**Pediatric Hearing Aid Management: Experiences and Perspectives of Spanish-Speaking Parents**

Karen Muñoz,1, 2 Diego Guillen,1 Carlos Muñoz,2 Michael P. Twohig,3
1Department of Communicative Disorders and Deaf Education, Utah State University, Logan, UT

2National Center for Hearing Assessment and Management, Utah State University, Logan, UT

3Department of Psychology, Utah State University, Logan, UT

**Financial disclosures/conflicts of interest:** there are no financial disclosures or conflicts of interest to report.

**Address correspondence to:**

Karen Muñoz, Department of Communicative Disorders and Deaf Education, Utah State University, 1000 Old Main Hill, Logan, UT 84321. Phone: (435) 797-3701; Email:karen.munoz@usu.edu

**Abstract**

**Purpose:** The purpose of the study was two-fold to explore: (a) hearing aid management experiences of Spanish-speaking parents who have young children using hearing aids, and (b) parents’ access to the internet and perceptions about remote audiology services.

**Method:** The study used a mixed methods design. Data were collected through a phone interview.

**Results:** Eleven mothers of children aged 14 to 60 months participated. Most of the children (9/11) had a bilateral hearing loss, and two had an additional disability. Three themes emerged for hearing aid management experiences: audiology services, routines, and emotional challenges/supports. Parents had variable levels of confidence in their skills with the greatest variability for three items: ranging from no confidence to complete confidence: *using the listening tube to make sure that the sound quality of the hearing aid is good, removing moisture from the earmold tubing, and troubleshooting problems when your child’s hearing aids are not working*. All participants reported having consistent internet access and had positive perceptions about the possibility of remote audiology services.

**Conclusion** This study provided insights into hearing aid management experiences and perceptions of Spanish-speaking parents. Parents described variability for audiology services, routines for hearing aid use and care, and access to other parents of children with hearing loss. Spanish-speaking parents present additional elements in the hearing care process that need to be incorporated in planning. Remote services may be an opportunity to enhance access to support that could improve effectiveness of hearing aid management.

**Introduction**

The Hispanic population is growing in the United States. From 2010 to 2021, the Hispanic population represented 52% of the total population growth (Pew Research Center 2021) and it is estimated that by 2055 there will be over 105 million people of Hispanic descent (U.S. Census Bureau 2018). In 2020 the Hispanic population represented 19% of the U.S. population (U.S. Census Bureau 2021a) with people originating from Mexico (nearly 60%) and many other countries (Pew Research Center 2021). Approximately two-thirds have been in the U.S. for more than 10 years (Pew Research Center 2019), report speaking Spanish in their homes (Pew Research Center 2021), and have a median household income lower than their White non-Hispanic counterparts (U.S. Census Bureau 2021b). Culturally responsive care is an integral element of person-centered audiological services, and understanding perspectives of Spanish speakers is important for supporting a population at risk for reduced access to effective audiological services. We use the word Hispanic to refer to native Spanish speakers of any heritage.

Hispanics face disparities shaped by social and structural factors such as cultural values, social support systems, education, income, and health care (Velasco-Mondragon, 2016). Furthermore, health disparities can negatively impact child development. Each year, approximately 6,000 infants are born with permanent hearing loss in the U.S. (Centers for Disease Control and Prevention [CDC], 2021). Benchmarks for obtaining services when infants do not pass the newborn hearing screening indicate diagnostic testing be done before 3 months and entry into early intervention before six months of age (Joint Committee on Infant Hearing, 2019). The CDC collects annual data on benchmarks; however, data related to demographics such as ethnicity are not routinely collected and reported by all states, obscuring the ability to determine presence of disparities. Research studies, however, have shed light on disparities. For example, Hispanic infants were found to be less likely to have an outpatient hearing re-screening (Thompson & Yoshinaga, 2018), to have delays in age at hearing aid fitting (Caballero et al., 2017), and less likely to receive services for hearing aid and speech-language services (Qian et al., 2021). Various factors can contribute to disparities, including fewer Hispanics having private health insurance than non-Hispanics (Office of Minority Health, n.d.), and parent factors such as level of education, socioeconomic status, and level of confidence can influence timely adherence to infant diagnostic testing and intervention services (Bush et al., 2017).

Early access to amplification and consistent audibility are foundational components of early intervention for spoken language development (McCreery et al., 2015; Walker et al., 2015). However, hearing aid use is influenced by a variety of factors that are regarded as malleable or nonmalleable (McCreery & Walker, 2017). In a comprehensive literature review, 17 factors that affected hearing aid use were identified, and of those, 12 were malleable (Nailand et al., 2021), representing opportunities for audiologists to improve audibility for children in partnership with parents. Children rely on their parents to put the hearing aids on each day and to make sure they are working; however, hearing aid management can be complex for parents to navigate, and it is understandable that they encounter challenges implementing hearing aid routines within their daily lives. Parents have reported emotional and practical challenges that negatively influenced hearing aid use (Walker et al., 2013; Muñoz et al., 2016a; Nichols et al., 2022) and their routines for daily hearing aid care tasks (Muñoz et al., 2019; Nichols et al., 2022).

It is important to consider other challenges Spanish-speaking parents may experience in addition to learning how to manage their child’s hearing aids. Barriers such as difficulty with scheduling, fear of missing work, or the need for an interpreter to effectively communicate can interfere with attending appointments, (Caballero et al., 2017; Flower et al., 2021). Comprehensive information online related to pediatric hearing loss may be difficult for parents to find in Spanish (Muñoz et al., 2016b), and may not be accessible at a fifth-grade reading level, as is recommended for educational materials (The Joint Commission, 2010). For example, Gaeta et al. (2021) found that hearing aid user manuals in Spanish were written at an eighth-grade reading level, and that not all hearing aid manufacturers included an option for a Spanish-language hearing aid user guide. Spanish-speaking parents of young children wearing hearing aids have reported wanting more detailed information than they received, and a desire for more emotional support from their audiologist (Caballero et al., 2017).

Three recent studies have promising findings that parent interventions can improve hearing aid management outcomes (Muñoz et al., 2017; Ambrose et al., 2020; Muñoz et al., 2021). Muñoz et al. (2017) found that parents of young children with low hours of hearing aid use were receptive to supplemental virtual visits and that hours of hearing aid use increased with the additional support; this study included Spanish-speaking families. Ambrose et al. (2020) found that parents of toddlers were receptive to an intervention that included individualized education, coaching and check-ins, and that hours of hearing aid use increased. Muñoz et al (2021) found that parents were receptive to remote education and support that included instructional videos and weekly check-ins, and that parent outcomes were better for knowledge, confidence, and frequency of device monitoring compared to parents that only received treatment as usual from their audiologist.

Remote parent education and support as a supplement to typical in-office audiology appointments may be an opportunity for audiologists to flexibly partner with Spanish-speaking families as they help families achieve intervention goals for their children. There is widespread use of smart phone technology—85% of Hispanic adults report owning a smart phone (Hispanic Trending 2016; Pew research Article, 2021), and evidence supports use of tele-audiology in clinical practice (Muñoz et al., 2020).

Understanding Spanish-speaking parents’ experiences with hearing aid management and their perceptions related to remote audiology services can help identify opportunities to increase access to services and support for parents in providing consistent audibility for young children using hearing aids. Therefore, the purpose of this study was two-fold: (1) to explore hearing aid management experiences of Spanish-speaking parents who have young children who use hearing aids, and (2) to explore parents’ access to the internet and their perceptions about remote audiology services.

**Materials and Methods**

**Participants**

Eleven parents were recruited through audiology clinics and early childhood programs. To be eligible, parents were Spanish-speaking, had a child under five years of age who used a hearing aid, and resided in the U.S. or Puerto Rico. Audiologists, teachers of the deaf, and parent support organizations, that indicated working with Spanish speaking familes when contacted by the first author, shared the recruitment materials from November 2021 to May 2022, and interested parents contacted the research team through email or phone. Recruitment ended when data saturation was reached, that is, no new themes, concepts or patterns were identified from the data by the first two authors. The number of interviews needed to reach saturation varies among studies and is determined based on factors specific to each study. Based on the focus of the study and participant characteristics, in this study, saturation was detrmined when no new data emerged in three consecutive interviews. Sufficient saturation can be determined when contributing data no longer add to further depth for understanding (Saunders et al., 2018), and when participants share similar characteristics, saturation can be achieved with a smaller sample size (e.g., Landon & Schultz, 2018). Participants received a $25 Wal Mart gift card for their participation. The study methods were reviewed and approved by the University Institutional Review Board.

**Procedure**

We used a mixed methods design and data were collected in a phone interview. A member of the research team who is a native Spanish-speaker verbally consented parents and conducted the interview in Spanish. Each parent participated in one interview that took 30 to 60 minutes. Interviews were audio-recorded. We used an interview guide adapted from previous survey research conducted by the research team in English to investigate pediatric hearing aid management. A member of the research team translated the interview questions and the first author verified the translation accuracy for conceptual equivalence of the items. The interview guide was piloted with two Spanish-speakers to assess feasibility for use in the phone interview format and items were further modified to improve clarity. Following the guidelines from Tong et al. (2009), interview questions, along with prompting, were directed to better aid parents to openly express their opinions and experiences. See appendix A for interview guide promps. The interview guide included five components:

*Demographics:* items described participant characteristics, including: child gender, age hearing aids received, laterality of hearing loss, presence of other medical conditions, parent country of origin, education level, and family income.

*Perspectives on using the Internet:* three items to explore parents’ access and perspectives. Questions included: (1) *tell me about your internet use*, (2) *what are your thoughts on using the internet to learn how to manage your child’s hearing aids*, and (3) *in addition to the in-person appointments with your audiologist, what would you think about getting help through video conference appointments*?

*Hearing aid management:* five items to explore parent experiences with their child’s hearing loss and management of the hearing aids. Prompts included: (1) *how have you and your family been doing with your child’s hearing loss*, (2) *tell me about the support you have received to help you with managing your child’s hearing aids-for example putting on the hearing aids, checking that they work*, (3) *tell me about a typical day with handling your child’s hearing aids*, (4) *tell me about the things that cause you problems with the hearing aids*, and (5) *what other thoughts or suggestions would like to share*?

*Hearing aid management confidence:* fourteen items to rate the level of confidence parents had with hearing aid management tasks (e.g., putting the hearing aid on your child), see Table 1. Items were rated on a scale from 0 to 100 (0 = not confident at all; 100 = completely confident). The scale was adapted for interview delivery from the English scale used in a written survey format (Muñoz et al., 2021) by modifying the instructions and removing the stem prior to each item.

*Importance of hearing aid management:* two items to rate parent perception of importance for knowing how to properly manage their child’s hearing aids and for other caregivers to know how to manage the hearing aids. The questions were rated on a scale from 1 to 10 (1 = very little importance; 10= very important).

**Analysis**

The quantitative items related to demographic variables, confidence in hearing aid management skills, and the importance were entered into REDCap, a secure online research database, and analyzed using descriptive statistics (frequencies, central tendencies). One child had a bone conduction hearing aid and the confidence scale items related to earmolds were skipped . The qualitative data were transcribed from the audio recordings by the interviewer, and then translated to English by the second author. The interviewer reviewed the translations to verify that meaning was maintained in the process. The first and second authors conducted a thematic analysis, as described by Braun and Clark (2012). They iteratively reviewed and coded meaningful conversation units from the data after each interview to determine when saturation was reached. Then through an iterative review process, emergent themes were identified. For hearing aid management questions, the frequency of the meaningful conversation units was calculated for each theme and sub-theme to show the extent the various topics were discussed within the interview. Sample parent quotes are provided in English and Spanish to support the themes.

**Results**

Eleven mothers participated and they originated from six countries: Mexico (3), El Salvador (2), Colombia (2), Honduras (1), Argentina (1), Guatamala (1), and one parent resided in Puerto Rico. Over half of the mothers had a college degree (6/11), one parent attended some college, three completed high school, and one completed 11th grade. The family annual income ranged from $25,000 to $300,000; two mothers were unsure and did not report an amount. The children were 14 to 60 months of age (M = 31.5; SD = 14.2), received hearing aids from 2 to 40 months of age (M = 9.9; SD = 10.8), and most were male (7/11). Most of the children had a bilateral hearing loss (9/11), and two had an additional disability. All of the mothers (100%) indicated that it was very important (rated 10 on a scale of 1 to 10) to them to know how to properly manage their child’s hearing aids and for other caregivers to know how to manage the hearing aids.

**Confidence**

The mothers rated their confidence, from no confidence to complete confidence, on a scale from 0 to 100, with fourteen hearing aid management tasks (see Table 1). There was variability for all items, with a range of less than 50 up to 100 for 64% (9/14) of the items. Three items ranged from 0 to 100: having confidence in *using the listening tube to make sure that the sound quality of the hearing aid is good,* *removing moisture from the earmold tubing,* and *troubleshooting problems when your child’s hearing aids are not working*.

**Hearing Aid Management Themes**

Three themes emerged for hearing aid management. The frequency of meaningful conversation units revealed the topic most discussed was audiology services (40%), followed by routines (31%), and emotional challenges/support (29%) (see Table 2). Representative parent quotes are provided for each theme in tables 3-5.

*Audiology Services*

Four sub-themes were found within audiology services: education and support, communication, hearing aid benefit, and service challenges. The mothers described receiving variable education and support from their audiologist. They described receiving technical help for how to check hearing aid function. Some mothers indicated only receiving basic guidance, while other mothers received extensive and detaild training and support. Most (9/11) reported having hearing aid maintenance tools (e.g., listening stethoscope); although they had varied understanding of how and when to use the tools. They did not spontaneously share about emotional support received from the audiologists, indeed one mother described a lack of emotional support when she was crying at the appointment when her child received hearing aids.

Overall, mothers reported feeling comfortable communicating with their audiologist (10/11), and just over half indicated they had an interpreter during appointments (6/11). The interpreter helped mothers have confidence in the communication, even if they had some ability to communicate in English. One mother indicated she was not comfortable communicating with her audiologist, and even though she had difficulty understanding English she did not have an interpreter. Parents expressed appreciation for communication with their audiologists when the audiologist took time to listen to their concerns, teach them, were supportive, and answered their questions.

Over half of the mothers (7/11) expressed that they see the benefit their child receives from wearing hearing aids. They shared examples such as their child singing when the hearing aids are on, asking for the hearing aids to be put on, and being upset if the hearing aids are not working or were taken off. When asked if they had access to loaner hearing aids if their child’s hearing aid needs repair, only three mothers knew about loaner hearing aids.Some mothers expressed challenges with audiology services. One mother indicated the distance to the clinic created challenges accessing services. Two mothers shared challenges related to the relationship with the audiologist was a barrier, and problems related to getting earmolds replaced was a common concern raised.

*Routines*

Two sub-themes were found within routines: hearing aid use and checking device function. Mothers described variability in their routines and one mother reported that she did not have a routine for hearing aid management. The daily routines varied, ranging from one mother that used the listening stethoscope every day to make sure the hearing aids were working to another mother that shared uncertainty in what to do. This mother described putting the hearing aid up to her ear sometimes to check it, but didn’t really know what to listen for. A common approach was for the mother to see if the hearing aid battery worked by listening for the feedback. Most of the mothers used their child’s typical daily schedule to describe hours of use, and reported their child used their hearing aids more than 10 hours per day (8/11). One mother described the audiologist checking hours of use to help monitor wear time, and one mother described using the hearing aid app to help monitor wear time. For most families, the mother was the sole person responsible for hearing aid routines (7/10), at times another family member helped in some families, and one parent described that her child tells her when the aid is not functioning correctly.

*Emotional Challenges/Support*

 Two sub-themes were found within emotional challenges/support: emotions and thoughts, and support form others. Most mothers (9/11) shared that their initial response to their child’s hearing loss diagnosis was emotionally difficult. They shared feelings of extreme sadness, guilt, and being confronted by doubt from extended family members. The mothers varied in who they talked to about their child’s hearing loss. Some only talked to their spouse, some included extended family members, while others also talked to people outside of their family (e.g., their provider, therapist, other parents). One parent shared that she does not talk to anyone. When asked how they felt about others seeing their child wearing the hearing aids, less than half of the mothers felt comfortable (5/11), a few were uncertain about how they felt, and a few felt worried about how their child may be treated because of their hearing aid. Some mothers reported being connected to parent-to-parent support groups and talked about the importance of talking to other parents. They shared how this connection helped them to not feel alone and the positive influences talking to other parents provided. Five parents reported that they have not talked to any other parents.

**Remote Services**

All of the mothers reported using the internet frequently, having access at home, and using various apps. Just under half reported using their phone exclusively to access the internet (5/11), some used their phone and computer, and a few use a phone, computer, and tablet. When asked about remote audiological services, none of the mothers were aware of this as an option, although they all had positive perceptions about the possibility of access to services remotely.

When asked what problems they perceived they might have with remote services, some mothers raised concerns that there may be issues with unreliable internet connections and challenges with scheduling. A few mothers were unsure how remote audiology services with young children could be possible, considering the demands of being in-person for testing and lack of cooperation with a young child. They did not have an awareness or expectation that education and support could be provided remotely.

**Discussion**

The current study interviewed Spanish-speaking mothers of children who used hearing aids and were under five years of age. Specifically, we explored parents’ experiences with hearing aid management, their confidence performing related tasks, and their perceptions of importance for learning hearing aid management skills. We also explored their access to the internet and their perceptions related to remote audiology services to help inform clinical practice regarding inclusion of remote services with Spanish speakers.

Our findings revealed variability in hearing aid management related to parent routines, confidence in performing skills, talking to other parents of children who use hearing aids, and the extent of support received by the audiologist. This finding is similar to experiences described by English speaking parents of young children in other studies (Muñoz et al 2016a, 2019) and in one survey study of Spanish speaking parents (Caballero et al., 2017). Confidence ratings are subjective and provide self-reported perception of how the mothers felt about applying the hearing aid management tasks. Although the ratings do not provide insight into how well or how often mothers engaged in the tasks, self-efficacy is associated with a greater ability to take needed actions (Bandura, 1997). Overall, the lower confidence ratings in our study were observed in less than half (4/11) of the participants, three of whom had a college degree. The Spanish-speaking parents in our study described facing additional challenges related to accessing information and support. As one mother explained, her English was limited and she did not have an interpreter. Other mothers described receiving incomplete information. Obstacles exist that can prevent equitable service delivery for children including limited access to services and not addressing contextual factors that can impede comprehensive communication (Houtrow et al., 2022; Kuo et al., 2022). Consistent audibility is foundational for spoken language development (McCreery & Walker, 2017), and when audiologists partner with parents malleable factors that influence auditory access can be addressed to increase parent effectiveness (Ambrose et al., 2020) including when education and support is provided remotely (Muñoz et al., 2021).

 Parents in the current study described that the diagnosis of their child’s hearing loss was emotionally difficult. Parents talked about the technical support they received from their audiologists, they did not bring up that their audiologists provided emotional support. In fact, one parent described that the audiologist did not understand her emotional pain during the hearing aid fitting. Parent emotions and thoughts can impede their ability to move forward with intervention steps. Parents in the current study expressed being concerned about others seeing their child wearing hearing aids and this distressing thought can interfere with hearing aid use. Internal barriers can persist when they are not addressed. Audiologists have an important role in helping parents adjust to their child’s hearing loss and intervention needs (San Miguel et al., 2022), and this requires asking parents’ about internal barriers and supporting parents in addressing them as part of the intervention process.

Remote services for hearing aid management represents an opportunity to increase access to services (Glista et al., 2021). All participants reported acess to the internet on their smart phone. Hearing aid Apps are available for parents when their child obtains hearing aids, and can provide a mechanism to support monitoring hearing aid use through the data logging feature and access to remote services. Only one parent shared using the App to monitor wear time for her child. The parents responded positively to the idea of remote services; however, none of the parents were aware that remote services could be an option. There are evidence-based guidelines to assist audiologists in navigating how to incorporate remote hearing aid services into their practice (Glista et al., 2022). Spanish-speaking parents represent a vulnerable population that is at risk for sub-optimal education and support as a result of the additional barriers they face in accessing information and services. Remote services offer flexibility that could help overcome barriers such as distance from the clinic and time needed to travel to appointments. Additionally, incorporating remote services for a hybrid approach to pediatric hearing aid services offers the opportunity to provide education and support more frequently after hearing aid fitting as parents are developing management routines.

In a recent scoping review to identify research in audiology with Spanish speakers, a paucity of research with parents was revealed (Muñoz et al., in press). Research with this population is needed to guide practice considerations for variables that influence access to and utilization of audiology services. Further research is needed to better understand the journey from newborn hearing screening through diagnosis, entry to early intervention, and implementation of intervention strategies to support kindergarten readiness for children of Spanish-speaking parents. We need to understand and identify solutions for barriers to follow-up, factors that influence parent decision-making, and strategies for effective education and support. Audiologists can examine their current practices to support access to comprehensive services, including having a professional interpreter for appointments, having resources available in Spanish, asking parents about their thoughts and emotions, and having a plan for parent learning support.

Limitations of the study are important to acknowledge. During analysis the results were not presented to families for review during the interpretation process, which may have introduced bias in the results. Fifty-four percent of the mothers had a college degree, more than is found in the U.S. demographics (2023, The Educational Trust), and this may have impacted the types of challenges and experiences that were identified. Furthrmore, the data saturation decision may have limited experiences and challenges identified. Actual hours of hearing aid use may be less than what was reported as research has shown parent report over-estimates hours of use when compared to data logging results from the hearing aid (Walker et al., 2013; Muñoz et al., 2014). Internal reliability of the confidence scale could not be determined due to the small sample size. There were only two prompts included in the interview guide related to parent perceptions of remote audiology services. Additional questions may have increased understanding of parents needs and desires related to access to remote services. The interviewer was a native Spanish-speaker with a masters degree in anthropology, he did not have a background in audiology and may have missed opportunities to further probe parent responses. This is also a strength of the study, as the interviewer was unbiased and responses did not influence the interview discussion.

**Conclusion**

This study provided insights into hearing aid management experiences of Spanish-speaking parents, as well as their perceptions on the possibility of access to remote audiology services. We found variability among parents for audiology services received, routines for hearing aid use and care, and access to other parents of children with hearing loss. Communication between parents and audiologists is critical for effective outcomes, and Spanish-speaking parents present additional challenges to the process that need to be incorporated in planning. Parents were open to remote audiology services although had not known it was possible. Adding remote services presents an opportunity to enhance access to support that could improve effectiveness of hearing aid management for children with hearing loss.

**Data Availability Statement**

The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

**Acknowledgement**

No funding was received for this research.

**References**

Ambrose, S. E., Appenzeller, M., Al-Salim, S., & Kaiser, A. P. (2020). Effects of an intervention

designed to increase toddlers’ hearing aid use. *Journal of  Deaf Studies*

*and Deaf Education*, 25(1), 55–57. <https://doi.org/10.1093/deafed/enz032>

Bandura, A. (1997). Self-efficacy: The exercise of control. W H Freeman/Times Books/ Henry Holt & Co.

Braun, V., & Clarke, V. (2012). Thematic analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biologica*l.* *American Psychological Association.* (pp. 57–71). <https://doi.org.dist.lib.usu.edu/10.1037/13620-004>

Bush, M. L., Kaufman, M. R., & McNulty, B. N. (2017). Disparities in access to pediatric hearing health care. *Current Opinion in Otolaryngololgy & Head and Neck Surgery*, *25*(5), 359–364. <https://doi.org/10.1097/MOO.0000000000000388>

Caballero, A., Muñoz, K., White, K., Nelson, L., Domenech-Rodriguez, M., & Twohig, M. (2017). Pediatric hearing aid management: challenges among Hispanic families. *Journal of the American Acadamy of Audiology*, *28*(8), 718–730. <https://doi.org/10.3766/jaaa.16079>

Centers for Disease Control and Prevention (2021). 2019 Annual Data Early Hearing Detection and Intervention (EHDI) Program. Retrieved January 24, 2922 from <https://www.cdc.gov/ncbddd/hearingloss/ehdi-data2019.html>

Flower, K. B., Wurzelmann, S., Tucker, C., Rojas, C., Díaz-González de Ferris, M. E., & Sylvester, F. (2021). Spanish-speaking parents' experiences accessing academic medical center care: Barriers, facilitators and technology use. *Academic Pediatrics*, *21*(5), 793–801. https://doi.org/10.1016/j.acap.2020.10.008

Gaeta, L., Garcia, E., & Gonzalez, V. (2021). Readability and suitability of Spanish-language hearing aid user guides. *Am J Audiol*, *30*(2), 452–457. https://doi.org/10.1044/2021\_AJA-20-00215

Glista, D., Ferguson, M., Muñoz, K., Davies-Venn, E. (2021). Connected hearing helathcare: shifting from theory to practice. *International Journal of Audiology, 60*(S1-S3). *https://doi.org/10.1080/14992027.2021.1896794*

Glista, D., O’Hagan, R., DiFabio, D., Moodie, S.T.F., Muñoz, K., Richert, F., Curca, I.A., Meston, C., Pfingstgraef, D., Joseph, K., Brown, C. (2022). Virtual hearing aid care: clinical practice guideline v2.0. Western University. DOI: 10.5206/0820211097

Hispanic Trending. (June 28, 2016). Internet usage penetration among Hispanics in the United States from 2014 to 2020 [Graph]. In *Statista*. Retrieved January 09, 2022, from <https://www.statista.com/statistics/590815/internet-usage-reach-usa-hispanic/>

Houtrow, A., Martin, A. J., Harris, D., Cejas, D., Hutson, R., Mazloomdoost, Y., & Agrawal, R. K. (2022). Health equity for children and youth with special health care needs: A vision for the future. *Pediatrics*, *149*(Suppl 7), e2021056150F. https://doi.org/10.1542/peds.2021-056150F

Joint Committee on Infant Heairng Year 2019 Position Statement: Principles and guidelines for early hearing detection and intervention programs. (2019). *Journal of Early Hearing Detection and Intervention,*4(2), 1-44. DOI: <https://doi.org/10.15142/fptk-b748>

Kuo, D. Z., Rodgers, R. C., Beers, N. S., McLellan, S. E., & Nguyen, T. K. (2022). Access to services for children and youth with special health care needs and their families: Concepts and considerations for an integrated systems redesign. *Pediatrics*, *149*(Suppl 7), e2021056150H. https://doi.org/10.1542/peds.2021-056150H

 Landon, T. J., & Schultz, J. C. (2018). Exploring rehabilitation counseling supervisors’ role in promoting counselor development of ethical fluency. *Rehabilitation Counseling Bulletin*, 62(1), 18–29. <https://doi.org/10.1177/0034355217728912>

McCreery, R. W., & Walker, E. A. (2017). Pediatric amplification enhancing auditory access. San Diego, CA: Plural Publishing.

McCreery, R.W., Walker, E.A., & Spratford, M. (2015) Understanding limited use of amplification in infants and children who are hard of hearing. *SIG 9 Perspectives on Hearing and Hearing Disorders in Childhood,* *25*(1), 15-23.

Muñoz, K., Preston, E., & Hicken, S. (2014). Pediatric hearing aid use: how can audiologists support parents to increase consistency? *Journal of the American Academy of Audiology*, *25*(4), 380–387. https://doi.org/10.3766/jaaa.25.4.9

Muñoz, K.F., Rusk, S. E., Nelson, L., Preston, E., White, K. R., Barrett, T. S., & Twohig, M. P. (2016a). Pediatric hearing aid management: parent-reported needs for learning support. *Ear and Hearing*, *37*(6), 703–709. [https://doi.org/10.1097/AUD.0000000000000338](file:///C%3A%5CUsers%5Ca02366665%5CLibrary%5CContainers%5Ccom.apple.mail%5CData%5CLibrary%5CMail%20Downloads%5C7B7AC6AF-5FC4-46A6-BCD7-37A9D4113552%5C%22)

Muñoz, K. F., Nelson, L. H. & Barker, B. (2016b). A review of internet resources related to spoken language intervention for Spanish-speaking parents of children who are deaf or hard of hearing. *Journal of Early Hearing Detection and Intervention, 1*(2), 72-77. DOI: <https://doi.org/10.15142/T3KG6Q>

Muñoz, K., Kibbe, K., Preston, E., Caballero, A., Nelson, L., White, K., & Twohig, M. (2017). Pediatric hearing aid management: a demonstration project for using virtual visits to enhance parent support. *International Journal of Audiology*, *56*(2), 77–84. <https://doi.org/10.1080/14992027.2016.1226521>

Munoz, K. F. Larsen, M. Nelson, L. Yoho, S. E. & Twohig, M. P. (2019). Pediatric amplification management: Parent experiences monitoring children’s aided hearing. *Journal of Early Hearing Detection and Intervention,*4(1), 73-82. DOI: <https://doi.org/10.26077/a049-v107>

Muñoz, K., Nagaraj, N., & Nichols, N. (2020). Applied tele-audiology research in

clinical practice during the past decade: A scoping review. *Internaitonal Journal of Audiology, 60(*S1), S4-S12. DOI: [10.1080/14992027.2020.1817994](https://doi.org/10.1080/14992027.2020.1817994)

Muñoz, K., San Miguel, G., Barrett, T.S., Kasin, C., Baughman, K., Reynolds, B., Ritter, C.,

Larsen, M., Whicker, J.J., & Twohig, M.P. (2021). eHealth parent education for hearing aid management: A pilot randomized control trial. *International Journal of Audiology, 60*(sup1), S42-S48.

 doi: 10.1080/14992027.2021.1886354

Nailand, L., Munro, N., & Purcell, A. (2022). Identifying the factors that affect consistent hearing aid use in young children with early identified hearing loss: A scoping review. *Ear and Hearing*, *43*(3), 733–740. <https://doi.org/10.1097/AUD.0000000000001139>

Nichols, N., Muñoz, K., San Miguel, G. G., & Twohig, M. P. (2022). eHealth education and support for pediatric hearing aid management: parent goals, questions, and challenges. *American Journal of Audiology*, *31*(1), 189–203. <https://doi.org/10.1044/2021_AJA-21-00098>

Office of Minority Health. (n.d.). Retrieved November 8, 2021 from <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=2&lvlid=15>

Pew Research Center. (2021). Key facts about U.S. Latinos for national Hispanic heritage month [Report]. Retrieved November 8, 2021 from https://www.pewresearch.org/fact-tank/2021/09/09/key-facts-about-u-s-latinos-for-national-hispanic-heritage-month/

Pew Research Center. (2019). Length of time in the U.S. for Hispanic immigrants, 2000-2017 [Report]. Retrieved November 8, 2021 from <https://www.pewresearch.org/hispanic/chart/u-s-hispanics-time-in-u-s/>

Pew Research Center. (2021). Mobile Fact Sheet[Feature]. Retrieved November 8, 2021 from <https://www.pewresearch.org/internet/fact-sheet/mobile/?menuItem=d40cde3f-c455-4f0e-9be0-0aefcdaeee00>

Qian, Z. J., Chang, K. W., Ahmad, I. N., Tribble, M. S., & Cheng, A. G. (2021). Use of diagnostic testing and intervention for sensorineural hearing loss in US children from 2008 to 2018. *JAMA Otolaryngology-Head & Neck Surgery*, *147*(3), 253–260. <https://doi.org/10.1001/jamaoto.2020.5030>

San Miguel, G. G., Muñoz, K., Barrett, T. S., & Twohig, M. P. (2022). Moderators and predictors in a parent hearing aid management eHealth program. *International Journal of Audiology*, 1–8. Advance online publication. https://doi.org/10.1080/14992027.2022.2048103

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: exploring its conceptualization and operationalization. *Quality & Quantity*, *52*(4), 1893–1907. <https://doi.org/10.1007/s11135-017-0574-8>

Thompson, V., & Yoshinaga-Itano, C. (2018). The role of audiologists in assuring follow-up to outpatient screening in early hearing detection and intervention systems. *American Journal of Audiology*, *27*(3), 283–293. <https://doi.org/10.1044/2018_AJA-17-0113>

The Educational Trust (2023). A look at detree attainment among Hispanic women and men and how COVID-19 could deepen racial and gender divides. Retrieved May 27, 2023 from https://edtrust.org/resource/a-look-at-degree-attainment-among-hispanic-women-and-men-and-how-covid-19-could-deepen-racial-and-gender-divides/

The Joint Commission. (2010). *Advancing effective communication, cultural competence, and patient- and family-centered care: A roadmap for hospitals*. Retrieved March 2, 2022 from <http://www.jointcommission.org/assets/1/6/ARoadmapforHospitalsfinalversion727.pdf>

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, *19*(6), 349–357. <https://doi.org/10.1093/intqhc/mzm042>

US Census Bureau. (2018). Forecast of the Hispanic population of the United States from 2016 to 2060 (in millions) [Graph]. In Statista. Retrieved November 10, 2021, from <https://www.statista.com/statistics/251238/hispanic-population-of-the-us/>

U.S. Census Bureau (2021a). Race and ethnicity in the United States: 2010 census and 2020 census. Retrieved November 10, 2021 from <https://www.census.gov/library/visualizations/interactive/race-and-ethnicity-in-the-united-state-2010-and-2020-census.html>

US Census Bureau. (2021b). Median household income in the United States in 2020, by race or ethnic group (in U.S. dollars) [Graph]. In Statista. Retrieved November 10, 2021, from <https://www.statista.com/statistics/233324/median-household-income-in-the-united-states-by-race-or-ethnic-group/>

Velasco-Mondragon, E., Jimenez, A., Palladino-Davis, A. G., Davis, D., & Escamilla-Cejudo, J. A. (2016). Hispanic Health in the USA: A scoping review of the literature. *Public Health Reviews*, *37*(1). https://doi.org/10.1186/s40985-016-0043-2

Walker, E. A., Holte, L., McCreery, R. W., Spratford, M., Page, T., & Moeller, M. P. (2015). The influence of hearing aid use on outcomes of children with mild hearing loss. *Journal of Speech, Language, and Hearing Research*, *58*(5), 1611–1625. <https://doi.org/10.1044/2015_JSLHR-H-15-0043>

Walker, E. A., Spratford, M., Moeller, M. P., Oleson, J., Ou, H., Roush, P., & Jacobs, S. (2013). Predictors of hearing aid use time in children with mild-to-severe hearing loss. *Language, Speech, and Hearing in Schools*, *44*(1), 73–88. https://doi.org/10.1044/0161-1461(2012/12-0005)

Table 1. Confidence with hearing aid management skills

|  |  |  |
| --- | --- | --- |
| **Skills** | **M (SD)** | **Range** |
| **Hearing aid use** | **82.88 (23.84)** |  |
| Putting hearing aids on your child |  90.91(13.79) | 60-100 |
| Keeping the hearing aids on when your child resists wearing them | 83.64 (24.96) | 20-100 |
| Observing what your child can and cannot hear with the hearing aids | 74.09 (27.37) | 20-100 |
| **Teaching Others** | **86.04 (22.40)** |  |
| Teaching others to put the hearing aids on your child | 85.45(23.11) | 30-100 |
| Teaching others to change/recharge the battery | 93.90 (13.07) | 59-100 |
| Teaching others to use the listening tube to make sure the hearing aids are working | 82.73 (32.50) | 10-100 |
| Explaining your child's hearing loss to others | 74.50 (18.50) | 40-100 |
| Explaining to others why it is important for your child to wear the hearing aids | 93.64 (10.68) | 70-100 |
| **Hearing aid maintenance** | **74.51 (31.92)** |  |
| Changing/recharging the hearing aid battery | 93.64 (10.68) | 70-100 |
| Using the listening tube to make sure that the sound quality of the hearing aid is good | 71.11(35.73) | 0-100 |
| Cleaning ear wax from the earmold opening | 84 (18.00) | 40-100 |
| Removing moisture from the earmold tubing |  54.10 (38.67) | 0-100 |
| Knowing when your child needs new earmolds | 81.50 (14.15) | 60-100 |
| Troubleshooting problems when your child's hearing aids are not working | 62.73 (40.47) | 0-100 |

Table 2. Frequency of meaningful conversation units for hearing aid management themes

|  |  |  |  |
| --- | --- | --- | --- |
| Themes | Frequency % (n) | Sub Themes | Frequency % (n) |
| Audiology services | 40% (68) |  |  |
|  | Education and support | 50% (34) |
|  | Communication | 32% (22) |
|  | Hearing aid benefit | 10% (7) |
|  | Service challenges  | 8% (5) |
|  |  |  |
| Routines | 31% (54) |  |  |
|  | Hearing aid use | 61% (33) |
|  | Checking device function | 39% (21) |
| Emotional challenges/support | 29% (49) |  |  |
|  | Emotions and thoughts  | 53% (26) |
|  | Support from others | 47% (23) |
|  |  |  |

Note: Percentages reflect percent of the total meaningful conversation units related to responses to questions for hearing aid management experiences.

Table 3. Parent quotes for hearing aid management theme: Audiology Services

|  |  |
| --- | --- |
| **English** | **Spanish** |
| **Education and Support** |
| *“They always have time to help us with any questions that we have…they have taken the time to teach us, step by step, what we need to know ….”* [P10]  | *“Este, cualquier pregunta que nosotros tenemos…hemos tomado tiempo con ellos en que nos enseñen realmente, paso a paso, qué es lo que necesitamos saber…”* |
| “*we are learning as we go along, but the audiologist taught us the very basics.”* [P7] | *“las cosas vamos aprendiendo, pero lo básico, básico nos enseñó la audióloga”.* |
| “*I don't know if I have one [stethoscope], but the first time the audiologist did it for me in her office…but she didn't tell me if I have to use it at home.”* [P5] | *“Oh, yo no sé si realmente lo tengo* [refiriéndose al estetoscopio] *pero la primera vez la audióloga me lo hizo allá…pero no me explicó si yo tengo que usarlo en la casa*”. |
| **Communication** |
| *“She speaks only English and I am the one who goes to the appointments and my English is not that good.”* [P5] | *“ella habla solo inglés y yo soy la que voy a las consultas y mi inglés es un poquito reducido”.*  |
| *“I have always used an interpreter… I always ask all the questions that I have because it is also new to me”* [P9] | “*Siempre he utilizado intérprete… Yo siempre pregunto todas las dudas que tengo porque es nuevo también para mí”.*  |
| “*I feel very comfortable and she's very, how can I say it, she has like the patience to explain.”* [P12] | “*…me siento muy cómoda y ella es muy, cómo le explico, tiene esa como le dijera yo, como paciencia de explicar..*.”  |
| **Hearing Aid Benefit** |
| *“Putting them on every day has helped her quite a bit...she's indeed hearing more.”* [P6] | *“Bueno, poniéndoselos todos los días le ha ayudado bastante a ella… ella sí está escuchando más”.* |
| “*The hearing aids have been extremely beneficial for my girl, she doesn't take them off and if you take them off she fights it because she needs them. You can tell that she really does need those hearing aids.”* [P4] | “…  *los audífonos han sido sumamente beneficiosos para mi nena, o sea ella no se los quita y si uno se los quita ella pelea porque o sea ella necesita. Se nota que ella en realidad si necesita esos audífonos…*” |
| **Service Challenges** |
| *“Once they took the mold impression and the mold arrived at the clinic. I felt it was taking a long time and they wouldn't call me, so I called to see if the earmold had arrived and they told me 'yes, yes it has'. I told them 'I need the earmold because my child is without the hearing aid' and I was told 'there are no appointments right now' and I thought, if I have the hearing aid, I think it is a simple thing to just give me the earmold.”* [P13] | *“Una vez le sacaron la impresión del molde y ya estaba el molde hay* [en la clínica]. *Entonces, a mí se me hacía mucho tiempo y no me llamaban, entonces yo hablé para ver si no estaba todavía el molde y me dijeron ‘sí, sí está’. Les dije ‘es que yo necesito el molde porque mi niña anda sin el audífono’ ‘Oh, es que no hay citas ahorita’ y yo digo bueno, si el audífono ya está, pienso que es algo sencillo darme solamente el molde".*  |

Table 4. Parent quotes for hearing aid management theme: Routines

|  |  |
| --- | --- |
| **English** | **Spanish** |
| **Hearing Aid Use** |
| *“maybe four, six hours a day... At the beginning she told me that in babies I should only put them on four hours a day, no more, because (intelligible) and he was young, and all of that.”* [P5] | *“quizás unas cuatro, seis horas al día… Ella al principio me dijo que en bebés solo se los pusiera cuatro horas al día, no más, porque (ininteligible) y era chiquito, y todo eso*”. |
| *“…we put them on him as soon as he wakes up. Before he leaves his room or after he goes to the bathroom and comes back, it's the first thing he looks for. We take them off when he goes to bathe and when he goes to sleep.”* [P10] | *“…se los ponemos nosotros en cuanto él se despierta. Este, antes de que salga de su cuarto o después que él al baño y regresa, este, es la primera cosa que él busca. Este, se lo quitamos cuando se va a bañar y cuando se va a dormir”.*  |
| *“Regularly on Mondays to see if it is working, I check it with the device, that little tube they gave me, I try to check it. They told me that it is like saying A, E, I, O, U. (Unintelligible) That is something I do with Z or S and I try to at least listen to it. So, on Mondays I leave it like that with my sister. Sometimes if I don't remember, I do it on Tuesday. But it's always like every beginning of the week.”* [P2] | *“Pues regularmente los lunes para ver si está bien, con el aparato, ese tubito que me dieron, se lo trato de chequear. Me dijeron que es así como A, E, I, O, U. (Ininteligible) Eso es algo que haga con Z o S y ya trato de escucharlo por lo menos se lo dejo a mi hermana así más o menos el lunes. A veces si no me acuerdo lo hago el martes. Pero siempre es como cada inicio de semana”.* |
| **Checking Device Function** |
| *“Almost always me.  For example, he [Father] takes my other daughter to school. When he comes back my other daughter is ready, already dressed and wearing her hearing aids, and he takes her to school, but almost always me. But he also knows how to do it.  For example, I have taught him.  But I do it most of the time.”* [P12] | *“Um, casi yo siempre.  Por ejemplo, él* [Padre] *se va a dejar mi otra niña en la escuela, entonces cuando él regresa ya está la, mi otra niña ya está cambiada, conectada a sus audífonos, entonces ya solo él se la lleva, pero casi siempre yo, y él también sabe.  Por ejemplo, le he enseñado, él también.  Pero mayormente yo lo hago”.*  |
| “*No, just me. Since he* [father] *leaves early, he doesn't have time for that.* [P13] | “*No, solamente yo. Él* [padre] *como sale temprano, no tiene tiempo de eso”.*  |
| *“I am mainly responsible, but my little girl tells me, she tells me “Mom it’s doing turururu, tururururu, and then I know that the battery is running low. But she tells me. There was another time she told me that she couldn’t hear very well and when I saw it, it was not placed in the ear properly, but she herself tells me.”* [P4] | “*Yo soy la responsable mayormente, pero mi nena mismo me lo dice, ella me dice “mamá está haciendo turururu, tururururu, y ya yo sé que pues la batería que se está acabando. Pero ella me lo dice. Hubo otra vez que me dijo también como que no escuchaba muy bien y cuando este lo vi era que estaba fuera de sitio, pero ella misma me lo dice*” . |

Table 5. Parent quotes for hearing aid management theme: Emotional Challenges/Support

|  |  |
| --- | --- |
| **English** | **Spanish** |
| **Emotions and Thoughts** |
| *[Second child diagnosed with a hearing loss] "..., when they told me that my daughter is also losing her hearing, about her hearing loss, I felt that my world was coming to an end, that it wasn't the same for me, but sometimes I have to fight for them because they are everything to me.”* [P12] | [Segundo hijo diagnosticado con pérdida de audición] *“..., cuando me dijeron de que también mi niña está perdiendo, su pérdida de audición, sentía que mi mundo se me acababa, de que no era lo mismo para mí, pero a veces tengo que luchar por ellas porque son todo para mí”*.  |
| *“The truth is that in my family I had some negative reactions at the beginning, because they did not accept that he was like that.”* [P2] | *“En mi familia la verdad si tuve cierta negatividad al principio, de que no aceptaban que estuviera así”.*  |
| *“For me it has been, I worry that when she starts school, she will be bullied by the other children when they see that she wears hearing aids. I also feel bad sometimes when people notice that she wears hearing aids, and I feel sad seeing that.”* [P13] | *“Ay, para mí ha sido, es mi preocupación que cuando la niña entre en la escuela, ella sufra de bullying por los otros niños al ver que ella usa audífonos. Yo me siento como mal a veces también que la gente se fija que ella trae audífonos, y me siento pues triste de ver eso”.*  |
| “*Well, I don't really care… I don't care if other people criticize them* [hearing aids] *or say they are bad. (unintelligible). What matters to me is that my son hears, learns to speak and everything else*.” [P1] | “*Pues, la verdad me da igual… Me da igual si otra gente como los critica* [audífonos] *o dicen que son malos. (ininteligible). Lo que me importa es que mi hijo pues escuche, aprenda a hablar y todo lo demás”.*  |
| **Support from Others** |
| [P1] *"To be honest with you I hardly ever talk to anyone about those things."* | *“Para serle sincera casi con nadie hablo como de esas cosas”.*  |
| [P7] *"I think it helps you not to feel so lonely and it's not just my son. For example, I'm part of a group on Facebook."* | *“Creo que a uno le ayuda a no sentirse tan solo y no solo es mi hijo. Por ejemplo, yo soy parte de un grupo en Facebook”.* |
| [P13] *"Hands and voices, we've met other people and it's so comforting to meet someone who is going through the same thing you are and to feel like you're not the only one, so I think meeting other people who are going through the same thing is like the best thing...It uplifts you."* | *“Manos y voces hemos conocido a otras personas y es tan reconfortante conocer a alguien* *que está pasando por lo mismo que tú y que sentirte que no eres la única, entonces yo pienso que conocer a otras personas que están pasando por lo mismo es como lo mejor…Te anima más”.* |