Exploring the Role of Assistive Technologies in Healthcare for Minors with Cognitive Disabilities

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ABSTRACT

Assistive technologies (ATs) are devices that enable individuals with physical or cognitive impairments to have greater control over their mobility, communication, and independence. However, in healthcare settings, children with cognitive disabilities face significant barriers to accessing or using ATs due to provider unfamiliarity, limited knowledge, time constraints, or a lack of clear training in such technologies. This cross-sectional survey of parents examines parental perceptions of assistive technology use and related healthcare experiences among 24 parents of children enrolled in Moderate to Severe Disability (MSD) programs in Bardstown, Kentucky. Of survey respondents, 15 children use at least one form of assistive technology (62.5%), with speech-generating devices being the most common (45.8%), followed by wheelchairs (28.1%). Parents frequently reported that their children experienced greater independence as a result of ATs, especially at home. Only one-third (33.3%) of children using ATs in this study had them prescribed by a physician, while most families found them at the recommendation of speech specialists, family, or friends. However, when ATs are prescribed by a physician, parents reported feeling a greater sense of comfort with their child using them across spaces, including in healthcare settings. Findings from this study suggest that greater physician awareness of, and training surrounding ATs may be associated with parental confidence and more consistent AT use, demonstrating the potential value of improved provider training and interdisciplinary communication.

INTRODUCTION

Background

Children with cognitive disabilities face significant barriers that prevent them from accessing high-quality healthcare (Stone et al., 2024). These challenges stem from a lack of communication, provider familiarity with ATs, and system-wide support (Howard et al., 2020). Assistive technologies (ATs) refer to any device, system, or service that helps people with disabilities or seniors increase, maintain, or improve their functional capabilities (*What Is AT?* –

Assistive Technology Industry Association, n.d.). Ranging from speech-generating programs to mobility aids, when used consistently, ATs have the potential to improve patient-provider communication, foster independence, and develop the patient's quality of life (Gormley & Fager, 2021). Despite their potential benefits, ATs are underutilized in clinical environments (Field & Jette, 2007). Limited provider awareness, inadequate training, and structural barriers all contribute to the lack of application of ATs in healthcare settings.

This inconsistency is especially troubling as developmental disabilities are on the rise in the US (Li et al., 2023). Parents are often key advocates in getting assistive technology for their child, but remain unaware of different technologies or are unable to access relevant information about them. At the same time, healthcare providers may lack sufficient training in AT prescription or be unaware of which devices may benefit their patients. Without proper prescription, application instruction, or use, the effectiveness of ATs may be reduced.

Previous research has highlighted the significant barriers in not only obtaining ATs but also in their continued and effective application. Several studies have found disparities in accessing ATs caused by factors such as disability type, education level, race, and socioeconomic status (Kaye et al., 2008). Additionally, systematic barriers, such as inadequate provider training, lack of awareness, and design limitations, further restrict the practical adoption of ATs in clinical settings (Howard et al., 2020). Despite some populations expressing a willingness to financially support AT development, widespread implementation remains stalled as a result of structural and systematic barriers (Shin et al., 2015).

These findings consistently reflect a gap in existing literature. While many studies examine the barriers to obtaining ATs or their broader impact, far fewer explore how parents perceive a physician's familiarity with ATs, or how this perception relates to device use and comfort across settings. This gap is especially present in rural and semi-rural regions, where access to specialists and ATs resources may be limited. To address this gap, the present study examines parents' experiences with ATs for minors with cognitive disabilities, with emphasis on the acquisition and perception of ATs in addition to comfort level with such devices.

METHODS

Participants

Participants for this study were 24 parents or legal guardians of children enrolled in primary through high school MSD programs within the Bardstown, Kentucky, public school system, which serves Nelson County and the surrounding regions. All children had a diagnosed cognitive disability as indicated by MSD program eligibility, and fell between 2-21 years of age as defined by school policy (*Exceptional Child Services*, n.d.). No additional inclusion or exclusion criteria were applied. The total number of parents invited to participate is unknown, as surveys were distributed via classroom teachers.

Recruitment and Procedure

Anonymous surveys were distributed by MSD teachers, inviting parents to respond on their child's behalf to an online Qualtrics questionnaire. Participation was voluntary, and parents indicated being over the age of 18 and expressed explicit consent in question one of the survey. Embedded within question one was an informed consent form available to participants describing the purpose and procedures of the study.

Survey Instruments

The survey collected qualitative and quantitative data surrounding AT use, access, perceived effectiveness, and comfort. Utilizing Likert scales, multiple choice, and open-ended questions, the survey included items assessing parental comfort, training experience, perceived physician awareness, prescription rates, and perception of ATs.

Data Collection

All survey responses were collected via Qualtrics, then processed into Microsoft Excel by date of completion and checked for completeness. No responses were excluded.

Data Analysis

Quantitative data were summarized using descriptive statistics such as frequencies, percentages, means, and standard deviations. Relationships between select variables were descriptively examined using scatterplots and coefficients of determination (R^2). No inferential statistical tests were used, given a small sample size.

Qualitative responses to open-ended questions were reviewed multiple times to identify recurring themes related to ATs access barriers, training experiences, and device use. Rather than employing a formal coding framework, the researcher read each response and grouped them based on recurring ideas (e.g., challenges with access, lack of training, or outdated resources). Themes were grouped manually based on the categorical response to a given question, and these are intended to give a general summary of common challenges rather than offer a structural analysis.

Ethical Considerations

This study involved minimal risk and utilized anonymous survey responses. It was reviewed by an ad hoc ethics committee consisting of a school administrator, STEM educator, medical professional, and a supervisory adult researcher (Dr. Hadavi). After receiving approval, the survey was disseminated, and teachers were given a template email to send to parents, outlining the nature of the project if they elected to participate (not being related to any academic or official school work).

RESULTS

Table 1 denotes the major demographics of survey respondents. Among 24 survey respondents, the average age of the children was 11.6 (SD = 4.8), with ages ranging from 2 to 21 years. 62.5% of children in this study use ATs, most commonly suggested by family, friends, or a speech specialist (66.7%). Children first received ATs at an average age of 9.7 years (SD = 2.3).

Table 1

Child and Family Characteristics and Assistive Technology Use (N=24)

Characteristic	**n**	**%**
Child Age (Years)		
Mean age (SD)	11.6 (4.8)	-
Child Age When First Received ATs (Years)		
Mean age (SD)	9.67 (2.3)	-
Race/Ethnicity		
White	14	58.3
Black	4	16.7
Hispanic	2	8.3
Asian	1	4.2
Did not answer	4	16.7
Household Income		
$40,000–49,000	2	8.3
$50,000–59,000	1	4.2
$60,000–69,000	2	8.3
$70,000–79,000	1	4.2
$80,000–89,000	3	12.5
$90,000–99,000	3	12.5
$100,000–149,000	3	12.5
$150,000+	2	8.3
Did not answer	7	29.2
Child uses ATs		
Yes	15	62.5
No	9	37.5
ATs Prescribed by Physician (Among AT Users)		
Yes	5	33.3
No	10	66.6
Primary AT Source (Among AT Users)		
Speech Specialist	5	33.3
Family or Friend	5	33.3
Other	5	33.3
Child's Primary Diagnosis		
Autism/ASD	7	29.2
Down Syndrome	5	20.8
Cerebral Palsy	3	12.5
Angelman Syndrome	1	4.2
Mild Mental Disorder	1	4.2
Noonan Syndrome	1	4.2
Tracheobronchomalacia motor impairment	1	4.2

Did not answer	5	20.8

Note. AT = assistive technology. Percentages may not sum to 100 due to rounding. Household income categories reflect original response options provided to parents. The $100–149k range reflects a larger bin size due to the higher-income distribution of this sample. Physician prescription percentages only refer to the subset of AT users (n = 15).

Respondents most frequently reported their child's condition as Autism Spectrum Disorder (ASD), with 29.1% reporting this as a primary condition. Down syndrome was the next most common condition reported, with 20.8% of respondents reporting it as their child's primary diagnosis. 58.3% of respondents were White, 16.6 % of respondents were Black, and 8.0% were Hispanic. 37.5% of participants in this study reported a household income between 80 and 149 thousand dollars annually.

All of the children in this survey have a primary pediatrician, followed by 17.4% having a neurologist and/or ENT, and 13% who see a speech specialist. It was reported that the majority of AT users and parents were briefly trained (61.5% and 53.8%, respectively). In this study, only 30.8% of parents reported they received thorough training on how to operate their child's device(s) as seen in Table 2.

Table 2

Healthcare Providers Seen and Assistive Technology Characteristics (N=24)

Characteristic	**n**	**%**
Healthcare Providers Seen		
Primary Pediatrician	23	100
ENT	4	17.4
Neurologist	4	17.4
Speech Specialist	3	13
Occupational Therapist	2	8.7
Ophthalmologist	2	8.7
Psychologist	2	8.7
Cardiologist	1	4.3
Autism Specialist	1	4.3
Endocrinologist	1	4.3
Gastroenterologist	1	4.3
Genetic Counselor	1	4.3
Hematologist	1	4.3
Developmental Neurologist	1	4.3
Urologist	1	4.3
Vascular Specialist	1	4.3
Orthopedic Specialist	1	4.3
Mean number of providers seen (SD)	2.04 (1.8)	-
AT Training (Among AT Users, n = 15)	7	
Yes, Thoroughly Trained	4	30.8
Briefly Trained	8	61.5
No Training	1	7.7

Parent Taught to Use AT (Among AT Users)		
Thoroughly	4	30.8
Briefly	7	53.8
No	2	15.4

Note. AT = assistive technology. Percentages may not sum to 100 due to rounding. AT-related percentages only refer to the subset of AT users (n = 15). Percentages for healthcare providers indicate the proportion of children who see each type of specialist; children may see multiple physicians.

Table 3 demonstrates which ATs are most commonly used and how often among respondents in this survey. The most common assistive device used was talkers, with 45.8% respondents reporting their child uses one, with 45.5% using theirs daily. This is followed by wheelchairs being the next most common device, with 20.8% of respondents reporting their child uses one, with 100% using one daily.

Table 3

Assistive Technology Used and Frequency of Use

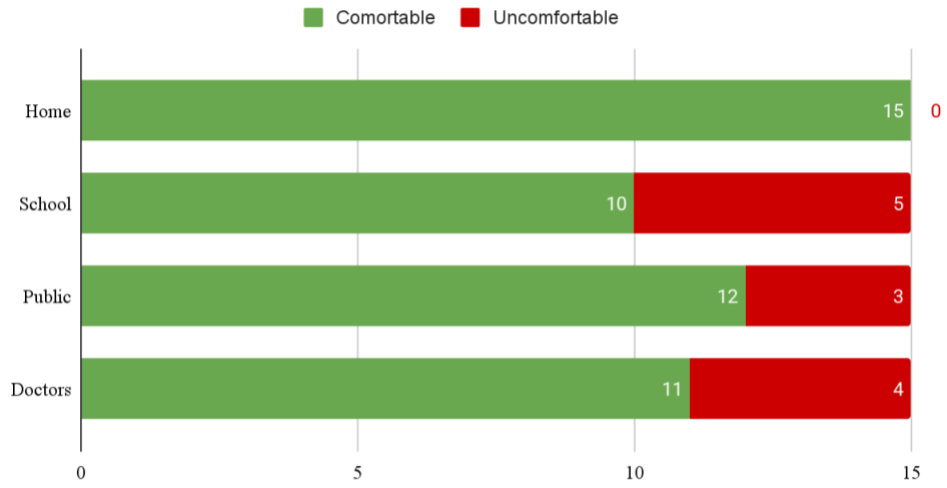
		Frequency Using Assistive Technologies		
Device	**% Respondents (#)**	**% Daily (#)**	**%4-6x/week**	**% 2-3x/week**
Wheelchair	20.8% (5)	100% (5)	0% (0)	0% (0)
Walker	2.4% (1)	0% (0)	2.4% (1)	0% (0)
Stander	12.5% (3)	0% (0)	8.3% (2)	8.3% (1)
Talker	45.8% (11)	45.5% (5)	16.6% (4)	8.3% (2)
Ipad	8.3% (2)	100% (2)	0% (0)	0% (0)

Note. AT = assistive technology. Percentages may not sum to 100 due to rounding. Percentages refer to the entire survey population (n = 24). Children may use more than one device and may use devices across settings.

Parents in this study reported they are most comfortable with their child using assistive technology at home (100%), followed by public spaces (80%), healthcare settings (73%), and least in school (66%), as demonstrated by Figure 1.

Figure 1

Comfort with Assistive Technology in Different Settings (N=15)

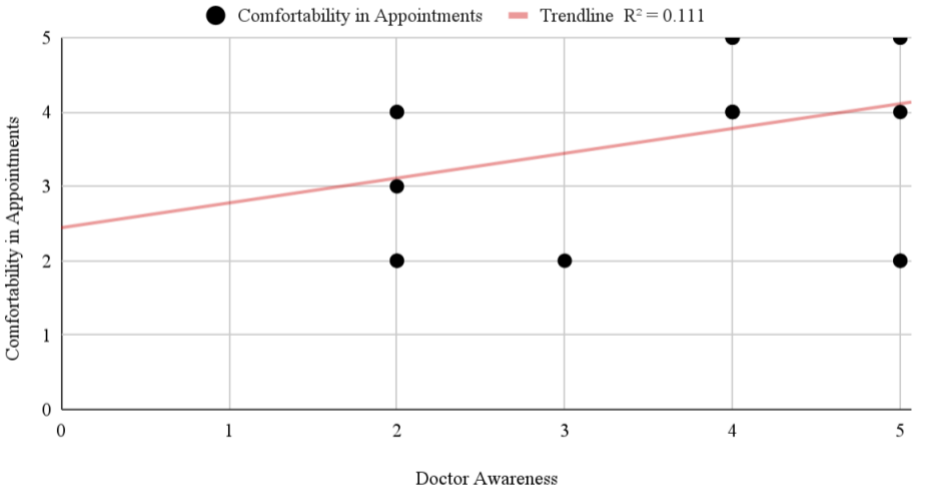


Note. n = 15. Comfort ratings reflect reported parental comfort with their child's AT use across four settings.

Figure 2 shows respondents' selection of comfort with their child using assistive technology in physicians' appointments (on a 1-5 scale, 5 representing 'extremely comfortable'), compared to the level of that physician's awareness (also on a 1-5 scale, 5 representing a physician who is 'definitely aware' of patient's AT). In general, it can be seen that greater physician awareness can be slightly related to higher levels of comfort with AT use in appointments.

Figure 2

Comfort in Medical Appointments vs. Perceived Physician Awareness of Assistive Technology

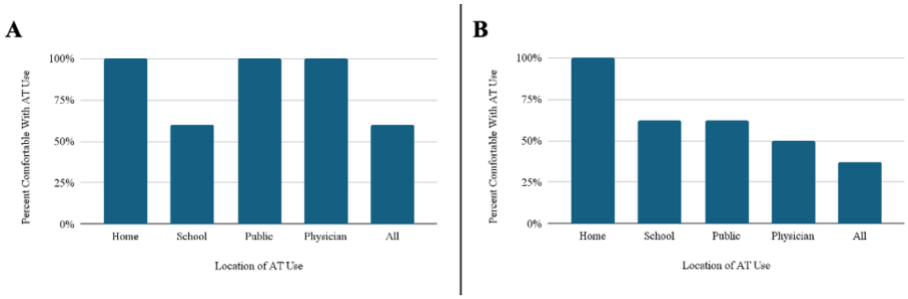


Note. Analysis included only AT users. A simple linear regression (n = 15 AT users) indicated a weak association (R^2 = .11) between physician awareness and parental comfort.

Figure 3 denotes locations where parents reported they were comfortable with their child using prescribed AT (panel A) versus unprescribed AT (panel B).

Figure 3

Parental Comfort with Assistive Technology Use Across Settings by Prescription Status



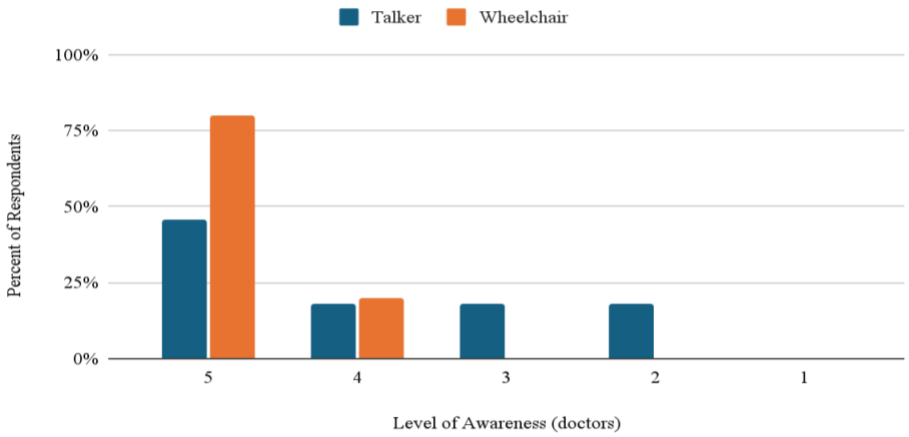
Note. AT = assistive technology. *n* = 15 AT users across both categories. Panel A models prescribed AT (n = 5), Panel B models unprescribed AT (n = 10).

100% of parents reported that they were comfortable with prescribed AT being used at home, in public, and at the physician's office (as seen in panel A). Similarly, 100% of parents of children with unprescribed AT also felt comfortable with their child using devices at home, but only 38% reported being comfortable with AT use in all settings (as seen in panel B).

Figure 4 compares parental reports of physician awareness of talkers versus wheelchairs.

Figure 4

Perceived Physician Awareness of Talkers and Wheelchairs



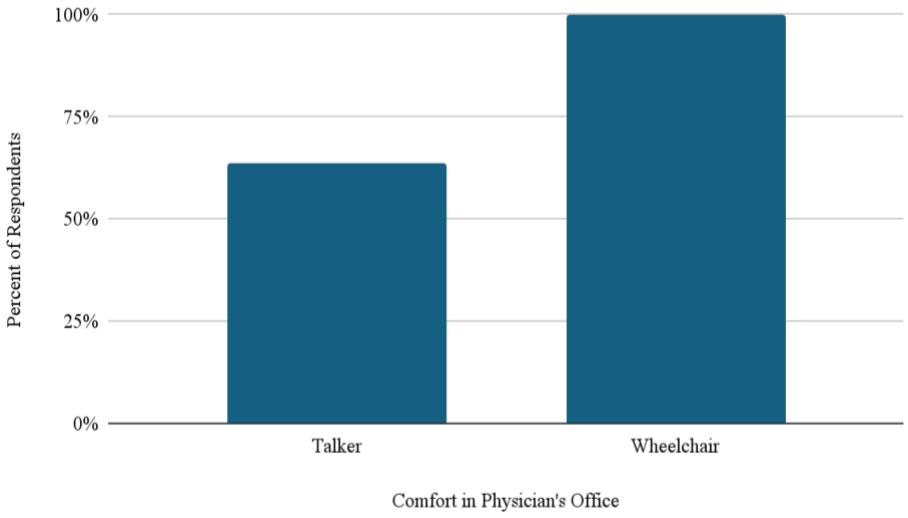
Note. n = 11 talker users, n = 5 wheelchair users. Perceived physician awareness reported on a 1-5 scale (5 representing a physician's 'definite awareness' of a device).

This figure shows that wheelchairs are much more likely to be known to a physician than talkers. 80% of parents whose child uses a wheelchair reported their physician was 'definitely aware' of their child's AT, whereas only 45.5% of respondents reported physicians were 'definitely aware' of a talker.

Figure 5 illustrates parental comfort with talker versus wheelchair use in medical appointments.

Figure 5

Comfort in Clinical Settings by Device Type

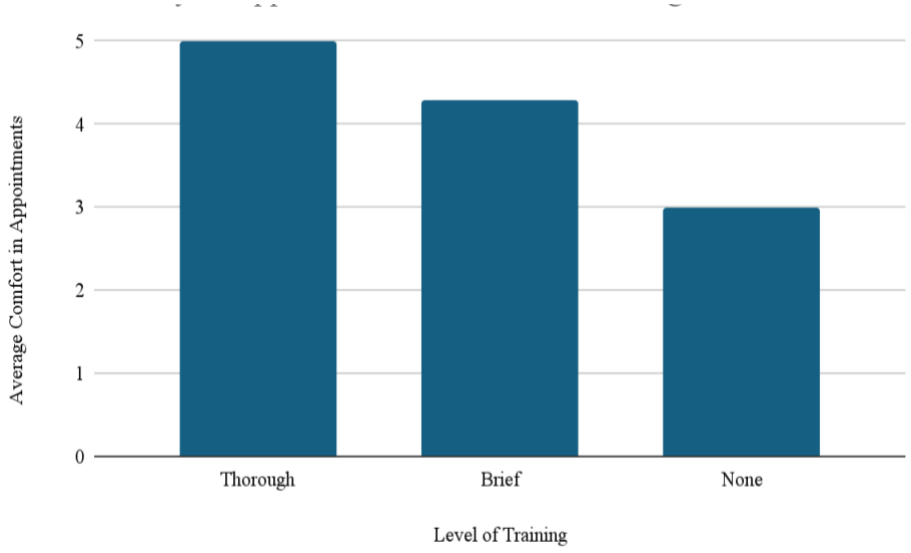


A comparison of the reported comfort using a talker versus a wheelchair in a physician's office. Of parents whose child uses a talker, 63.6% reported they were comfortable with their child using it in an appointment. In comparison, 100% of the parents of wheelchair users were comfortable with their child using it in an appointment.

Figure 6 presents parental comfort with AT use in medical appointments across levels of AT training.

Figure 6

Parental Comfort with AT Use in Medical Appointments vs. Training Level



Of parents who were thoroughly trained in using their child's device, their average comfort in appointments was rated a 5 (on a 1-5 scale, 5 indicating extreme comfort). Parents who were briefly trained to use their child's device had an average comfort level of 4.29 (indicating strong comfort). In situations where parents were not at all trained to use their child's device, parents reported an average comfort level of 3 (neutral) in physicians' appointments.

Parents were additionally asked to identify their top complaints surrounding their child's assistive technology and healthcare; their quotes are as follows:

> *"We had a really hard time figuring out where to go, what resources to use, and what information was reliable."*
>
> *"When we were learning to use and change her talker, it was hard to teach ourselves and our daughter where to go or what to do."*

DISCUSSION

This study highlights several important patterns in how minors with cognitive disabilities use ATs and how parents perceive physician involvement in this process. Key findings suggest clear differences in familiarity, training, and comfort across device types, in addition to greater opportunities for the implementation of ATs in clinical practice and education.

Across the sample, 62.5% of children used at least one device, with talkers and wheelchairs being the most common. While race and ethnicity in this sample were similar to U.S. distributions, the higher income skew and single-district sample limit the generalizability of this study (United States | Data USA, n.d.). In this study's population, the most common condition reported was Autism Spectrum Disorder (ASD), followed by Down syndrome and Cerebral Palsy. Notably, only one-third of respondents

reported their child's device was prescribed or recommended by a physician; the remaining population found ATs through an outside source.

Parental comfort with AT use was reported to be highest at home, while comfort in public and clinical settings varied significantly based on whether a device was prescribed. When a physician prescribes a device, parents collectively reported being more comfortable with their child using the device in all settings. However, in cases where assistive technology was not prescribed by a physician, reported parental comfort with device use in public spaces and in clinical spaces drops to 63% and 50% respectively. This suggests physician involvement may help parents feel more comfortable with their child's navigation of ATs outside the home.

For example, 80% of wheelchair users reported their child's physician was 'definitely aware' of their device, compared to only 45.5% of talker users. This disparity is similarly reflected by daily use, with 100% of wheelchair users reporting daily use, while less than half of the talkers reported the same use. These findings align with the broader theme present in existing literature, demonstrating that physicians receive far more training in mobility devices than in augmentative and alternative communication (AAC) devices. This gap likely contributes to uneven support across device types and reinforces the parental perception of varying physician familiarity.

Across all devices, parental comfort with usage during appointments was positively correlated with their physician's awareness of ATs. Despite this positive correlation, it should be noted that this relationship is weak ($R^2 = 0.11$). This suggests that while physician awareness may contribute to parental comfort levels with AT use across devices, other factors, such as level of training, device prescription, or environmental barriers likely play a larger role. The role of parental training with AT was particularly clear: 100% of parents who reported being 'thoroughly trained' in using their child's device experienced 'extreme comfort' with their child using the device in clinical settings. In comparison, parents who received brief or no training experienced greater uncertainty in the same environment. Several respondents described the difficulty of device operation with no instructions, noting that the lack of training and education contributed to ineffective employment.

However, respondents also revealed clear gaps in the treatment of minors with cognitive disabilities, especially as it relates to ATs. More than 20% of parents reported that the greatest barrier related to ATs was gaining access to them. Other primary complaints included outdated resources and a lack of information to teach correct device use effectively. The divide between mobility and communication devices was particularly clear, with wheelchairs being consistently used with and supported by providers, while talkers were perceived to be less familiar to physicians and less consistently built into daily routines.

Consistent with broader research, these findings suggest parents and physicians need greater access to clear guidance, training, and support as they relate to ATs. In addition, they point to a need for systematic improvement within healthcare education and practice. Since physicians play such a pivotal

role in shaping parental confidence and AT utilization, this might start with expanding the standard curriculum for medical school students and residents, particularly in relation to alternative communication strategies. Simulation-based experiences (SBEs) have proven to be an effective strategy to enhance communication and quality of care between the healthcare team, patients, and families. (Farina et al., 2024) Incorporating ATs into SBEs could hold potential for building provider experience with non-traditional communication methods. While this expansion would benefit patients with cognitive disabilities, it also holds potential to improve the quality of care for patients who have suffered a stroke, have ALS, Parkinson's, or a range of other conditions that impact motor or speech skills.

Developmental screening protocols offer a crucial window for early intervention. The first three years of life are considered the most intensive for the acquisition and development of speech and language skills. (Boat et al., 2015) As demonstrated within existing literature, many cognitive or communication-related disabilities are recognizable within the first two years of life. (Developmental Monitoring and Screening, 2025) Such conditions are most commonly recognized in developmental screenings at 9,18, or 30 months of age. (AAC: A Key That Can Unlock the Human Right to Communicate – North Carolina Schweitzer Fellowship, 2023) These screenings offer an opportunity to introduce a child to ATs during critical periods. With the recognition of a condition impairing communication or motor skills, physicians have the opportunity to work across disciplines and with speech specialists to effectively incorporate ATs into their patients' care. Early interdisciplinary collaboration may serve to strengthen communication in the physician-patient relationship and improve the long-term quality of life for individuals with cognitive or motor impairment.

Limitations

These findings may not be representative of the broader U.S. population. It should be noted that this survey had a limited sample size of 24 parents located in Bardstown, Kentucky, which includes rural and suburban populations. This survey has focused on the role of assistive technology in minors with cognitive disabilities as opposed to a population who acquired disabilities later in life (amputation, stroke, degenerative conditions); therefore, this population may not be representative of all who use ATs.

CONCLUSION

This study suggests that physician involvement and awareness in AT use have a meaningful impact on a parent's perception of such devices. Specifically, the prescription of these technologies by a physician was associated with higher parental comfort with device use across settings. Parental comfort with AT use in clinical appointments was slightly correlated to perceived physician awareness of a given device, highlighting the potential benefits of expanded provider training. Most families within this study found their child's device through an outside source, many struggling with AT access and use. Future research on the topic of ATs, especially as they pertain

to individuals with cognitive disabilities, should focus on a larger geographical population and include a larger and more diverse sample size. Additionally, focusing on the impact of amended education or healthcare policy, as suggested, has the potential to improve AT access, training, and long-term outcomes across care settings.

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