth semi-structured telephone interviews with MH providers and clinic administrators. Following the explanation of the general study purpose, each participant provided written (caregivers) or verbal (provider and administrators) consent, which assured the voluntary nature of participation, the confidentiality of responses, and the right to end the interview at any time or refrain from answering questions. This study received IRB approval through Emory University’s Institutional Review Board.

Sample & Recruitment

Participants were recruited through purposive sampling. Purposive sampling is widely used in qualitative research for the identification and selection of information-rich cases for the most effective use of limited resources.³³ Focus group participants were recruited with the assistance of staff from each site; clinic staff posted fliers in the waiting rooms and shared fliers with caregivers to advertise the focus groups. Parents and grandparents (i.e., caregivers) were eligible for the study if they had a child or grandchild enrolled in a public health insurance program (Medicaid or CHIP) that had received treatment for attention deficit hyperactivity disorder (ADHD) at one of the sites for at least 2 months. If the caregiver had more than one child that met these criteria, we asked them to provide us with information about their oldest child receiving ADHD treatment at the clinic. The final sample included 37 participants across five focus groups at the four sites. Focus groups lasted approximately two hours, and each focus group participant received refreshments and a \$40 gift card.

From each clinic, we also recruited the clinic administrator with responsibility over scheduling and other staffing-related decisions. Clinic administrators then assisted with the recruitment of providers at their respective clinics. We sought participation from physicians, therapists, and other clinic support staff to include key informants with a range of experiences and expertise. Administrators provided the research team with the contact information for several providers. From this list, we selected at least one physician and two

non-physicians at each clinic. We recruited these providers to participate in the study by email. A total of 17 individuals participated in semi-structured interviews: four administrators, four physicians, five therapists, and four other clinical staff, including a nurse practitioner, a social worker, a licensed practical nurse, and a paraprofessional provider. Interviews lasted between 30 minutes and one hour, and each provider and administrator received a \$50 electronic gift card after completing the interview.

Data Collection Instruments

Focus group participants completed a brief, anonymous written survey to collect information on their demographics, cellular phone and smartphone ownership, and use of technology to access health information. We developed a focus group moderator's guide to stimulate conversation about perceived barriers and facilitators for families seeking MH services for their child, as well as their perspectives on strategies to improve the MH treatment process, including the use of mHealth tools.

Similarly, providers and administrators completed a pre-interview survey to obtain information about their demographics, professional background, education, and work responsibilities. A semi-structured interview guide was developed to stimulate conversation about three domains: 1) perceived barriers and facilitators for *caregivers* helping their child seek treatment for ADHD; 2) barriers and facilitators for the *provision* of high quality mental health services; and 3) innovative strategies and approaches to improve MH treatment for youth with ADHD, including mHealth tools.

The focus group and semi-structured interview guides included broad open-ended questions, and targeted probes to allow participants to discuss their experiences and thoughts in more detail. When eliciting discussion about the use of technology, we included questions about the perceived helpfulness of mHealth tools (including smartphone applications [i.e., apps]) to help caregivers manage their child's MH symptoms and treatment. Probes included questions to ascertain stakeholders' perspectives on what types of functions and features may be helpful to caregivers. There were slight variations in how this topic was covered between the focus groups and semi-structured interviews because of the inherently varied nature of these two methodologies.

Analysis

We present descriptive information from the questionnaires about participant demographics. For focus group participants, we also provide information about cellular phone ownership, smartphone ownership, and use of technology to access health information.

All focus groups and interviews were audio-recorded and transcribed verbatim to ensure accuracy and completeness of data. Participant's names and other identifying information, including clinic names and references to geographic locations, were removed from the transcripts. Detailed field notes about observations during and immediately after each focus group and interview were taken, which enhanced the analysis of the data.

Using MAXQDA software,³⁴ we implemented a team-based approach to systematically code each transcript.³⁵ Two main researchers reviewed and coded the transcripts with a lead

analyst to review emerging themes for the codebook. Initially, a priori structural codes (determined by the study research questions) were applied to the transcripts using a directed approach to content analysis,³⁶ and inductive codes (those which emerged organically from the data) were subsequently applied to the transcripts. We identified themes based on the structural and inductive codes. Coding discrepancies were discussed among the team and modifications were made to the codebook. This iterative process helped enhance intercoder reliability and led to a well-defined codebook.³⁵ We applied a convergence model, in which results were merged after separate analysis of focus group and interview data.³⁷ The data were triangulated during the interpretation stage of analysis.

Results

Caregiver demographics and child characteristics

Most focus group participants were mothers or grandmothers (91.9%), African American (56.7%), had at least some college education (62.1%) (Table 1). More than four-fifths (83.8%) had one child receiving ADHD treatment, and 16.2% had at least two children receiving ADHD treatment.

Participants reported a range in age of their oldest children/grandchildren who sought ADHD treatment (from ages 4 to 17); more than half (51.4%) of caregivers reported that their only child or (oldest child) receiving ADHD treatment at the clinic was between the ages of 12 and 17. More than four-fifths of the participants' children were receiving medication (89.2%) for their MH problems and/or some type of individual psychotherapy services (78.4%); over one-fourth (27.0%) were receiving family therapy. More than three-fourths (75.6%) of caregivers reported that their child had at least one co-morbid MH problem in addition to ADHD such as oppositional defiant disorder and other behavioral problems, depression and other mood problems, bipolar disorder, and post-traumatic stress disorder.

Clinic administrator and provider demographics

Key informants who participated in the semi-structured interviews included clinic administrators, physicians (psychiatry and primary care), therapists, nurses, and other clinic staff. The majority of these participants were female (82.4%) and less than 40 years of age (53.0%). This sample was comprised of non-Hispanic white (58.8%), African American (29.4%), and Asian (11.8%) participants. Just over one-third (35.3%) had been in their current position for at least 3 years (Table 1).

Caregiver technology ownership and usage

All of the focus group participants who responded to the technology survey (N=34) owned a cellular phone, and more than three-fourths (79.4%) reported having a smartphone. All of those with a smartphone reported using their device to access information online, including health information. More than three-fifths of participants (61.8%) received text updates or alerts about health or medical issues, and nearly one-third (32.4%) used their phone to interact with their child's provider through the internet or email (Table 2).

Qualitative Findings

Focus groups and interviews explored participants' perceptions about the potential of mHealth tools to help caregivers manage their child's MH treatment. Overall, the large majority of focus group participants and nearly all providers and clinic administrators expressed support for at least one function of an mHealth tool that could help caregivers manage the MH treatment process for their child. More specifically, key informants expressed interest in and support for mHealth tools that would: (1) deliver reminders for caregivers; (2) help caregivers obtain information about ADHD symptoms and treatment options; (3) help caregivers track information about their child's symptoms and treatment progress; and (4) facilitate communication between caregivers and providers (Table 3).

Provide reminders for caregivers—Nearly three-fourths of focus group participants stated that mHealth tools that provide reminders for caregivers would be helpful. These include reminders about their child's mental health appointments and/or the need to refill their child's ADHD medication. The majority of administrators and providers also believed that mHealth reminders would be helpful for caregivers.

Appointment reminders

All four clinics already provided appointment reminders to caregivers by telephone, and one clinic also provided an option for caregivers to receive reminders by text at the time the data were collected. Therefore, most caregivers had experience receiving appointment reminders, and several spoke about how appointment reminders by telephone or text were helpful because they were very busy and could be forgetful. When explaining how the current appointment reminder system was helpful, one caregiver noted:

“Because I’m so scattered trying to take care of him and his needs and make sure everything’s in place, I have a tendency to forget. ... For them to call me up and say, “You’ve got an appointment tomorrow. Can you make it?” Then something else could’ve come up instead of that appointment’s that’s important at the moment, so, yeah, it helps a lot for them to call and remind you.” (Caregiver)

Administrators and providers also described the benefits of telephone/text reminders to improve appointment attendance. In other parts of the interview, providers and administrators described barriers these families faced when helping their child seek treatment, including competing needs, busy schedules, and logistical challenges (e.g., transportation). Clinic administrators and providers also discussed the challenges related to the high no-show rates for appointments, including lost revenue. A couple of key informants emphasized how the telephone/text appointment reminder system was an important strategy to reduce appointment no-shows:

“I think that if we didn’t have the automated appointment reminders, I think our no-show rate would probably be horrendous. I think that does improve [no-show rates] and patients have come to expect to get that reminder call the day before their appointment from the automated system.” (Administrator)

Medication refill reminders

Although very few caregivers had personal experience receiving telephone/text reminders about medication refills, several reported that these types of reminders would help them manage their child's MH treatment. One caregiver described how they would like to receive medication refill reminders by phone or text:

“Yeah, I would need it [a reminder] because, like today, I wanted to go and get my son's medication filled...even though I had great intentions and I was available—it might slip my mind on the first..., and then we'll be like, “Oh, he took his last pill yesterday,” and so you kind of need that reminder.” (Caregiver)

Similarly, several providers and administrators believed that medication refill reminders would be helpful for caregivers – including those delivered by text or phone as well as those embedded within a smartphone app. One provider noted:

“If it was something similar to that, not only providing education about ADHD, but also reminders. Your son is due for their three-month follow-up. Your son is almost out of medication. ‘Cause we do see that where they didn't realize they were gonna be out of medication, and then it's Friday afternoon, and then you're kind of stuck. If we had an app that kind of provided education about what's going on or what symptoms you might see with these medicines, but also will serve as reminders, I think that would be very helpful.” (Provider)

Help caregivers obtain information—Participants in all three groups of stakeholders described how mHealth tools, including smartphone apps, that helped caregivers obtain educational information about MH symptoms and treatment options had the potential to facilitate MH care for these youth. Several participants in each of the five focus groups discussed the need and desire to have access to more information about their child's MH problems and treatment including information about: symptoms, behavioral management techniques, psychotropic medication, and other MH treatment-related information. For some caregivers, the desire for more information stemmed, in part, from a belief that they did not have a sufficient understanding of the issues at hand. One caregiver explained why a smartphone app with additional information could be helpful to bridge this knowledge gap:

“If there could be some facts or little tidbits about the issues that your child has. Because a lot of my issues is ignorance. I don't know. I don't know a lot of things about ADHD . [...] an app like the bible app. Every day it has something inspirational. Every morning you can have something like something you should know about ADHD.” (Caregiver)

Other caregivers articulated how they were eager to receive new ideas about strategies to help their child and attend to their behavior through an mHealth tool, such as a smartphone app. One caregiver suggested:

“...My issue is I'm just I don't know what to do. [...] Oh maybe you can try doing this. Little ideas cuz I'm to the point like-so I don't know. Maybe, yeah he's acting out. Maybe you pull him to the side or whatever. [...] Just some suggestions for his behavior. That would help me out. Cuz I'm runnin' through the list and I'm runnin'”

it over and over again. We're doin' the same thing and it's not working. I need new ideas. That would help me out." (Caregiver)

Most clinic administrators and providers also described the need for improved caregiver education about MH-related issues and treatment options, as well as support for mHealth tools that could help caregivers obtain information about their child's symptoms, behavioral management techniques, and MH treatment options. A few respondents also described the potential usefulness of a smartphone app that could provide information tailored to an individual child's needs or treatment plan. One provider suggested the following for a smartphone app:

"If the service provider has maybe gone over a skill that week, if they're familiar with the app and know the skill, they can kind of add that to the parents' queue or a list of the techniques that had learned that they could reference back to and try it out and things like that. They could even write down what worked well or what didn't work well if they could jot a note or record a note or something like that." (Provider)

Help caregivers keep track of information for MH treatment plan—Participants also endorsed the potential of mHealth tools, such as smartphone apps, to help caregivers enter and store information about their child's treatment plan. More than half of the caregivers expressed support for an mHealth tool that could help them keep track of MH symptoms and/or medications (including side effects). A few caregivers described how difficult it is to remember so much information about their child's behavior in between visits with the provider -- especially if using a handwritten system to keep a log. A few caregivers also described difficulties recalling details about which psychotropic medications their child had tried and the side effects they had experienced over the course of time. For these caregivers, a more automated system of keeping track of symptoms and/or treatment related-information had the potential to be timesaving and reduce the possibility that the hand-written information would be lost. One caregiver explained how a smartphone app that helps track symptoms would be beneficial.

"... it would be really helpful if there was like little boxes that you could just touch on your phone, and you'd click. "Did they do this today?" Boom, boom, boom. "Did they not do this today?" Boom, boom, boom. Then it generates like a graph of whether they're improving or if the frequency is going up or going down. I can't take notes or write things down because I'll write something on this paper, and then I'll throw it somewhere." (Caregiver)

Another caregiver explained how a smartphone app that kept track of information related to the child's medicine would be helpful.

"How about something for medicines too, like -- he's tried this medicine. I don't remember from two years ago what a specific medicine—what reaction he had, and that's why he couldn't take it... If they had some way to plug in, "Okay, he's tried this medicine," just..... to try to track what he was having" (Caregiver)

The majority of providers/clinic administrators also expressed support for mHealth tools that could help caregivers keep track of information about their child's MH treatment plan. Key informants were supportive of smartphone app features such as a symptom check list, behavior chart, and/or a mechanism to help caregivers keep track of information related to administering the child's medication (e.g., dosage, timing of medicine). In the words of one provider:

“Yes. I think that would be wonderful, cuz a lot of times, I can't give a calendar out and get them to write down how each day was, so I think having an app to where they can share it with us, kinda like the schools do with grades, would be very helpful in seeing kinda what time these symptoms are flaring, what's going on, just different variables, so I think that would be great” (Provider)

Facilitate communication between caregivers and providers—Participants described the potential helpfulness of mHealth tools that facilitate communication between the caregivers and the MH providers. Some caregivers described how mHealth tools that helped track information about their child's symptoms, medication, and/or treatment plan would enable them to remember what to tell the doctor during a MH visit about their child's behavior and progress. In other words, these caregivers described how these tools had the potential to improve the accuracy of information they shared with the provider. One caregiver explained:

“That way you know what to tell the doctor when you go in for your appointment. You can just look and say, ‘You know what? I noticed that she did a lot of this or this or that.’” (Caregiver)

A few providers and administrators also described how mHealth tools may facilitate communication between caregivers and providers. This discussion generally centered on how technology could be used to facilitate asynchronous communication between the caregiver and provider – in which information entered at one point in time by one party is reviewed/received at a different point in time. Several examples were provided about types of asynchronous communication between caregivers and providers that could be facilitated through mHealth tools including: caregivers communicating with providers about attendance at upcoming appointments; caregivers using a smartphone app to ask providers a question through a smartphone app; or caregivers recording information about their child's behavior between appointments to share with a provider at a later time. One clinic administrator explained:

“If a parent has a question about their child's ADHD medication, ‘Well I'm not really sure if this particular side effect is something that's associated with the medication or it may be related to something else. Well, let me log onto this little app and send a message to the provider just to ask a question. To me it simplifies the process for the parents and it reduces their need to pick up the phone and make a phone call with every question that they have.’” (Administrator)

Challenges and other considerations—Several participants across all three groups of stakeholders described challenges related to the economic constraints experienced by low-

income families, and how these may impede the ability of these families to access and use mHealth tools that are implemented through a cellular phone or smartphone. For example, a couple of caregivers and providers raised concerns about the fact that not all low-income families can afford smartphones and/or smartphone apps. Several providers/administrators also described how some low-income families experience inconsistent cellular phone service because they may not have the economic resources to pay their bills on time. One clinic administrator noted the importance of making a smartphone app affordable for low-income caregivers:

“I think that we often encounter parents’ phones being shut off because they haven’t paid their bill or don’t have the ability to pay their bill. Most of them do have smartphones, though. If the app were free or low cost, I imagine it could be very helpful.” (Administrator)

Another challenge described by stakeholders related to caregivers’ interest in and likelihood of using the mHealth tool. Nearly one-fifth of caregivers expressed a lack of interest or unwillingness to use a smartphone app or particular features of an app. The majority of these caregivers described how features that replicate a function they already have access to through their phone or other technology (e.g., a search engine on a website) would not be helpful. For example, one caregiver mentioned that an app feature that provides MH information would not be useful because they can use an online search engine, such as Google, to find that information. In other instances, caregivers mentioned that a particular feature (such as a reminder) may not be helpful simply because they did not believe they needed it. When asked about the usefulness of medication reminders, one caregiver stated:

“It [medication refill reminder] was more bothersome cuz I knew I was gonna do it [refill the medication] anyway...” (Caregiver)

Several providers/administrators also questioned how many caregivers would be willing to use a smartphone app, and anticipated variation in caregivers’ likelihood of using these tools due to factors such as caregiver motivation and/or psychosocial stressors associated with living in poverty. One clinic administrator described,

“There definitely are some with smartphones, but the only way it’s gonna work is if they’re motivated. They have to be motivated to turn on whatever the app is or to plug in whatever info they gotta plug into the app to make it work. I gotta tell you, with my population, I would probably tell you ten percent might use it.” (Administrator)

Discussion

Our study highlights the potential of mHealth tools to help caregivers manage the MH treatment process for their child. Findings from our qualitative data revealed that most caregivers and nearly all providers/administrators expressed interest in the potential of mHealth tools to facilitate the MH treatment seeking process for children with ADHD. These findings were supported with survey data collected from caregivers, which indicated high rates of access to cellular phone and smartphone technology. These caregivers reported similar rates of cellular phone and smartphone ownership compared to those reported in a

national sample of U.S. adults during a similar timeframe.³⁸ The study participants also expressed widespread acceptability of receiving health information online, and all of the caregivers in our sample with smartphones had used their devices to access the internet and find health/medical information online. Our findings add to a growing body of research reporting that caregivers may be especially motivated to use smartphones and other forms of technology to help their child with special health needs navigate the health care system.³⁹

Beyond issues of access to technology, in the qualitative data, caregivers, providers, and administrators described the potential helpfulness of mHealth tools that streamline the care seeking process for busy, resource constrained caregivers, by providing reminders (i.e., appointment reminders and medication refill reminders) and tools to keep track of treatment-related information. Several caregivers shared their perspectives about why these tools would be especially helpful – describing their busy schedules, the challenges caring for a child with MH needs, and the volume of information they are supposed to keep track of (using a handwritten system) when managing their child's treatment. Our findings are consistent with prior research among adults and adolescents with MH disorders documenting the effectiveness of short messaging service (SMS) appointment reminders (i.e., text reminders) to improve attendance at appointments and reduce no-show rates,^{40–45} as well as the usability of mHealth tools among those with MH disorders for mood charting.^{46,47} To date, however, this literature has generally focused on the individual with the MH disorder that sought care for themselves, rather than among caregivers helping a child navigate the MH treatment process. Our findings suggest that these tools would be of interest to caregivers with publicly-insured children helping their child navigate the treatment system.

Caregivers, providers, and administrators also described the potential helpfulness of mHealth tools that facilitate the flow of information for caregivers, including functions that provide MH-related information for caregivers as well as functions that facilitate communication between caregivers and providers. There was considerable support for mHealth functions that offered a resource for caregivers to obtain easy-to-understand information about MH symptoms and treatment options, as caregivers described a need and desire for more information on these topics. In addition, providers and clinic administrators discussed the need to provide greater information and education to caregivers. Previous studies that have piloted a MH-specific mHealth application for patients with MH problems have included information and resources to help educate the users.^{48,49} Our findings build on this work by highlighting how this function would also be helpful for caregivers to navigate their child's mental health treatment process.

Despite considerable expressed interest in mHealth tools for caregivers of pediatric MH patients, participants from all three groups of stakeholders also spoke of two major challenges when considering the potential usefulness of mHealth tools for caregivers to manage a child's MH treatment in safety-net settings. First, several participants noted that only a subset of caregivers would be interested in using these tools. The fact that most of our caregiver respondents expressed interest in these tools may also reflect a positive bias of those caregivers who were most interested in/able to attend the focus groups. Yet, even the most skeptical MH providers and clinic administrators we interviewed described how this

type of technology would be of interest to a subset of families they served. Second, despite widespread access to phones/smartphones, providers noted that such access may be inconsistent if patients/caregivers are unable to pay bills or when pre-paid phones are used. Therefore, strategies may need to be employed to assist caregivers with the cost of the phone, cellular phone service, and/or the smartphone app itself in order to ensure consistent access.

Conclusions drawn from this study and implications for practice and future research should be tempered by the following limitations. First, participant recruitment was solely from four safety net clinics in Georgia that serve publically insured youth. Thus, the findings may not necessarily generalize to other populations or settings. Selection bias is another possible limitation. The four partner sites were purposively selected. In addition, clinic administrators volunteered to participate and to assist the research team with the process of recruiting providers and caregivers into the study. Nevertheless, clinic administrators and providers were able to provide perspectives about the potential of mHealth tools to facilitate the treatment seeking process for low-income families. Third, because the focus of the study was on mHealth tools for caregivers, we did not ask caregivers about their child's cellular phone/ smartphone ownership or their child's potential interest in mHealth technologies to facilitate MH treatment. Lastly, although the study included the perspectives of caregivers managing the MH treatment-seeking process for a child, the perspectives of the children themselves were not included. Future studies may investigate youth (particularly adolescent) perspectives on mHealth tools used by their caregivers as part of the care seeking process.

Our findings reveal stakeholders' interest in the development and availability of mHealth tools that support caregivers helping their child seek MH treatment. Medicaid and CHIP play an especially important role in the treatment of children with MH care needs. Therefore, caregivers with a child insured through one of these programs constitute a potential consumer base for mHealth tools targeting different aspects of MH care delivery and care management. As new mHealth technologies continue to emerge, biotechnology firms, entrepreneurs, and researchers should consider investing in the development of and research on mHealth technology that facilitate the MH treatment process for these families.

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Table 1:**Participant Characteristics**

	Caregivers (N=37)	Administrators & Providers (N=17)
Participant Characteristics		
Female, %	91.9	82.4
<i>Age, %</i>		
<40 years old	32.4	53.0
40–49 years old	27.0	23.5
50+ years old	32.4	23.5
Unknown	8.1	-
<i>Race, %</i>		
White	43.2	58.8
African American	56.7	29.4
Asian	-	11.8
<i>Education, %</i>		
High School Degree or Less	37.8	-
Some College	35.1	5.9
College Degree	27.0	17.6
Master's or Doctorate Degree	-	76.4
<i>Length of Time in Position, %</i>		
<1 year	-	35.3
1 to <3 years	-	29.4
3+ years	-	35.3
Information about Child		
Number of Children in Household Who Receive ADHD Treatment, %		
1 child	83.8	-
2+ children	16.2	-
Age of Oldest Child Receiving ADHD Treatment (Years), %		
<12	48.6	-
12–17	51.4	-
<i>Comorbidities reported, %</i>		
None	24.3	-
1 co-morbid MH condition	35.1	-
2+ co-morbid MH conditions	40.5	-
<i>Types of Treatment Received by Oldest Child, %^a</i>		
Medication	89.2	-
Individual Therapy	78.4	-
Family Therapy	27.0	-

	Caregivers (N=37)	Administrators & Providers (N=17)
Group Therapy	13.5	-

^aNotes: These categories are not mutually exclusive.

Table 2:

Use of Technology among Caregiver Participants

	Percent [±]
Has a cellphone	100
Has a smartphone	79.4
Uses phone to...	
Send/receive email	73.5
Send/receive texts	94.1
Take picture	97.1
Access internet	79.4
Find health/medical info online	79.4
Interacts with child's provider through internet or email	32.4
Receives health/medicine text updates/alerts	61.8
Looked for health information online in past 12 months	82.4

[±]Percent calculated for 34 caregivers that responded to pre-focus group questionnaire about technology

Table 3: MHealth functions that can improve the MH treatment process for low-income youth

Function	Strength of endorsement		Caregivers	Providers & Admin	Caregivers	Illustrative Quotes	Providers & Administrators
	Caregivers	Providers & Admin					
Provide reminders for caregivers about...	+++	++					
•Appointments	+++	++					
•Medication refill	+++	+					
Help caregivers obtain information about...	+++	++					
•ADHD, including symptoms	++	+					
•Behavioral management techniques	++	+					
•Treatment options	++	+					
Help caregivers track information about...	+++	+++					
•Symptoms	+++	++					
•Medication – dose, symptoms, and side effects	++	++					
•Behavioral management techniques	+	+					
Help caregivers communicate with providers	++	+					
•Improve the accuracy of information parents share with providers	++	+					
•Facilitate asynchronous communication	+	+					

Notes:

⁺ Some Endorsement [Discussed in 2 of the focus groups or by less than half (i.e., <8 of 17) of interviewees]

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Strong Endorsement [Discussed in 3 or 4 of the focus groups or by 9–13 of interviewees]
++
++
++ Very Strong Endorsement [Discussed in all 5 focus groups or by at least 80% (i.e. 14 of 17) of interviewees]