

# Predicting Assistive Technology Use Among Individuals with Multiple Sclerosis



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## Introduction

The physiological symptoms of multiple sclerosis (MS), combined with its unpredictable course, often results in mobility deficits. Assistive technology (AT) is often used to help compensate for physiological impairment to improve functioning and quality of life. While several studies have sought to describe the types of AT used by individuals with MS, few have investigated the factors that actually predict mobility AT use among these individuals.

The purpose of the present study was to identify the demographic, disease-related, functional, and perceptual factors that predict whether or not an individual will utilize AT, using data from a national survey of American adults living with MS.

## Methods

**Participants:** 2,825 women (77.9%) and 800 men (22.1%), with a mean age of 53.29 (SD = 10.00) ranging from 20-91 years.

**Procedure:** Data were collected as part of a national survey investigating factors related to housing concerns of individuals with MS, and represented responses from individuals randomly selected from the North American Research Committee on Multiple Sclerosis (NARCOMS) patient registry or members of National Multiple Sclerosis Society (NMSS) state chapters.

### Measures:

- **Perceived Deficits Questionnaire (PDQ-5):** 5-item self-report scale used to assess cognitive functioning.
- **Home Functioning Scale:** 19-item self-report scale developed by the researchers to assess home functioning.
- **MS Impact Scale-29:** 29-item self-report scale used to assess perceived physical and psychological impact of MS.

**Data Analysis:** A 3-step hierarchical logistic regression was conducted to assess: (1) demographic/disease related factors, (2) functional factors, and (3) perceptual factors as predictors of AT use.

## Results

- Prior to entering variables into the model, whether or not individuals used AT was estimated to be accurately predicted 51.2% of the time.
- **1<sup>st</sup> Step – Demographic Predictors:** Accurately predicted AT use for 78% of the sample; significantly improving the prediction of AT use by approximately 27%, *Chi-square*=1554.45, *df*=34, *p*<.001.
- **2<sup>nd</sup> Step – Functioning Predictors:** Cognitive and home functioning further improved the model's accuracy of prediction to 84%; a 6% increase from the previous step, *Chi-square*=777.35, *df*=2, *p*<.001.
- **3<sup>rd</sup> Step – Perceived Impact of MS:** Perceived physical and psychological impact of their MS only minimally improved the model's accuracy of prediction (<1% improvement), *Chi-square*=69.69, *df*=2, *p*<.001.

Table 1. Results of the Logistic Regression

Variable	<i>X</i> <sup>2</sup>	Wald	<i>p</i>	Exp(B)	95% CI
Step 1: Demographic Predictors**	1554.45		.000		
Age (in years)*		35.33	.000	1.03	1.02, 1.04
Gender*		6.76	.009	1.32	1.07, 1.62
Education**+		34.50	.000		
Grades 10 – 12*		4.06	.044	0.39	0.16, 0.98
College graduate**		17.40	.000	0.52	0.38, 0.71
Graduate school**		11.22	.001	0.58	0.42, 0.80
Employment status**+		232.41	.000		
Employed part-time**		13.78	.000	1.84	1.33, 2.54
Self-employed part-time*		4.08	.043	1.65	1.02, 2.69
Unemployed (not seeking)**		18.69	.000	2.81	1.76, 4.49
Homemaker*		4.44	.035	1.58	1.03, 2.41
Permanent disability**		188.26	.000	4.92	3.92, 6.18
Retired**		10.32	.001	1.67	1.22, 2.29
Family income**+		31.48	.000		
\$25,000 - \$39,999*		3.88	.049	0.77	0.59, 1.00
\$40,000 - \$59,999**		4.54	.033	0.73	0.55, 0.98
\$60,000 - \$79,999**		12.78	.000	0.58	0.43, 0.78
\$80,000 - \$99,999**		19.58	.000	0.48	0.35, 0.66
Over \$100,000**		20.88	.000	0.51	0.38, 0.68
MS type**+		466.17	.000		
Progressive Relapsing**		68.82	.000	5.36	3.61, 7.97
Secondary Progressive**		354.42	.000	11.35	8.81, 14.62
Primary Progressive**		120.67	.000	9.29	6.24, 13.82
Not sure**		31.10	.000	2.44	1.78, 3.33
Ethnicity+		6.55	.365		
Step 2: Functioning Predictors**	777.35		.000		
Cognitive functioning**		41.04	.000	0.93	0.91, 0.95
Home functioning**		515.70	.000	1.13	1.11, 1.14
Step 3: Perceived Impact of MS**	69.69		.000		
Physical impact**		55.16	.000	1.05	1.08, 1.11
Psychological impact**		40.54	.000	0.93	0.91, 1.06

NOTE: \* *p* < .05, \*\* *p* < .01; only significant contrasts for categorical variables are listed; + education categories contrasted to 'HS graduate or GED', employment status categories contrasted to 'employed full-time', family income categories contrasted to 'less than \$25,000', MS type categories contrasted to 'Relapsing-remitting', ethnicity categories contrasted to 'Caucasian'.

## Major Findings

Overall, inclusion of demographic and functional factors improved prediction of AT use from 51% to 84%. Interestingly, the addition of predictors related to the participants' perceived physical and psychological impact of their MS only minimally improved the model's accuracy of prediction (<1% improvement). Across predictor variables entered into the logistic regression, type of MS, employment status, and home functioning were the strongest predictors according to the Wald statistics. Thus, as individuals had more progressive forms of MS, were less employed, or had more severe deficits in functioning around their home, they were more likely to use AT. Therefore, objective functional impairment related to MS disease severity is more important to predicting AT utilization than perceptions about physical or psychological deficits.

## Limitations & Implications

A few limitations of the present study must be considered. First all data were collected cross-sectionally, therefore, no conclusions can be drawn regarding the causal relationships between the predictors and outcome variable. Second, data were collected via self-report. Additionally, due to the large sample size, the study may have been over-powered making small effects appear statistically significant.

Overall, results from this study were consistent with previous literature, in which factors related to disease severity and subsequent functional impairment were the strongest predictors of whether or not an individual uses AT. Future research should build on these findings by examining within-group differences among AT and non-AT users by investigating differences in AT use among various types of MS and assessing whether or not there is a desire for AT among non-AT users.

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