

INTERIM FINDINGS: IMPACT OF ASSISTIVE TECHNOLOGY ON USERS AND THEIR CAREGIVERS

Louise Demers,¹⁻² William B. Mortenson,¹⁻³, Marcus J. Fuhrer,⁴ Jeffrey Jutai,⁵
James Lenker,⁶ & Frank DeRuyter⁷

¹*Centre de recherche de l'Institut universitaire de gériatrie de Montréal,*
²*École de réadaptation de l'Université de Montréal,* ³*Gerontology Research*
Centre, Simon Fraser University, ⁴*National Institute of Child Health and Human*
Development, National Institutes of Health,
⁵*University of Ottawa,* ⁶*University at Buffalo,* ⁷*Duke University*

INTRODUCTION

Some experimental studies [1-3] have found that assistive technology (AT) interventions can improve functional outcomes for assistance users. However, we know little about the impact of these devices on their informal caregivers. Specifically, scant evidence exists to support or refute the claim that assistive device use decreases dependence on caregivers or that it reduces caregivers' sense of burden.[4] Given that 1) most care is provided by informal rather than formal caregivers, 2) an increasing number of older adults require assistance and 3) serious potential problems are associated with caregiver burnout, we are conducting a study to determine if a structured dyadic AT intervention will positively impact both assistance users and their informal caregivers.

OBJECTIVE

The objectives of the study were to examine the effects of an AT provision, updating and training (ATPUT) intervention on 1) the daily activities and social participation of the assistance user, and 2) the physical and/or psychological demands on the caregivers who assist with these activities. We anticipate the AT intervention will diminish the assistance provided by the caregivers by facilitating 1) the use of AT alone, or 2) the use of AT combined with caregiver assistance

METHODOLOGY

The target population consists of 1) assistance users age 65 years and over who

have a mobility limitation and 2) their unpaid, informal, caregivers. The participating dyads were randomly assigned either to the experimental or the control groups. The experimental group received an ATPUT intervention consisting of 5 components: 1) identification and prioritization of problematic activities by the assistance user and his/her caregiver; 2) in-residence assessment of the daily activities and social participation and preferences of the assistance user; 3) detailed review of the AT and human assistance that were currently being used; 4) recommendations by an occupational therapist for possible changes in the personal assistance strategy; 5) negotiation of an ATPUT plan with the assistance user and her/his principal caregiver. This plan included recommendations for AT devices, including up to \$250 of financial assistance. The control group received the same intervention six weeks later.

Two outcome measures were used for assistance users. The degree of difficulty with selected activities was measured using the Individually Prioritized Problem Assessment (IPPA).[5] Activity satisfaction and performance was measured using the Life-H.[6] The primary outcome measure for caregivers was the Caregiver AT Outcome Measure (CATOM).[7] We have also collected data on health using the EQ-5D,[8] functional status using the Functional Autonomy Measure (SMAF),[9] and cognition using the MMSE.[10]

RESULTS

Results are presented for 22 dyads who had received the ATPUT intervention (Table 2). Degree of difficulty decreased while activity satisfaction and performance increased significantly for assistance users (respectively: $t=3.4$, $p=0.003$; $t=3.35$, $p=0.002$; $t=2.5$, $p=0.019$). Moreover, caregiver burden, measured using the CATOM decreased significantly post-intervention ($t=2.7$, $p=0.015$).

Table 1: Characteristics of the participants (n=22 dyads)

Independent variables	Assistance Users		Caregivers	
	Mean or (n)	SD (%)	Mean or (n)	SD (%)
Age	81	7	68	15
Female	(12)	54%	21	86%
Education	10	5	12	3
Health (EQ-5D)	54	22	79	17
Cognition (MMSE) (0-30)	27	4	NA	NA
Functional status (SMAF) (-87-0)	-24	8	NA	NA
Diagnosis:				
Neurol	(5)	23%	NA	NA
Rhumato	(11)	50%	NA	NA
Cardio	(3)	14%	NA	NA
Other	(3)	14%	NA	NA

DISCUSSION AND CONCLUSION

This research is necessary and timely. It is the first study with a randomized controlled experimental design to assess the impact of an AT intervention on the lives of assistance users and their informal caregivers. Similarly positive findings for the completed study will encourage research efforts to examine AT interventions under ordinary clinical conditions to determine if they also yield benefits for caregivers as well as users. Such studies may have potential policy and practice implications in terms of a dyadic approach to the provision of devices and services. Further research also could test if

reducing the burden of informal caregivers can enable assistance users to live longer in the community.

Table 2: Outcome measures

Dependent variables (range)	Before the intervention		After the intervention		p
	Mean	SD	Mean	SD	
Degree of difficulty (IPPA) (1-5)	3.6	1.0	2.7	0.9	0.003
Satisfaction (LIFE-H) (1-5)	2.1	0.	3.0	0.8	0.002
Performance (LIFE-H) (0-9)	3.8	2.1	5.0	2.5	0.019
Caregiver outcomes (CATOM) (14-70)	53.5	9.7	59.6	9.7	0.015

p values associated with t test

ACKNOWLEDGEMENTS

The authors are members of the Consortium for Assistive Technology Outcomes Research (<http://www.atoutcomes.org>). This work has been supported by the National Institute on Disability and Rehabilitation Research under Grant H133A060062).

REFERENCES

- [1] L.N. Gitlin, L. Winter, M.P. Dennis, M. Corcoran, S. Schinfeld, and W.W. Hauck. "A randomized trial of a multicomponent home intervention to reduce functional difficulties in older adults," *J Am Geriatr Soc*, vol. 54, pp. 809-816, 2006.
- [2] D.J. Wilson, J.M. Mitchell, B.J. Kemp, R.H. Adkins, and W. Mann. "Effects of assistive technology on functional decline in people aging with a disability," *Assist Technol*, vol. 21, pp. 208-217, 2009.
- [3] W.C. Mann, K.J. Ottenbacher, L. Fraas, M. Tomita, and C.V. Granger. "Effectiveness of assistive technology and environmental interventions in maintaining independence and reducing home care costs for the frail elderly - a randomized controlled trial," *Arch Fam Med*, vol. 8, pp. 210-217, 1999.
- [4] C.L. McWilliam, W.L. Diehl-Jones, J. Jutai, and S. Tadrisi. "Care delivery approaches and seniors independence: a systematic literature review and synthesis," *Can J Aging*, vol. 19, pp. 101-125, 2000.
- [5] R. Wessels, L. de Witte, R. Andrich, M. Ferrario, J. Persson, B. Oberg, W. Oortwijn, T. VanBeekum, and O. Lorentsen. (2000). "IPPA, a user-centred approach to assess effectiveness of assistive technology provision," *Technol Disabil*, vol. 13, pp. 105-15, 2000.

- [6] J. Desrosiers, L. Noreau, L. Robichaud, P. Fougereyrollas, A. Rochette, and C. Viscogliosi. "Validity of the assessment of life habits in older adults," *J Rehabil Med*, vol. 36, pp. 177-182, 2004.
- [7] M. Depa, L. Demers, M. Fuhrer, J. Jutai, J. Lenker, and F. DeRuyter. "A tool for measuring assistive technology outcomes as experienced by caregivers," *Can J Occup Ther* (conference supplement); vol. 76, pp. 54, 2009.
- [8] EuroQol Group. "EuroQol - a new facility for the measurement of health-related quality of life," *Health Policy*, vol. 16, pp. 199-208, 1990.
- [9] J. Desrosiers, G. Bravo, R. Hébert, and N. Dubuc. "Reliability of the revised functional autonomy measurement system (SMAF) for epidemiological research," *Age Ageing*, vol. 24, pp. 402-406, 1995.
- [10] M.F. Folstein, S.E. Folstein, and P.R. McHugh. "Minimal mental state: a practical method for grading the cognitive state of patients for the clinician," *J Psychiatr Res*, vol. 12, pp. 189-198, 1975.