Feasibility of Orientation and Mobility Services for Young Children with Vision Impairment using Teleintervention

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The demand for orientation and mobility (O&M) training for very young children with blindness or vision impairment (B/VI) and their families is increasing in the Early Intervention (EI) period. However, the extreme shortage of qualified O&M specialists to work with this population may be limiting their access to appropriate services. This study used a needs assessment survey to collect information about the feasibility of providing O&M services in EI using the alternative service delivery model of teleintervention. Responses from 121 individuals in the profession of EI for young children with B/VI provide insight on the current practices and perceptions of practitioners, educators, and administrators. The results of this study and its implications for future research are discussed.

Children with blindness or vision impairment (B/VI) require instruction in highly specialised skills, for example braille and orientation and mobility (O&M), to access the world around them. O&M training teaches individuals who are vision impaired the skills necessary to travel safely and independently through their environment. Learning and mastering a combination of orientation skills and mobility skills enables such children (who are vision impaired) to navigate and manage their travel environments confidently, safely, and independently.

Much research demonstrates that young children with B/VI learn about their world in a tactual, experiential manner through independent movement that increases their allocentric understanding of body awareness and literacy referents (Papadopoulos, Koustriava, & Kartasidou, 2012). Logistic regression data for adults with B/VI show a strong correlation between independent travel skills and future employment (McDonnall, 2011). O&M training during the early years of a child's life may facilitate the development of independent movement and travel skills throughout the individual's lifetime.

The Need for O&M in Early Intervention

Although the availability of O&M instruction has largely been limited to preschool and school aged children, the provision of these services to infants and

toddlers is evolving (Anthony, Bleier, Fazzi, Kish, & Pogrund, 2002; Cutter, 2007; IDEA, 2011). The way that the human nervous system develops varies with age and early childhood is a critical time period for motor development (Bushnell & Boudreau, 1993; Ferrell, 2011; Hadders-Algra, 1995). Midway through the first year, children should begin to move toward landmarks in their environment prompted by their interest and social interactions with others, rather than only referencing their own bodies. For example, the Groningin Vroege Interventie Project (VIP) showed a correlation between measured motor interventions and improved developmental outcomes for children at risk of neurological developmental delay at six months old, one year old, and 18 months old (Hielkema et al., 2011). Using a variety of strategies that fostered the infants' self-motivated, independently produced motor activities, these improved developmental outcomes included functional mobility. Hielkema et al. (2011) reported,

> the data suggest that coaching of parents to solve their own problems and to integrate motor activities in which the infant is allowed to explore the borders of its own abilities into daily routines might be a simple and effective means of promoting infant development (p. e14).

During this time in children's lives, it is important for their families to receive an understanding of O&M to help them support the foundational skills necessary to establish good habits and to build more advanced travel skills in the future (Beelmann & Brambring, 1998; Kesiktas, 2009). O&M training for young children (birth through 3 years old) with B/VI involves a team-based, family-centred approach that focuses on sensory, concept, and movement development (Joffee, 1988; Pogrund & Fazzi, 2002).

The value of understanding O&M for young children with B/VI by their families is progressively being recognised and, consequently, increasing the demand for O&M services in EI. The extreme shortage of qualified O&M specialists, as well as EI personnel, to work with this population of children may be limiting their access to services, especially in rural and remote areas (Marcin et al., 2004; Olson, Fiechtl, & Rule, 2012). Increasing the access that young children with B/VI and their families have to qualified O&M services requires creativity and innovation in service delivery models. Investigating alternative service delivery methods, such as teleintervention, could help make O&M services more available for young children with B/VI.

A Preview of the Teleintervention Model

"Teleintervention" is an emerging term used to describe distance-based EI services for children birth through 3 years of age who have been identified as having a developmental delay or at risk for disability. The term "teleintervention" captures the educational focus of EI services provided by a variety of health and non-health professionals (Cohn & Cason, 2012, p. 210).

Teleintervention involves using tele-communication technology (e.g., computers; the internet; and synchronous videoconferencing applications, such as Skype™ or FaceTime™) to deliver professional services to clients at a distance (American Speech-Language-Hearing Association, 2010). As the technology for

teleintervention becomes more available and reliable, additional research is necessary to determine the possibility of engaging in the use of O&M beginning in EI. Previous research in telemedicine showed that parents and practitioners found technology-based intervention at least as effective as face-to-face consultations (Harper, 2006; Kelso, Fiechtl, Olsen, & Rule, 2009). The use of teleintervention, with accessible technology and a thoughtfully designed protocol, will allow families to access specialised consultation and services that would not typically be available to them.

A significant history of the use of technology to provide healthcare and therapeutic assessment and intervention exists to provide successful models for practitioners to adapt to their communities and organisations (Behl, Houston, Guthrie, & Guthrie, 2010; Boisvert, Lang, Andrianopoulos, & Boscardin, 2010). Early pioneers in healthcare and rehabilitation services identified ethical and legal issues, including the professional responsibilities necessary for quality teleintervention services (Cohn & Cason, 2012). Currently, concerns include privacy and confidentiality, licensure, and local laws that affect the practice of this alternative service delivery model. The development of practice standards, based on research and effective implementation strategies, is critical in addressing these legal and ethical issues.

Teleintervention supports and provides a viable method of best practice in EI (Olson et al., 2012). Many providers find it difficult to turn the responsibility of integrating strategies into families' daily routines because they "spend most of their time interacting with the child" and often do not allow "parents time to learn techniques or identify opportunities to use them" (Olson et al., 2012, p. 338). Coaching from a distance supports a philosophy of building the capacity and enhancing the strengths and resources of families (Dunst & Trivette, 2009; Hadders-Alger, 2011; Rush & Shelden, 2011). According to Dirks and Hadders-Algra (2011), "coaching is defined as professional guidance aiming to empower caregivers so that they can make their own decisions during daily care activities. This implies that coaching differs largely from instruction" (p. 66). In the teleintervention model of practice, EI providers are required to improve their communication and modelling skills so parents become fully engaged and confident in the recommended O&M strategies. Research from various teleintervention models demonstrated an increased use of the family-centered coaching model of intervention (Blaiser, Behl, Callow-Heusser, & White, 2013; Heimerl & Rasch, 2009; Kelso et al., 2009; Olson et al., 2012). In a randomised controlled trial that compared EI teleintervention services to EI in-person services parent engagement was statistically more significant ($p < .05$) for families receiving EI teleintervention (Blaiser et al., 2013). The necessity of using coaching strategies with parents through an EI teleintervention model suggests an opportunity to promote family-centred best practices to increase parent engagement and positive child outcomes.

Purpose of the Study

The purpose of this needs assessment survey (Rossi, Lipsey, & Freeman, 2004) was to collect information about the feasibility of providing EI O&M services through an alternative service delivery

method, specifically teleintervention. Through investigating the current practices and perceptions of teachers of students with vision impairment who specialise in early intervention (EI-TVIs), O&M specialists, EI vision program directors, and educator preparation university personnel will have a better understanding of what is necessary to develop a teleintervention protocol for O&M in EI.

The study focused on the following research questions:

1. What are the most common types of service provision used by professionals working in B/VI with families in EI?

2. What is the level of importance of O&M services in EI among professionals working in B/VI?

3. Which technologies associated with teleintervention are the most familiar to professionals working in B/VI?

Methodology

PARTICIPANTS

The study's participants included professionals working in B/VI in various settings, with varying levels of experience, across the world. Approximately 30 electronic invitations to participate in the study were sent to personal contacts in the United States, Canada, and Australia. These contacts were asked to forward the survey to anyone they knew with the appropriate experience and expertise. In addition, permission was granted by an electronic mailing list (Early Intervention Training Center for Infants and Toddlers with Visual Impairments, 2013) to post the survey, significantly increasing participation. A total of 125 respondents attempted the survey

although only 121 respondents completed the survey. Respondents included teachers of students with vision impairment (TVIs; n = 43), O&M specialists (n = 25), both (TVI and O&M specialist; n = 24), related service professionals (therapists, occupational therapists, speech-language pathologists, and low vision therapists; n = 12), administrators (n = 5), university professors (n = 4), and others (deafblind consultants, O&M specialist with multiple roles, early interventionists, and rehabilitation teachers; n = 12).

The number of year's respondents had provided direct services ranged from 1 to 5 years (19%), 6 to 10 years (24%), 11-20 years (28%), and 21 or more years (29%). All respondents indicated having experience working with young children with B/VI.

PROCEDURE

Approval for this study was obtained from the Institutional Review Board at a university located in the intermountain region of the United States. The participants for this study were recruited internationally via email through individuals and organisations that provide early intervention services to young children with B/VI.

INSTRUMENTATION

A survey instrument was developed using Qualtrics® software to collect data online due to low prevalence rates and geographic dispersion (Hatton, Bailey, Burchinal, & Ferrell, 1997). It consisted of 11 multiple-choice questions and one optional free-response question. Information of interest included the participants' professional demographics; views of O&M and O&M services in EI; knowledge and familiarity with computer tablets and videoconferencing

software / applications; and perceptions about the feasibility of providing O&M services through teleintervention.

DATA COLLECTION

Data collection was completed using the Qualtrics® survey developed by the authors. Potential participants were sent an email invitation with a brief description of the study and a link to the survey. Before each participant could access the first question to the survey, he/she read a cover letter that had information about the purpose of the study, the intent of the survey, and the measures taken to ensure the participant's confidentiality of his or her responses. Confidentiality was strictly maintained throughout the study as a function of the Qualtrics® software. The identities of the participants taking the survey were not available to the researchers. No incentive was offered beyond the opportunity to assist the professions of B/VI pursue a potential new service delivery model.

DATA ANALYSIS

Data analysis was conducted using the descriptive information generated by the Qualtrics® software. The number of responses for each survey question, and their corresponding percentages, were used to answer the research questions. This information was used to determine whether or not teleintervention is a feasible service delivery model for providing O&M

services to young children with B/VI in EI. A combination of forced choice, multiple answer, and one open-ended question were used.

Results

The results from the survey revealed that the majority of respondents learned about teleintervention for the first time through the survey cover letter. Respondents also reported being familiar with teleintervention through public media, such as broadcast television, magazine articles, or web links of interest shared through social media networks. A small number of respondents indicated they have participated in teleintervention as part of their service delivery model for EI or have personally used teleintervention to receive healthcare services (Table 1). Previous research in distance-based intervention indicated that this model requires an advocate for practice to be adopted in areas where service is currently provided face-to-face (Heimerl & Rasch, 2009). Since teleintervention is a complex system, "the local champion [the advocate] had to be willing to learn the process, help to identify local technological resources, market the program to other users, coordinate the site activities and collect survey data regarding the encounters" (Heimerl & Rasch, 2009, p. 3). The researchers embraced the role of "champion" for teleintervention, having

Table 1. The way respondents (*N=121*) learned about teleintervention.

Knowledge of teleintervention	%
Survey cover letter	64
Public media	18
Early intervention experience	15
Healthcare experience	2

Table 2. Frequency of EI services to young children with vision impairment (*N=121*).

Frequency of service provision	%
More than one time a week	27
Weekly	22
Monthly	20
Other	17

successfully experienced this model of service delivery while working closely with families.

The survey data indicated that the types of services for young children with B/VI are provided in relatively equal amounts across population areas in suburban (62%), large urban (56%), and rural or remote (55%) areas. Respondents were allowed to choose more than one answer, and the results showed that many providers do cross demographic boundaries. Settings where children receive services include home visits (81%), community-based inclusive settings (51%), and centre-based specialised infant and toddler programs (43%). It is encouraging to note that the majority of EI B/VI services are provided in the home or in community-based and inclusive settings, as recommended in best practices (Division for Early Childhood & National Association for the Education of Young Children (DEC/NAEYC), 2008; Dunst & Trivette, 2009).

Ensuring that children with B/VI are receiving adequate services in EI is an essential component determining whether O&M teleintervention will be feasible. The survey indicated that young children with B/VI received services with varying frequency. Service provision varied from more than one time a week to a weekly or monthly model. Additional ('other') schedules included

a combination of weekly and monthly, annually, and as needed models (Table 2).

Data related to O&M services in EI indicated that respondents (*N*=121) considered O&M services for young children with B/VI essential for good motor development and independent travel skills (78%) and beneficial to some families in EI (22%). All professionals indicated that O&M was necessary as soon as possible in EI, and none of them thought that waiting until children with B/VI began using a white cane was a good idea. The majority of respondents reported that O&M services in EI in their areas were consistently available. Others reported that O&M services were provided through consultation, or for assessment purposes. Some respondents indicated that O&M services in EI were available on a limited, inconsistent basis or when children were ambulatory. Only a small percentage of respondents reported that they did not have access to an O&M provider (Table 3).

Data related to the technologies associated with teleintervention practice revealed that the majority of our participants were familiar with tablet computers and video conferencing applications / software. Respondents used iPads or tablet computers to teach young children with B/VI; provide resources for parents; consult with colleagues; or participate in professional development opportunities. Only a few

Table 3. Availability of O&M services as an early intervention service for young children with vision impairment in provider's service area (*N*=121).

Availability of O&M as an EI service	%
Consistent service	67
Consultation	16
Assessment	7
Limited / when child was ambulatory	7
No access to O&M provider	3

respondents indicated that they do not use these technologies (Table 4). It is encouraging to learn that most practitioners in EI for young children with vision impairment have some level of comfort with technologies that can be used in teleintervention. Although expensive, inaccessible technology was an area of concern for many professionals in former studies of teleintervention (Olson et al., 2012). However, using tablet technology is within the price range and skill level of most individuals in our society. Further investigation of technology security and accessibility issues is necessary to establish a useable protocol process that can address confidentiality concerns and connectivity.

Video conferencing applications / software, for example as Skype™ or FaceTime™ are vital in facilitating interaction between participating members in the teleintervention service delivery model. Respondents reported using video conferencing applications / software mainly for personal and social communication (64%) and professional development or online learning (50%). They also used video conferencing applications / software to interact with colleagues or EI team members (24%) and provide services to

Table 4. Familiarity with technologies associated with teleintervention practice and uses (*N=121*).

Technologies and uses	%
iPads or tablets computer and applications associated with them	
Yes – teach young children with B/VI	68
Yes – provide resources for parents	57
Yes – consult with colleagues	46
Yes – participate in professional development opportunities	53
No – unfamiliar / not use at all	13
Video conferencing applications / software	
Yes – personal and social communication	64
Yes – professional development or online learning	50
Yes – interact with colleagues or EI team members	24
Yes – provide services to families	11
No – unfamiliar / not use at all	16

Note. Respondents could select more than one answer for this survey question.

families (11%). A small percentage of respondents indicated they were unfamiliar video conferencing applications / software (Table 4).

Discussion

The results of this study appear to show that individuals in the profession of EI for young children with B/VI believe that the use of teleintervention might be a feasible alternative service model to traditional, direct-services in the home. Sixty-eight percent of respondents (*N*=76) indicated they would participate in a teleintervention model if it were available in their geographic area. The effectiveness of the coaching model, technology issues, and legal and privacy concerns are areas of importance that need investigation and consideration. The results of the survey indicated that training is needed to increase the experience of professionals in using technologies associated with teleintervention**.**

Limitations of this study include sampling bias, incomplete responses, and validity. Anytime a convenience sample is necessary, sampling bias is an internal threat to validity. It is difficult to determine whether or not the sample included some individuals who would have objected to teleintervention. Using an online survey implies that our respondents have some understanding and ease with technology.

This survey has provided interesting information from colleagues who support families of young children with B/VI. Legal and ethical issues, as well as technology options, will be explored by the authors to create standards of practice, coaching strategies, and a pilot study. Further research is necessary at this time to develop a working protocol that supports effective implementation and fidelity.

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