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A smart (phone) solution: Improving early intervention for families of low socioeconomic status

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A SMART (PHONE) SOLUTION: IMPROVING EARLY INTERVENTION FOR FAMILIES OF LOW SOCIOECONOMIC STATUS

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Abstract: This paper analyzed the use of the smartphone in early intervention with parents of children who are deaf or hard of hearing. The smartphone tools explored were texting, video, social media and internet, and mobile applications. This paper examined the benefits and drawback to using these tools in early intervention with a population that has additional stressors on the early intervention experience.

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Introduction

Poverty is a prominent topic in education due to the well-documented effects it has on a child's academic success. Research shows children who grow up in impoverished environments are more likely to exhibit academic and language delays. In the field of deaf education, supporting children from low socioeconomic status (low-SES) homes is crucial because children with hearing loss already demonstrate delays in listening and language regardless of the demographic challenges. Research demonstrates early intervention and parent education is a solution to decrease delays of children who deaf or hard of hearing. Moreover, this strategy is successful in other related fields when working with the low-SES population to increase engagement in intervention or medical care. In sum, to improve services for children who are deaf and hard of hearing from low-SES providers should empower parents to create a developmentally-enriching environment to aid in their child's development.

Early intervention

Part C of IDEA provides early intervention services for families and children who are deaf or hard of hearing. The goal of Part C of IDEA is to enhance the development of a child with a diagnosed physical/mental disability/condition, delayed in one or more of the five developmental areas, and in some states, the child qualifies for services by being at-risk for development delay (Adams, Tapia, & The council on children with disabilities, 2013). Evidence-based practice for early intervention includes the coaching model and natural environment (Adams et al., 2013; Rush, Shelden, & Hanft, 2003; Woods, Wilcox, Friedman, & Murch, 2011). Barton and Fetti (2013) conducted an analysis of past research to find the relation between implementation fidelity, intervention fidelity, and child outcomes for parent-implemented interventions. The results showed a positive correlation between effective parent training (the coaching model), the use of evidence-based practices (natural environment and

parent engagement), and the success in child behavior positive change and parent satisfaction (Barton, & Fettig, 2013).

The natural environment includes settings and daily activities/routines of the family, child, and other important people that aid in the development of the child's life (Adam et al., 2013; Rush et al., 2003; Woods et al., 2011). The natural environment allows the early interventionist to develop the caregivers' skills through activities and environments that the child would be participating regardless of their disability. Typical activities and environments used by the family will promote carryover because there is no change to a daily routine. Supporting the natural environment, coaching is a collaborative approach between the early interventionist and families in which the provider coaches parents to develop positive relationships with their child and to create developmentally-enriching environments (Adam et al., 2013; Rush et al., 2003, Woods et al., 2011). The coaching method has five principles that make the intervention successful: joint planning, observation, action, reflections, and feedback (Adam et al., 2013, Rush et al., 2003, Woods et al., 2011). While maintaining these principles, early interventionists counsel parents to relieve emotional stress. In addition, providers share resources with families to build their confidence and understanding of the developmental milestones for their child. To make these principles successful, caregivers and early interventionists need to have open communication, trust, and respect (Adam et al., 2013; Rush et al., 2003, Woods et al., 2011).

Providers aim to incorporate communication, trust, and respect in their services. The two main ways to measure a successful early intervention are the families reported emotions of the early intervention services and the development of the child. The National Early Intervention Longitudinal Study administered a survey to 2,974 families enrolled in early intervention programs to determine trends within early intervention services. The survey indicated a majority

of families had ease finding early intervention services, experienced appropriate involvement in making the IFSP goals, and felt their provider demonstrated respectful and individualized services (Bailey, Hebbeler, Scarborough, Spiker, & Mallik, 2004). The small percentage of families that reported negative experience consisted of families with low-income, low-parental education, or ethnic minority (Bailey et al., 2004). These families reported more effort to find services, lacked knowledge of the written IFSP document, wanted more involvement in the decision-making, and experienced dissatisfaction with the services provided by professionals (Bailey et al., 2004). Therefore, as professionals we need to find solutions and techniques in order to decrease the negative emotions to families that fall into these categories.

Additional stressors for low-SES families

Families with a low-SES have additional challenges and stressors that affect their involvement in the early intervention process and the development of their child. Voss and Lenihan (2014) state that families with a low-SES have obstacles limiting their access or success in early intervention services, "These challenges include: food insecurity, housing insecurity, health disparities, access to hearing technologies, lack of transportation, increased risk of child maltreatment, and lack of enriching environments and relationships (p. 13-6)." Housing insecurity will have a direct impact on families' consistency with home-visits and communication with providers. Lack of transportation creates difficulties for parents getting to work and children getting to appointments. Still more challenges exist that can cause additional stressors for the parents and children. For example, food insecurity can affect a parent and child's mental health and behavior (Adam et al., 2013). Lack of developmentally enriching environments, positive relationships, and access to hearing technology has been a trend that

affects a child's academics and language (Beeghly, 2006; Ispa et al., 2004; Voss, & Lenihan, 2014; Stern, Yueh, Lewis, Norton, & Sie, 2005).

The aforementioned additional stressors have an effect on the intervention experience. However, stressors that affect an enriching environment and a positive relationship between the caregiver and child have a direct effect on the child's development and the parents' ability to create a nurturing environment to foster the child's development. Ispa et al. (2004) conducted a study that observed video sessions of 1,232 mothers and children of a low-SES across a variety of ethnic race at Early Head Start Programs. This search focused on low-SES families because they have additional stress that can influence the warmth and relationship with their child. The videos captured the interaction of each mother and their child during play when the child was 15 and 25 months of age. The variables analyzed were maternal intrusiveness and warmth, child negativity, child engagement, and dyadic mutuality, or the connectedness. The study found that mothers' intrusiveness during play had a negative correlation on child engagement and dyadic mutuality and a positive correlation to the children's negative emotions toward their mother (Ispa et al., 2004).

Another study by Hart and Risley (1995), concluded that there are differences in language-enriched environments based on various income levels, which have an effect on a child's IQ and academic success. Hart and Risley (1995), stated, "By age three, the observed cumulative vocabulary for children in the professional families were about 1,100 words. For children from working class families, the observed cumulative vocabulary was about 750 words, and for children from welfare-recipient families it was just above 500 words." Vocabulary is a huge part of a child's language abilities and this powerful statistic demonstrates the difference of children's language potential from different backgrounds.

Ispa et al. (2004) and Hart and Risley (1995), provide examples of low-SES influence in typical developing children. Children who are deaf of hard of hearing often have decreased speech and language skills compared to typically developing peers. When considering a child who is deaf or hard of hearing that comes from a low-SES background, they have additional barriers to overcome on the journey to their true learning and communicative potential. Adding challenges to an already delayed child further amplifies the importance of effective techniques for early interventionists to improve a child's language environment and relationship with caregivers.

Characteristics of low-SES families

When researching the low-SES population it is important to recognize the characteristics and prevalence. Jiang, Ekono, & Skinner (2014), conducted The 2012 American Community Survey (ACS) to define demographic, socio-economic, and geographic trends for parents and their children. The survey demonstrates the prevalence of families living in low-SES in USA. Further, the survey revealed that low-SES attributes to other variables like marriage status, housing stability, race, and education. Jiang et al. (2014), found that 45% of children are living in families of low-income, which is poor or near poor determined by the federal poverty threshold. The study defined poor as at the Federal Poverty Threshold (FPT), above low-income as two times above the FPT, and near poor in between (Jiang et al., 2014). Past research has shown that families may need as much as 1.5 to 3.5 times more than the FPT in order to meet basic needs, which can vary depending on location and age of children (Dinan, 2009). Additionally, 48% of children under the age of three live in low-income families totaling 5.4 million children (Jiang et al., 2014). This statistic states that nearly half of children come from a low-income environment. The government census information states that the poverty level of children under the age of

eighteen years was 19.9 in 2013 and 14.5 percent for official poverty rate (DeNavas-Walt, & Proctor, 2014). However, the census statistics are based on the FPT and from past research this can be not an accurate depiction of all families struggling financially.

Looking at the change in the prevalence of low-income families demonstrates how relevant focusing on this population is present and future research. Jiang et al. (2014), found that there was a 13% increase of families in this category from the year 2006 to the year 2012. The government census found the first decrease since 2006, but the decrease was only .5 percent. This is a small decrease, which indicates that this will not resolve quickly. Further, the census stated that the decrease was not statistically different. Both survey statistics prove that there are a significant number of low-income families, which indicates a need of research for this population.

The Jiang et al. (2014), survey demonstrated that the Hispanic, African American, and American Indian make up the highest percentage of children living in low-income families. Children living in low-income families were more likely to have parent(s) that had less than a high school degree or high school degree level of education (Jiang et al., 2014). In addition, the parents of children living in low-income were more likely to work part time/part-year or be unemployed (Jiang et al., 2014). Lastly, 69% of children living in low-income families lived in a single parent home (Jiang et al., 2014). These statistics demonstrate common characteristics of children and parents living in low-income families. When researching families of low-SES, income should not be the only characteristic that defines this population, but should include education, race/ethnicity, and marital status in order to describe the population accurately. Therefore, articles relating to all characteristics provide relatable information in order to best formulate techniques for the low-SES population.

Language of children who are deaf or hard of hearing

Spoken language is a natural process that begins at birth. Spoken language has two primary drivers that affect the acquisition; joint attention and overhearing. Joint attention is the bond that develops between a child and caregiver in order for a child to learn the importance of social interaction and a baby's surrounding has meaning. After one year of age, overhearing is the primary driver of spoken language. Overhearing requires the child to process the acoustic stimulus in their environment successfully. This requires children to listen to environmental sounds and spoken language. A child that is deaf or hard of hearing begins their journey of learning spoken language delayed. The child has delays in joint attention due to not receiving verbal reinforcement. Due to a child's hearing loss, they are not able to process the acoustic signals in his or her environment and this will affect the brain's ability to process this type of stimuli. Due to these delays, children who are deaf or hard of hearing fall behind in the acquisition of spoken language. One of the goals of early intervention is to close the developmental gap in language, speech, and listening abilities between children who are deaf or hard of hearing and their typical hearing peers.

Deaf education techniques used with low-SES families

Understanding and researching techniques for families of low-SES who have children who are deaf or hard of hearing is important due to the huge impacts it has on a child's development. Voss and Lenihan (2014), published strategies for early intervention programs to utilize when working with at-risk families, which is a population of families that includes families with financial stressors and academic delays of the children from these families. The strategies were broken into the following categories: identify personal bias, build relationships (parent-professional and parent-child), assess family needs, document what works, keep

everyone safe, provide resources and support, educate families on quality instruction, and increase awareness and advocacy (Voss, & Lenihan, 2014). Incorporating these techniques into services will increase the effectiveness of early intervention for families of low-SES with children who are deaf or hard of hearing. In turn, this will positively affect the child's development and success later in life. These strategies are important to use in conjunction or when assessing the effectiveness of future strategies.

Finding evidence-based strategies to use with low-SES is important to improve the child's language. Within the field of deaf education, recent research explored the use of technology to improve language environments for children who are deaf or hard of hearing from a low-SES household. Sacks et al. (2013) began a pilot study for Project ASPIRE. The parents completed a ten-week course of weekly home visits that provide individualized information and techniques to improve the language environment for their child who is deaf or hard of hearing. The goal of the project used the LENA device to collect data on the number of words used in the child's environment for a given period of time. The LENA device provided qualitative data in order to provide feedback for the parents on how language-enriched their home environment is for the child. The individualized educational and interactive home visits in conjunction with the LENA increased the language environment the children experience (Sacks et. al., 2013). Although, this technology and approach has shown promise, the availability of these devices is not easily accessible. Therefore, future research should consider improving the language environment using the techniques used in this study, but should consider a more accessible type of technology.

Related fields techniques used with low-SES or related populations

Research from related fields has documented technology in early intervention services, in order to provide better services for their patients or parents. For example, in the medical field and prevention of child maltreatment field research examines video, texting and calling, mobile applications, and internet and social media to increase patient/caregiver engagement. In order to increase engagement the studies aim to improve access to resources for support and information. These types of technology aim to increase the communication between professional and parents/patients. The studies found that these technology tools generally improved the engagement and access to support and information across all populations. These approaches apply to the field of deaf education early intervention research in order to develop successful tools to increase success of early intervention for families of low-SES.

A cohesive solution: The Smartphone

Technology provides an opportunity for a cohesive approach of utilizing effective strategies in a method that is relevant for families in early intervention programs for children who are deaf or hard of hearing and of low-SES. Zickuhr (2011) found the following percentage of adults own smart phones: 95% of adults age 18-34, 92% of adults age 35-46, 86% of adults age 47-56. Singh, Wilkinson, & Braganza (2014) found no statistical difference between smartphone ownership across all socioeconomic statuses. This indicates that smartphone ownership is relevant to all socioeconomic statuses. Moreover, adults living in poverty were more likely than other demographic populations only to have wireless telephones in the home (Blumberg, & Luke, 2014).

This review of current literature will explore the hypothesis of a smartphone as a tool in family-centered EI services which can increase parent involvement and engagement for families of low-

SES. This tool can aid in the overall goal to increase the quantity and quality of parent and child interactions, as well as the child reaching his/her true developmental potential.

Method

The following search engines were used to collect articles: Scopus, PubMed, CINAHL, ERIC, and Google scholar. The key terms used to search articles in search engines were as followed: child-parent intervention, social media, family intervention, healthcare, intervention, parent education, education, early intervention, social network, statistics on smartphone, low-SES, SES, mobile applications, apps, mobile apps, technology, educational technology, and app language learning. A spreadsheet was created to sort through the most relevant and recent articles. The spreadsheet provided basic information on the article (title, author, date of publication, journal or source, main ideas, and if the article supported or opposed the research topics), and how the article was found (search terms and the database). The research articles used in this paper were current as of January 2015.

Smartphone Solution: Texting

The frequency of communication between a provider and the caregivers of a child who is deaf/hard of hearing increases success in early intervention. Increasing the communication between providers and caregivers develops rapport, improves the support caregivers receive from providers, and increases the frequency and comfort of parent reporting. When basing communication between caregivers and providers only on home visits, families from low-SES may be affected by differences in service granted by the government. In addition, families from a low socioeconomic status have unpredictable housing, which may create inconsistencies for home-visits. Parents have the chance to communicate with providers at related appointments, but due to transportation difficulty, this can also be a missed opportunity.

A popular method of 21st century communication is the text message using a smartphone. Smith (2011a) administered a survey to 2,277 adults to describe trends of Americans and their smartphone usage practices. The results showed that of adults that own a smartphone, 99% of adults 18-29 and 95% adults 30-49 receive or send text messages (Smith, 2011a). Smith (2011b) analyzed survey data on texting and phones calls. The survey results stated that younger, non-whites, and lower socioeconomic status populations use texting more than the other demographic populations (Smith, 2011b). Pew Research Center (2014) combined data from two surveys for a total of 2,008 adults. The results found that from the population that owned smartphones, 47% of the adult owners' total income was less than $30,000 a year (Pew Research Center, 2014). Smith's (2011b) data on texting showed that the frequency of texting was equivalent to the frequency of phone calls. However, the data stated that individuals that were more frequent texters preferred to be contacted by texting versus phone calls (Smith, 2011b). Texting is one of the most popular activities exhibited by smartphone owners and is practiced by the target population of parents from a low socioeconomics demographic. Therefore, this approach could improve rapport with caregivers in a way they view as comfortable and familiar. To better analyze the benefit and drawbacks of using the smartphone for communication, the focus was texting because it proves used by the intended population and the preferred contact method.

Research on utilizing texting in early intervention for families that are deaf and hard of hearing is limited; however, similar professions have conducted research in order formulate the benefits and drawbacks. The medical and prevention of child maltreatment fields have generalized benefits from studies considering the use of calling and texting to increase engagement of caregivers or behavior change in patients. Numerous studies indicate the use of texting increased opportunities for educators to communicate with families (Carta, Lefever,

Bigelow, Borkowski, & Warren, 2013; Jones et al., 2013). The enhanced communication leads parents to implement the strategies more often and reducing stress (Bigelow, Carta, & Lefever, 2008; Carta et. al., 2013). In addition, when providers received questions from parents concerning the techniques, it gave the provider information on the parents' habits of implementing the strategies.

Without face-to-face communication and the pressure of judgment lessened, texting and calling may lead to valid reporting (Alemagno, Cochran, Feucht, Stephens, Butts, & Wolff, 1996). Utilizing texting provides recorded communication because the phone has a text history. Texting has been utilized through automated systems that can provide the parents with additional information and reminders (Koshy, Car, & Majeed, 2008; Whittaker et al., 2012). This approach has increased the consistency of attending appointments and obtaining information.

The drawbacks complete the analysis of utilizing texts as a tool to promote improved communication and engagement of parents from a low socioeconomics in the early intervention process. A person's mobile phone is a part of an individual's personal life. Therefore, providers using their mobile phones as a tool to communicate with parents would be blending their personal and professional lives. Providers may feel uncomfortable with sharing private information with and feel pressure to answer families during non-working hours. Utilizing smartphones as a primary communication option may be problematic. Due to lack of resources, parents from a low socioeconomic status may have a higher chance of having their service turned off. Lastly, utilizing text messages would promote communication that excludes non-verbal information. Incorrect interpretation of the tone or intent of a text message is due to lack of emotion provided through live speech and body language.

Solutions for the drawbacks of using texting during the early intervention experience for parents from a low socioeconomics outweigh the success of this approach. Maintaining a separation of providers' personal and professional lives is a concern avoided by developing an automated response message for reachable hours. In addition, programs may consider providing early interventionists work phones in order to communicate with families. A contract discussing a families' and providers' boundaries of exchanging personal information could be a solution to address maintaining a balance of personal and professional lives. However, a contract on reachable hours may affect the rapport between a family and provider because the family would not feel their services were personalized. Families from a low socioeconomic status may not have the resources to maintain their phone consistently. As providers, we could provide information to families on apps that can make phone calls or texts with the use of Wi-Fi, which does not require a mobile service contract. Also, Wi-Fi is available for free at many public venues such as libraries and restaurant. For example, Facebook Messenger or Google Hangouts create communication options with Wi-Fi. Lastly, training professionals how to exhibit effective communication with parents through texting and phones calls will address miscommunication of messages without non-verbal information.

Texting is a popular mode of communication for adults. Texting provides an outlet that will increase communication between providers and caregivers. Improved communication allows early interventionist and parents to build relationships that will help in establishing a successful collaboration. Further, the increased communication allows providers to provide increased support and feedback to parents. The increased support can create a positive relationship for the parent and child, and further develop the parent skills in providing a language-rich environment for the child. Text reminders will help keep the parents involved in the early intervention

experience. The concerns that may develop when utilizing texting as a tool can diminish with planning and training of the professional.

Smartphone Solution: Video

Providers use coaching and communication within a families' natural environment to promote the engagement of caregivers and in turn build parents' confidence in using strategies to enhance a child's development of speech, language, and listening (Woods et al., 2011; Keilty, 2008). Early interventionists providing support to caregivers use a specific learning cycle that develops these skills. The three components of the learning cycle include: a demonstration of individualized activities for families to implement, parents' participation in guided practice and feedback with providers, and ongoing reflection of parents' skills and emotional states (Woods et al., 2011; Keilty, 2008). To build a caregiver's confidence and consistently integrate these strategies in their daily lives takes repetition. This supports the importance of constant communication between caregivers and providers. Voss and Lenihan (2014) state that there is a greater need of support from the provider for families in low-SES due to additional family risks.

The smartphone creates more opportunities for communication than just the basic forms of cellular communication like texting and phone calls. One of the popular methods is the ability to record, send, and view videos. Smith, (2011a) surveyed 2,277 adults' smartphone trends that demonstrated 89% of adults ages 18-29 and 83% adults ages 30-49 send videos or photos. In addition, the same survey results showed that 73% of adults ages 18-29 and 62% adults ages 30-49 record videos (Smith, 2011a). Lastly, the results revealed that 73% of adults ages 18-29 and 58% adults ages 30-49 watch videos (Smith, 2011a). These trends indicate the popular use of recording and sharing of videos among smartphone users and could help increase the success of families of low-SES during the early intervention process. The exchange of videos between

providers and caregivers could increase feedback and communication specific to the caregivers' abilities to implement the strategies with their child throughout their day.

Related fields have found benefits with video when working with parents of children with disabilities or parents that have additional stressors that resulted from low-income. Benzies, Magill-Evans, Harrison, MacPhail, & Kimak (2008) conducted a study to strengthen fathers' skills in caring for their infant. The study used video during the home visits. The fathers reported liking to have professional feedback (Benzies et al., 2008). The use of videos during home visits allows the opportunity to stop the video in order to highlight when the parent was using effective strategies (Benzies et al., 2008). Caregivers found that having access to recorded videos allowed them to watch the videos repeatedly (Lea, 2006; Benzies et al., 2008). Moreover, recorded videos increase involvement of caregivers that are not present at home-visits and other family members that play a critical role in the child's life (Baggett et al., 2009; Benzies et al., 2008; Lea, 2006; Jones et al., 2013). The video allows providers to understand the caregivers' ability to execute and frequency to use the strategies outside of home-visit sessions (Jones, et al., 2013). Providers having access to videos from caregivers allots early interventionists increased opportunities for caregivers to receive positive and constructive feedback between sessions (Jones, Forehand, McKee, Cuellar, & Kincaid, 2010; Jones et al., 2013).

The implementation of videos as a tool in early intervention will create concerns. Providers having recorded videos of families on their smartphones may lead to a privacy issue. Providers may watch the videos in a public area, which compromises the families' privacy. Furthermore, the provider's smartphone or account synced to the cloud may compromise the family's privacy. However, similar to other privacy concerns previously mentioned in the paper, work phones or privacy contracts may eliminate the concerns. Privacy contracts outline with

whom to share the videos with and how the videos will be stored after being stored. In addition, early interventionists could have proper training on working with smartphones that have private information. In addition, there are mobile apps designed to secure sharing information. Yakuel (2009, August 8) provided popular apps to share files which included: Box.net, wikisend, drop.io, filedropper, and zshare. Each app differs on how big the file can be, if you have to sign up to use the app, if there is a password protection, and other factors. Another concern from the provider perspective is sending demonstration videos to parents may not incorporate proper explanation of techniques. However, sending videos that include a recorded commentary through another technology medium like social media or email may prevent the concern. This would allow parents to receive larger files. Developing a demonstration video that includes an explanation of the strategies used in the activity may be difficult. Therefore, providers should receive technical training in order to obtain these skills. In addition, caregivers may have difficulty creating the videos for providers. Some of the difficulties for caregivers would be recording the activity while implementing it and keeping the child in one place. Although the level of difficulty keeping a child in view of the camera would be child and activity dependent, creating a setting that makes the child more focused may eliminate this concern. In order to eliminate recording difficulty, parents may consider purchasing a stand for the smartphone.

Statistics show that smartphones are common among adults. The use of recording and sharing videos is a common activity for smartphone users. Parents from low-SES in an early intervention program for children who are deaf or hard of hearing need added support in addition to the typical practices that provided by early interventionists. The use of videos would increase parents' use of strategies because having access to demonstration videos could create repetition of viewing effective strategies. The increased exchange of videos could create more

opportunities for providers to provide positive and constructive feedback of parents' use of effective strategies in their daily lives. With special considerations, most negative drawbacks would diminish. Therefore, the parents of low-SES would benefit from videos as a tool in their early intervention experience.

Smartphone Solution: Social media and the internet

Social media is a medium of communication for professional and personal worlds often utilized through a smartphone. Terry N.P. (2012), said "…Facebook [receiving] 590 million unique visits per month, Twitter 97 million, and the professional-oriented LinkedIn 41 million", which demonstrates that social media sites are familiar to the general population (p.705). Knapp, Madden, Wang, Sloyer, & Shenkman, (2011) conducted a survey that defined the internet use of low-income parents with children who have disabilities and received 2,371 responses. The results indicated, "About 82% of parents reported they used the Internet." (Knapp et al., 2011, p. 4). Further, the results concluded, "26% of parents had accessed the Internet or email from mobile devices." (Knapp et al., 2011, p. 4) Lastly, McKenna, D'Alessandro (2011) found that future patients would be empowered using technology to gain information on their health.

One popular use of the internet on a smartphone is social media. The frequent use and comfort with social media provides support for the investigation and consideration of this medium to improve the success of families of low socioeconomic status with children who are deaf or hard of hearing. Social media would aim to enhance the engagement and interaction of parents. In that, it could create more opportunities to exchange information, promote support among deaf and hard of hearing families, and increase the communication with providers and caregivers. Specific research on the effects of social media in early intervention for deaf and hard of hearing families is limited; however, other parallel professions have explored the possibilities.

Studies in health care and maltreatment prevention for at-risk families have concluded benefits and drawbacks to utilizing social media. Research demonstrated improvement in the relationship between caregivers and providers, the establishment of relationships among families, and the exchange and inquiry of information. One example is a survey used to reflect the increase of parental engagement in child maltreatment prevention, using Facebook. The parents stated they liked the easy access to a plethora of resources posted within the Facebook group and by other parents (Edward-Gaura, Whitaker, & Self-Brown, 2014). Parents felt they had more access to information (Edward-Gaura et al., 2014; Love, Sanders, Metzler, Prinz, & Kast, 2013). The parents stated that they had more communication with providers (Edward-Gaura et al., 2014).

In recent years, the medical field has studied the benefits and concerns of implementing social media and internet into healthcare. The results are consistent within the studies in maltreatment in that parents use internet and social media to find information and seek support. The results provide compelling and insightful information on how patients use the internet and social media (Sarasohn-Kahn, 2008; McKenna et al., 2011). Horrigan (2003) stated, "Three-quarters (73%) of health seekers say the Internet has improved the health information and services they receive (p. 3)." Vandelanotte et al. (2014) examined the effectiveness of free physical activity intervention websites. An interesting statistic concluded in their results stated, "The most popular options for content sharing were social media status updates (58.7%), discussion forums (50%), sharing success stories (50%), uploading photos (47.8%), blogs (43.5%), and the option to make comments (39.1%) (p. 11)." This statistic demonstrates how to share information through social media and internet. Health Commons Institute developed online support networks which are referred to as the "chicken soup of the Internet" for patients with

diabetes, cancer, or other health concerns (Sarasohn-Kahn, 2008). It was stated that the "cooks" can be formed any hour of the day in Facebook, where more than 500 groups focused on diabetes meet; FLickR, where there are nearly 2,000 photos posted on chemotherapy; and YouTube, where about 36,000 pages are devoted to some surgery."(Sarasohn-Kahn, 2008, p. 20). This statistic demonstrates how quickly various social medias can provide online support for the patients' health concern or disorder.

Social media may provide benefits and help eliminate obstacles presented for parents from a low socioeconomic status in early intervention, but there are potential drawbacks. Social media in personal use and professional use has led to privacy concerns for caregivers (Edward-Gaura et al., 2014; Nguyen et al., 2013). In promoting the use of this type of technology, there is the possibility of HIPPA violations occurring for families (Hawn, 2014; Terry, N.P., 2012; Terry, M., 2009). If a provider shared an experience with a family using social media, and did not monitor the information, the provider could release identifying information, which would result in HIPPA violation. Parent interacting through social media and internet allows for open communication. Parents may feed off other parents' negative experience and not assess the facts of the situation (Rozenblum, & Bates, 2013). Through an open communication, providers are unable to monitor other parents' responses, which could lead to a parent posting something offensive to another parent's family. The use of internet and social media as avenues for parents to gain information may lead to misinformation (Lau, Gabarron, Fernandez-Luque, & Armayones, 2012; McNab, 2009). Furthermore, professionals using social media with patients could blur professional and personal boundaries (Terry, N.P., 2012). Finally, professionals may give the organization they work for a bad reputation based on what they post (Terry, N.P., 2012).

Describing the benefits and drawbacks of the use of social media in early intervention is important in order to determine effectiveness of this tool. Benefits of social media outweigh the drawbacks leading to the generalization that this is a helpful tool. Careful planning by professionals and early intervention program may reduce a majority of concerns. Some points to consider would be informing parents on proper etiquette using social media by providing tips on appropriate ways to provide encouragement and empathy with other families. Families need access to a list of reliable sites and groups. To address privacy concerns, programs may consider signing a consent form. The consent form would outline what a family is comfortable sharing on the web. Early intervention programs should consider proper training that trains professionals on how to use social media professionally, in order to avoid the following concerns: HIPPA violations, inappropriate sharing to affect the reputation of their program, and inappropriate boundaries with caregivers.

Past research found considerations when considering how to implement social media effectively, especially to a particular target population. Edward-Gaura et al. (2014) recommended developing incentives for interacting on the group page in order to motivate parents to participate. In addition, the Pew Research Center has developed statistics based on the use of social media that help understand which site to use depending on the target demographic. Lenhart, Purcell, Smith, & Zickuhr (2010) found that Facebook is the only social media platform that does not show demographic trends. However, Twitter and Instagram users are more likely to be non-white, urban dwellers, or younger adults (Lenhart et. al., 2010). These statistics may assist in the careful considerations when establishing a tool that would target certain demographics.

The use of social media in health care and prevention of maltreatment has increased access to internet and smartphone ownership. These fields utilized social media to increase communication, community support, engagement, and access to information. Social media would allow families access to information and resources that they may view on their own schedule, as well as using a medium they are comfortable using. The increased mode of communication would reduce the possible missed chances of communication due appointments or home visits, which may happen due to housing insecurity and lack of transportation. Special training for professionals and parents can decrease social media concerns. Therefore, utilizing this medium as a tool in early intervention would aid in the success of the early intervention experience for families of low-SES with children who are deaf or hard of hearing.

Smartphone Solution: Mobile applications

The ownership of smartphones across all demographics makes mobile applications accessible. Mobile applications are a prevalent method to improve and simplify daily life routines. Incorporating mobile apps into early intervention would enhance the success of caregivers in two primary ways. First, parents can use mobile apps during interactive therapy activities to motivate the child to practice skills or enhance their development in language, listening, literacy, or social skills. Using mobile apps as an interactive activity may enhance a developmentally enriched environment for families who are of low-SES. Second, parents can use mobile apps to increase their communication with early interventionist, their ability to report or document the child's development, and the organization of health documents.

Chiong (2013) wrote an article on children and technology which stated, " In a survey of over 800 parents of preschool or early elementary-aged children, the number one place where they allowed their child to use their smartphone was 'in the car' (60%) followed by 'at home'

(39%), ‘while waiting’ (27%) and ‘while travelling’ (26%)” This statistic shows how and where parents are using a smartphone as a behavior management tool. Linebarger, & Vaala (2010) conducted a literature review that stated, “Screen-media-wise, a significant percentage of parents have reported that educational media is ‘‘very important” to their children’s intellectual development (p. 178).” Vandewater et al. (2006) conducted a survey to parents on the trends of their children’s use of technology. The survey results of the 0-2 population of 412 children demonstrated that on a given day toddlers spent 75.18 minutes watching television, 67.44 minutes watching DVDs/videos, 51.21 minutes playing hand-held games, 60.76 minutes with computer use, and 46.27 minutes reading from an electronic book (Vandewater et al., 2006). Providers must teach parents to use strategies in their daily routine to utilize their natural environment. Since parents are commonly using and valuing the use of technology to aid in their child’s developmental learning and behavior management, early interventionists should not avoid this activity from their coaching sessions. Instead, the early interventionist should take this opportunity to coach parents on appropriate ways to use a smartphone while managing their child's behavior or increasing their developmental learning. Utilizing mobile applications on a smartphone in the coaching sessions would allow the interventionist and the parent to feel confident that the activity would enhance the child's development. Parents and children are motivated by mobile apps, which may generate an increase in therapy activities using an activity that the parents and children are motivated by may improve carryover.

Some early interventionists believe that mobile applications are an activity that should not be encouraged because the child does not practice using language, which is always a primary goal for deaf and hard of hearing early intervention. Further, many people believe this one-sided

activity will not promote social development and could lead attention issues. Reviewing the concerns and benefits complete the analysis of using mobile apps as early intervention activities.

There is not definitive research on the benefits of infants and toddlers using mobile applications because it is a newer technology. The majority of research explores the impact of television with infants and toddlers and the use of technology for older children. Generally, an infant would not use an interactive game, but parents may use mobile applications to play videos for infants. Infants younger than 18 months do not have the developmental cognitive ability to process the idea of video, nor do they have visual abilities to watch a screen (Courage, & Howe, 2010). Zimmerman, Christakis, & Meltzoff (2007) found that infants did not benefit in learning language, or cognitive and social abilities from baby DVDs like Baby Einstein. Further, they concluded there is a lack to the research of baby DVDs, unlike the preschool shows, like Dora the Explorer that have been analyzed to define the benefits and drawbacks of preschoolers watching these shows. (Zimmerman et al., 2007). Other studies have concluded that toddlers and children benefit from interactive games to improve cognitive, social, and literacy skills (Chiong, 2013; Courage, & Howe, 2010; Hsin, Li, & Tsai, 2014). Studies have addressed a common myth that television causes behavior issues and ADHD. Results showed only violent television and a correlation to ADHD (Chiong, 2013; Courage, & Howe, 2010). All studies concluded incorporating parent or peer interaction increases the educational or developmental gain of utilizing the interactive game or watching a video (Chiong, 2013; Courage, & Howe, 2010; Hsin, et al., 2014; Zimmerman et al., 2007).

Past research has concluded reasons why the use of technology is important to immigrant or low-income families. Having children watch education shows may help increase the exposure of language and vocabulary for this population (Chiong, 2013; Zimmerman et al., 2007). Chiong

(2013) found that interactive games allow the activity to be child lead. Early interventionists encourage parents to engage in activities that are child lead in order to encourage language development for their children. Lastly, for immigrant families, parents may have limited English skills, and an application can aid in exposing the child to English (Chiong, 2013). Families that do not speak English as a primary language can be a population within low-SES families; therefore, mobile apps on a smartphone would be useful to the target population. Smartphone mobile applications can play an important role in educating children; moreover, adults use them to improve organization or simply daily tasks.

The next goal of using mobile apps accessible from a smartphone during early intervention would be to increase the organization, accuracy of parent reports, and communication between the parent and early interventionists. To consider the benefit and drawbacks of this goal of using mobile apps the medical field has done the most relevant research. The medical field has developed applications to empower patients and caregivers to improve healthcare for themselves of their children. Mosa, Yoo, & Sheets (2012) did a comprehensive literature review to identify the prevalence of medical applications and describe their function. After reviewing 2,894 articles, they documented 83 applications health-related mobile applications (Mosa et al., 2012). The applications provided clinical communication among providers and patients, education for professionals and patients, monitoring patients for professionals, and self-management (Mosa et al., 2012). The intent of these applications is to improve patient health and management of self-care. There is not research on the benefit of using mobile health apps, but the intention of using mobile apps in the health field is beginning. Early interventionists should aim to find mobile applications that can provide information for parents and help manage their child's intervention and health. Providers may consider basic applications

that come on the smartphone like the calendar for appointment reminders or the notepad to record milestones. In addition, mobile applications like Google Docs may lend a way for all professionals working with the family to collaborating effectively. The organization of early intervention documents, parent reporting, and appointments is important when collaborating and working as a team to help a child. Parents are the main coordinators of all this information. For families of low-SES this task can be difficult to manage due to other stressors that hold more importance to the basic needs of the family. By using mobile apps on a smartphone as a way to help parents stay more organized in a time efficient way, it may increase the parents' manageability of this task.

Mobile apps are a popular tool used by smartphone users. The use of mobile applications as an interactive activity and organizational tool may lead to increased success of early intervention for families of low-SES. Families of low-SES often need more coaching on creating developmentally-enriching environments that can be developed through the interactive activities learned from the providers. Early interventionists aim to find activities that the parents and children are motivated by in order to improve carryover of the techniques taught. Mobile applications used on smartphones motivate parents and children. In addition, smartphone apps are used to simply daily tasks and organization. Families of low-SES may experience difficulty managing their child's early intervention documents, reporting due to the burden of additional stressors. As early interventionists, we could incorporate coaching sessions for the caregivers on how to use smartphone apps to increase organization and parenting reporting. Creating ways to increase the parent organization will allow for better collaboration between the early interventionists and the parents.

Conclusion

Early intervention services aim to enhance the development of children that qualify for the services and strengthen parents' ability to care for their children. Research shows correlation between success in child development and parent satisfaction and effective parent training and use of evidence-based services (Barton, & Fettig, 2013). Some of the best-practice approaches to early intervention are the coaching method and natural environment. Providers implement these evidence-based practices in addition to counseling parents through this emotional experience and providing families with resources. To make these principles most successful early interventionists and caregivers need open communication, trust, and respect (Adams et al., 2013; Rush et al., 2003, Woods et al., 2011).

Early interventionists experience difficulty maintaining these principles in early intervention with families of low-SES. Additional stressors experienced by families of low-SES may cause dissatisfaction and the child more likely to demonstrate developmental delays. Families of low-SES with children who are deaf or hard of hearing are at an even greater concern due to their delayed language, listening, and speech skills. Due to this greater risk of developmental delays and dissatisfaction, effective early intervention strategies to improve the success of families of low-SES with children who are deaf or hard of hearing are important in the field of deaf education. Within the field of deaf education, there are evidenced-based strategies that increase the services provided for families of poverty in early intervention, which include: identify personal bias, build relationships (parent-professional and parent-child), assess family needs, document what works, keep everyone safe, provide resources and support, educate families on quality instruction, and increase awareness and advocacy (Voss, & Lenihan, 2014). Evidence-based strategies in deaf education often look at related fields that conduct intervention

services or the medical field for methods to improve deaf educations practices. Research conducted in related fields has analyzed approaches using technology like texting, social media, video, internet, and mobile apps to increase the patient or caregiver engagement.

This review of current research considers how the smartphone, which includes the technology tools of texting, video, social media, and mobile applications can increase caregivers' satisfaction of early intervention experiences and the success of the child's development. Texting can improve the communication between the early interventionists and parents as well as the process of coaching parents on developmentally-enriching activities. Videos can increase access to example videos using effective techniques, feedback on using the techniques, and the inclusion of other important caregivers who are typically unable to attend the home visits. Social media is a way to increase communication, community support, engagement, and access to information. Mobile applications are popular and will motivate parents and children to develop a developmentally-enriched environment using early intervention activities. In addition, mobile apps will increase the parents' ability to organization the collaboration of professionals and early intervention services. The tools analyzed all are accessed on a smartphone, which is commonly owned by families of low-SES.

All of these tools accessed on the smartphone can increase the practice of different principles for deaf education early intervention that are crucial in order to have a success experience and increase the development of the child. Increased communication helps build the relationship between professionals and caregivers' and the parents' ability to use therapy activities regularly. In addition, increasing the carryover and parents confidence incorporating developmentally-enriching activities will better the development of the child. As technology continues to advance and become an integrated tool into more fields, future research should aim

to find more evidence on the benefits of using technology with families of low-SES with children who are deaf or hard of hearing in early intervention.

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