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Comments

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Occupational therapists who work with people with disabilities as part of their professional practice are concerned about the use of assistive technology devices and how those technologies can improve their patients' independence, autonomy, and social participation in daily life. However, therapists face challenging problems related to access, use, and the potential abandonment of these technologies.

Background

For many patients, independence in a particular situation (transferring, feeding, toileting, etc.) can only be improved through the use of an assistive device. Occupational therapists might work diligently to help a patient acquire and use a particular device. When considering the use of that device in a specific environment, however, therapists must keep in mind the potential problems that may arise and the possibility that a patient might decide to abandon the technology.

There is some evidence about predictors of technology abandonment, and this evidence can provide information for occupational therapists' practice. For example, more than two decades ago, Phillips and Zhao (1993) identified four factors related to the abandonment of assistive technology devices: (a) not considering the user's opinions, (b) ease of device procurement, (c) poor device performance, and (d) changes in the user's priorities. At that time, the authors suggested technology-related policies and assistive technology services that could reduce the frequency of abandonment. Unfortunately, assistive technology abandonment by users is still a concern for everyone on a rehabilitation team.

One major factor related to abandonment is the complexity of cities and public accessibility. Of perhaps the greatest importance is public transportation, but also of concern is access to buildings and public spaces for leisure and engagement in everyday activities, such as shopping at a supermarket. For example, a person with a manual wheelchair can move around more independently, but if there is a lack of access to public transportation and/or steps at the only entry to a building, the use of that wheelchair might be limited.

In a literature review about wheelchair accessibility in public buildings, Welage and Liu (2011) discovered that none of the studies reported 100% wheelchair accessibility despite laws and regulations that should guarantee this. They concluded that practitioners who work in the field of assistive technology have a role in advocacy and assisting wheelchair users to have full social participation in all community places. Accessibility to public environments is a basic need of all citizens and an important human right, both of which are essential for urban planning (Evcil, 2009).

The measurement and assessment of accessibility remain a challenge for occupational therapists in light of the diversity of populations and their abilities and disabilities. Church and Marston (2003) discussed the fact that traditional measurements ignore physical and structural barriers, individual mobility restrictions or effort, and other problems. They also suggested that urban and building design problems preventing access for people with physical disabilities might lead to more

sophisticated access measurements, which, in turn, could improve access.

There are important questions to be asked. How can we improve the use of assistive technologies while also considering the environment and public policies that could offer people with disabilities opportunities for more social inclusion? What public policies could support the use of assistive technologies and reduce the abandonment of these valuable resources?

The Situation in Brazil

According to Laranjeira and Almeida (2008), of the nine million people with physical disabilities in Brazil, only 0.99% received any orthotics or auxiliary means of locomotion in 2002. They also reported that the national average rate was 9.99 orthotics per 1,000 disabled people, with 20 out of 26 Brazilian states below the national average. Six states presented rates lower than one orthotic per 1,000 disabled people: Goiás, Pará, Piauí, Rio Grande do Norte, Rio Grande do Sul, and Tocantins.

In 2008, Mello noted that users' lack of knowledge about existing resources and their rights was a contributing factor. Put simply, the vast majority of disabled people in Brazil, according to Mello, do not know their rights.

Legal Context

In Brazil's national political scenario, the first ideas concerning assistive technology were published under the term "technical help" in Law n° 10.098, dated December 19, 2000 (Presidência da República, 2000). This law established general rules and basic criteria to promote accessibility for

(Souza, Cruz, Alves, & Agostini, 2010). With new political programs and increasing concerns about human rights, this law was further consolidated through Decree n° 5.296, dated December 2, 2004 (Legislação Federal do Brasil, 2004).

Decree n° 5.296 was an important milestone for Brazilian public policies regarding technology and accessibility in urban spaces and transport systems for disabled children. The decree regulated Laws n° 10.048 and 10.098; respectively, they provide for priority service and establish general rules and basic criteria to promote accessibility for people with disabilities or reduced mobility (Legislação Federal do Brasil, 2004). For example, in Article 61, technical help is considered to be the products, devices, equipment, or technological adaptations especially planned to improve the functionality of a person with a disability or reduced mobility, favoring full or assisted personal autonomy.

Ministry of Health

Other entities are involved with this issue in Brazil. The Ministry of Health centralizes a national program responsible for the distribution of orthotic devices, manual and specialized wheelchairs, and shower chairs. Through subdepartments, the Ministry has made the monitoring and customizing of orthotics and prosthetics available through the Unique Health System (Sistema Único de Saúde [SUS]), as well as auxiliary means of transport in different rehabilitation procedures (Ministério da Saúde, 2011). Most of the rehabilitation resources available in Brazil for physically disabled people are physical devices. In a list released by the

Ministry of Health there is an extensive range of equipment, including various wheelchairs, orthopedic shoes, collapsible strollers for the transport of disabled children, adjustable walking sticks and crutches, and orthotic braces (Ministério da Saúde, 1993).

Although the SUS tables show the Ministry of Health's initiative in meeting the cost of these technologies, this presupposes that people with disabilities can be assisted by these products "off the shelf," ready for immediate use. In fact, adaptations are necessary in many cases (e.g., wheelchairs), and the cost of these adaptations is not covered; people are required to pay for those services that are not included in the assistive technology. Also, the National Health Policy of Disabled Persons mentions access to assistive resources, but the information is limited to a single paragraph in which official banks are encouraged to provide funding to disabled people for the acquisition of technical help (Legislação Federal do Brasil, 2004).

Mello (2006) presented a study about the trajectory of assistive technology use in Brazil. The author noted that, while there have been investments in research about this issue since the 1950s in countries in North America and Europe, in Brazil that investment is low and the use of assistive technologies is still limited. According to Mello, the main factors that contributed to low use were: (a) the absence of financial resources for device acquisition, (b) insufficient funding for assistive technology services by public health organizations and private health businesses, (c) rehabilitation professionals' lack of technical knowledge

regarding assistive technology products, and (d) a lack of specific training so these professionals could become providers of assistive technology. These factors call for investigations of and changes in policies and practices that can help not only the people who use assistive technology, but also the professionals who work with these resources.

Research in Brazil: Assistive Technology Use Purpose

In a recent review of this subject in Brazil, we could find no evidence about the monitoring of devices or equipment; about the mechanisms, strategies, and procedures adopted for acquisition; or about the factors that involved the users' conditions for the acquisition of these resources. Therefore, we conducted a study that aimed to identify (a) which assistive technologies users had, and (b) how the acquisition, use, and abandonment of these assistive technologies occurred.

Participants

We conducted a cross-sectional, descriptive study using a non-probabilistic convenience sample. Inclusion criteria were participants who: (a) had a physical disability and lived in São Carlos, (b) were registered in a Family Health Unit (Unidades Saúde da Família), and (c) were over 18 years of age. Exclusion criteria were: (a) insufficient cognitive capacity to answer the survey instrument, (b) comprehension aphasia and/or expression aphasia, and (c) other problems related to language that impeded the participants' ability to answer interview questions.

Ninety-one participants were recruited from the micro areas where they lived, with the aid of community health agents (Agentes Comunitários de

Saúde) and occupational therapists who worked in the public field. The proper review board for research approved the research project, and all of the participants provided informed consent.

Data Collection

We developed the interview form for this research based on our experience in the field with public and private rehabilitation services for adult and elderly people. The form contained a list of 16 assistive technology items and open and closed questions, and was organized in a logical sequence from general to particular issues. We submitted the form for evaluation by six external judges and then a pre-test with five of the participants.

After defining the final form, 14 research assistants were selected and trained for two months. Their training involved the use of the form and familiarity with all of the assistive technology equipment and devices that the participants might be using.

To clearly identify the technological resources owned by the participants, the data were collected in their homes. To complement these data, access to the participants' records identified their prescriptions, confirmed their diagnoses, and clarified any questionable information.

Results

Each of the 16 assistive technology items listed in the survey form was assigned one point, with a minimum of 0 points when the participant did not have any resources and a maximum of 16 points when they had all of the products. The other data from the form were analyzed through simple descriptive statistics, in percentages and measures

We categorized the types of technology owned by the participants according to the classification presented by Bersch (2008). Table 1 presents the total number of assistive resources identified in the sample studied. Table 2 summarizes the findings about the participants' use of assistive technologies.

Table 1

Assistive Devices and Equipment Acquired by the Participants

Categories of assistive technology	N	%
Mobility aids	92	46%
Aids for ADLs and IADLs	58	29%
Orthotics and prosthetics	20	10%
Environment accessibility	18	9%
Seating	11	6%
Total devices/equipment acquired	199	100%

Table 2

Summary of Assistive Technology Outcomes

		N	%
Distribution of assistive technology products	Adults (n = 34)	68	34%
	Elderly (n = 57)	131	66%
Funding source of acquired technology	Lawsuit	4	2%
	Donation	75	38%
	Public government	21	11%
	Own resources	79	40%
	Borrowed	5	2%
	Rented	15	7%
Current use (yes) or abandonment (no) of assistive device	Yes	164	82%
	No	35	18%
Reasons for abandoning resource use (n = 35)	Do not need the resource anymore	9	26%
	Do not like the resource	13	37%
	Afraid to use resource	5	14%
	Do not have physical conditions to use it	7	20%
	The equipment is not in a condition to be used	1	3%
Types of technologies abandoned (n = 28)	Wheelchairs	7	25%
	Crutches	2	7%
	Ortheses	1	4%
	Walkers	5	18%
	Canes	9	32%
	Special mattresses	1	4%
	Wheelchair cushions	1	4%
	Hospital beds	2	7%
Technologies prescribed by health professionals (not required)	Yes	119	60%
	No	80	40%
Participants knowledgeable about federal technology concession policies	Yes	21	23%
	No	70	77%

Table 3 shows the places where the participants indicated they had accessibility difficulties. Table 4 shows the participants' responses regarding public transportation difficulties.

Table 3
Public Spaces Where the Participants Showed Accessibility Difficulties

Public spaces	N	%
Supermarkets	36	65%
Shopping centers	34	62%
Plazas	34	62%
Parks	33	60%
Health services	26	49%
No difficulties reported	14	25%

Table 4
Difficulties the Participants Experienced When Using Public Transport (N = 91)

Difficulties	N	%
No difficulties reported	39	43%
Public transport not adapted	15	17%
Path where subject lives inaccessible by bus (distance to bus stop)	13	14%
Public transport adapted, but times restricted	12	13%
No companion for leaving house	10	11%
Public transport did not arrive in residential area	2	2%

The list presented in Decree n° 1.130, dated June 18, 2002, contains the procedures table of SAI/SUS indicating authorized products (Gabinete do Ministro, 2002). Of the 199 products acquired by the participants in this survey, 71.4% (n = 142) were granted by the SUS. This means that the participants who acquired this equipment using their own resources paid twice for items that are guaranteed by law.

The Issue of Assistive Technology Abandonment

The abandonment of assistive devices has typically been attributed to the individual characteristics of persons with disabilities and their

context. The most evident reasons are non-acceptance of their handicap and depression, low-quality products, social support weaknesses in the individual's environment, architectural barriers, and factors related to rehabilitation (intervention), such as inappropriate instruction and training for product acquisition (Wessels, Dijcks, Soede, Gelderbom, & De Witte, 2003).

Our study showed that products were not being used by the participants for several additional reasons: not believing in their benefits, aesthetic issues, needing a more secure device, and other issues peculiar to each case. For example, 13 of the 35 participants who abandoned a device (37%) said they did not use the device because they "did not like it." This suggests the need for interventions in monitoring ongoing use of a technology. However, this requires professionals who can attend to these issues. Thus, the lack of resource monitoring by a specialized professional in assistive technology can be one factor that causes patients to abandon technologies.

The lack of resource monitoring can be aggravated by the fact that these technologies do not require a professional's prescription. We agree that the prescription is an important issue. But additional follow-up is needed to integrate the technology into the patient's daily life. The "right" assistive technology devices can best be determined when decision making is a collaborative process between the therapist and the patient (Johnston, Currie, Drynan, Stainton, & Jongbloed, 2014).

We have observed the need for community health agents to identify people with physical disabilities and to identify work that should be

carried out by occupational therapists. Thus, these agents should receive appropriate training so they can correctly identify people with disabilities and articulate the appropriate level of rehabilitation needed in relation to occupational therapists.

This recommendation is not meant to generate a system of required prescriptions. But, various community health units in Brazil should provide appropriate follow-up and refer disabled individuals to specialized care in a way that improves the operation of health services. Occupational therapists with knowledge in assistive technologies must contribute more to the processes of the health network, ensuring that disabled people and others who need technological resources can receive benefits in keeping with their rights.

One example is mapping these individuals through household visits and identifying their needs in health, education, work, transportation, leisure, and other issues related to daily life. This would include identifying assistive products already owned by the users and defining other potentially useful technologies. At the same time, the need for ongoing monitoring, changes in care, and device exchanges between users could be established. This is all well within the competency of occupational therapists, and it is ensured and established by Brazilian law.

Finally, our study showed that many assistive technologies were acquired with the participants' own resources or donations. Many of these technologies could be granted by the federal government's concession program. However, we discovered that the participants used and needed

other technologies that are not included in that program.

Conclusion

We believe the data found in this study should be analyzed carefully in light of the participants' context, as it may have wider implications. There is an urgency to integrate assistive technologies, public policies, and environmental accessibility. Mobility related to public transportation and public urban spaces seems to be a problem not only in South America but in other countries as well. For example, Evcil (2009) developed a study in Istanbul, Turkey, to determine wheelchair accessibility in public buildings in its central business districts and to identify architectural barriers for wheelchair users. The greatest architectural barriers in that study were related to public transportation.

Thus, abandonment and accessibility in relation to assistive technologies are universal problems for occupational therapists. More evidence comparing reasons for this problem, potential solutions, and best practices should be shared among practitioners in different countries. Occupational therapists around the world should be actively engaged with public policies to enhance the use of assistive technologies with the aim to make it possible for people with disabilities to participate fully in life both inside and outside of their homes.

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