Comparison of Assistive Device Use and Needs of Home-Based Older Persons With Different Impairments

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Key Word: aging

This paper examined assistive device use by noninstitutionalized older persons with visual, cognitive, and physical impairments. One hundred fifty seven persons over 60 years of age (M = 75.5 years) were interviewed in their homes for the University at Buffalo Rehabilitation Engineering Research Center Consumer Assessments Study. Subjects were assigned to one of seven groups according to types of impairment: minimal, physical, visual and physical, cognitive, cognitive and physical, and cognitive and visual. Group assignments were based on scores on the Sickness Impact Profile (physical), Older Americans Resources and Services Program Multidimensional Functional Assessment Questionnaire (vision), and Mini Mental State Exam (cognitive). Overall, subjects owned a mean of 13.7 devices, used 10.8 devices (79% of the devices they own), and were satisfied with 9.8 devices (72% of the devices they own). There were significant differences among the impairment groups in numbers of devices owned and used, and in satisfaction with devices. Subjects expressed the need for more devices, especially devices for increasing mobility and assisting with balance. Results suggest a stronger role for occupational therapists in the assessment of assistive device needs of older persons, and in recommending devices and training persons in their use.

Older persons experience the effects of aging and the diseases that accompany aging, with resultant impairments and loss of independence. Many devices are available to assist older persons in overcoming impairments, preventing accidents, and promoting independence and comfort.

The University at Buffalo Rehabilitation Engineering Research Center (RERC) on Aging is funded by the National Institute on Disability and Rehabilitation Research to conduct a mix of research, service, device development and education projects, with a focus on assistive devices and environmental interventions for older persons. The RERC addresses both high-technology devices, such as print enlargement systems, and low-technology devices, such as magnifying glasses and reachers. The lead research project for the RERC, the Consumer Assessments Study, is following, for a period of at least 5 years, a group of older persons considered at risk for needing assistive devices or environmental interventions. This paper is based on the first-year results of interviews with 157 older persons living at home and focuses on their use of assistive devices.

Background

In discussing assistive devices, the Consumer Assessments Study uses the definition provided in the Technology-Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act) (Public Law 100-407, Sec 3(1)): “Any...
item, piece of equipment, or product system, whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. This is a broad definition that encompasses items designed specifically for persons with certain kinds of disabilities, as well as products that reach a broader market—products that may not originally have been designed specifically for persons with impairments. A raised toilet seat is clearly an assistive device; if a person with a physical disability requires a garage door opener to get the door open, then the Tech Act definition would include the garage door opener as an assistive device. Likewise, a microwave oven designed for the general population may be an essential assistive device to enable a person with a cognitive impairment to heat food.

Several reports have addressed the use of assistive devices by older persons. Page (1980) and Geiger (1990) followed 500 patients who were given assistive devices during a hospital rehabilitation program and found that approximately 50% of devices were abandoned after discharge. Bynum and Rogers (1987) found that closer to 80% of older persons receiving care at home were using assistive devices.

The Consumer Assessments Study has generated reports on use of devices by older persons with vision impairments (Mann, Karuza, Hurren, & Bentley, 1993) and cognitive impairments (Mann, Karuza, Hurren, & Tomita, 1992), and by those with stroke-related impairments (Mann, Hurren, Tomita, & Charvat, in press) and arthritis-related impairments (Mann, Hurren, & Tomita, 1993). Overall, a high rate of device use was found for each of these groups. The present study examines groups solely on the basis of impairment or disability and reflects the use of a larger sample, which permitted assignment of subjects to groups more specifically defined than in the earlier reports.

Method

In seeking to understand the use of assistive devices by the home-based older person, the Consumer Assessments Study collected data along several dimensions:

- basic demographic information such as age, education, and housing
- health status, including number and types of diseases present, use of medications, and use of hospitals and physicians
- functional status, including ability to complete activities of daily living (such as bathing) and instrumental activities of daily living (such as shopping for groceries)
- psychosocial dimensions, including mental status, depression, self-esteem, and sense of responsibility
- social resources, assistance available, and need for caregivers
- current use of assistive devices, including satisfaction and problems with devices, and ideas for new devices.

With this information, five major categories of questions were explored in the present study:

1. What are the general characteristics of this at-risk population, and each of the impairment-based groups: demographics, health status, functional status, psychosocial status, and available social resources?
2. What assistive devices are owned by the impairment groups? Does the ownership pattern differ among the groups?
3. What are the usage rates of the devices among the groups? What are the satisfaction rates with the devices among the groups? Are there differences in rates of use and satisfaction rates among the groups?
4. What problems are subjects having with the devices that they are not using? Are there differences in the types of problems among the groups?
5. What assistive devices do the subgroups say they need, but do not have? Is there a difference in the pattern of stated needs among the groups?

Instrument

The Consumer Assessments Study assembled a battery of instruments to measure multiple dimensions relevant to assistive device use and need. Each instrument used in the Consumer Assessments Study Interview Battery (CASIB) is described in detail elsewhere (Mann, Hurren, Karuza, & Tomita, 1993). The important instruments for this analysis were those used for assigning subjects to groups on the basis of impairments, and for determining assistive device use and needs:

Sickness Impact Profile (SIP)—Physical Dysfunction Section (Gilson et al., 1975). The SIP was used to determine percent of physical disability for subjects. Three sections of the SIP, with a total of 45 separate items, are used to calculate the percent of physical disability score; these sections are Body Care and Movement, Mobility, and Ambulation.

Older Americans Resources and Services Program Multidimensional Functional Assessment Questionnaire (OARS) (Fillenbaum, 1988). The Physical Health section asks subjects to rate their vision on a 5-point scale ranging from excellent to totally blind. This question was used for grouping subjects on vision impairment.

Mini Mental State Exam (MMSE) (Folstein, 1975). The MMSE was used to determine cognitive impairment. It consists of 11 items that are summed to create a mental
status score. The score ranges from a maximum of 30 to a minimum of 0.

**Assistive Technology Used Survey.** This interview instrument was developed for the Consumer Assessments Study. Subjects are asked, in an open-ended format, what devices they have. The interviewer probes to ensure complete responses. Subjects are also asked for a yes or no response to whether they use the device and whether they are satisfied with it. If they have a device and it is not used or they are not satisfied with it, they are asked to explain why not. The assistive devices used are coded into six categories—physical disabilities, hearing impairments, visual impairments, tactile impairments, cognitive impairments, and other devices—and several subcategories.

**Sample**

Subjects sought for the Consumer Assessments Study were older persons (over 60 years of age) who were at risk for needing assistive devices or environmental interventions. Persons at risk were defined as persons recently or currently receiving services from a human service agency, hospital, or nursing home. Study participants were selected from 16 service organizations from the Western New York area. The sample included 157 subjects who were assigned to one of 7 groups:

- **Group 1:** Minimally Impaired—Subjects with some impairments who did not meet the threshold for inclusion in one of the other groups.
- **Group 2:** Physically Impaired—Subjects who scored more than 20% physically disabled on the SIP.
- **Group 3:** Vision Impaired—Subjects who scored 4 or 5 (severe low vision or blind) on the OARS vision question.
- **Group 4:** Vision Impaired and Physically Impaired—Subjects who qualified for both Groups 2 and 3.
- **Group 5:** Cognitively Impaired—Subjects who scored lower than 24 on the MMSE. This threshold is commonly used by other investigators, and confirmed in an analysis by Braekhus, Laake, and Engedal (1992).
- **Group 6:** Cognitively Impaired and Physically Impaired—Subjects who qualified for Groups 2 and 5.
- **Group 7:** Cognitively Impaired and Vision Impaired—Subjects who qualified for groups 3 and 5.

**Data Collection**

Interviews were conducted in the homes of older persons by a nurse with training in research data collection. The mean time per interview was 2.2 hr. In all cases, the subject was present. For older persons with major cognitive impairments, the caregiver assisted in answering interview questions.

**Results and Discussion**

The results for each of the five study questions are presented together with comments on their implications. Summaries of the study findings follow.

**Sample Characteristics**

The descriptive results for the total sample and for each of the impairment groups are summarized in Table 1. Overall the mean age was 75.5 years, (SD = 8.4 years), with no statistically significant difference in age among the impairment groups. The sample includes persons from 60 to 92 years old.

The Jette Functional Pain Index (Jette, 1980) was used to measure pain. The overall mean for the sample on the Jette scale was 14.6, (SD = 13.8), with no statistically significant difference among groups. Scores on the Jette can range from 10 (no pain) to 40 (severe pain); thus this mean reflects a low level of pain, on average, among subjects.

The sample experiences a large number of chronic diseases, with a mean of 5.0 diseases per person. The differences in number of diseases among the impairment groups was significant, with Group 4 having a mean of 10.9 diseases, and Group 5 having a mean of 2.3 diseases. The large number of diseases probably affects the use of assistive devices; each disease can directly affect functional status and indirectly affect status through medications.

Functional status was measured by both the Functional Independence Measure (FIM) (Granger & Hamilton, 1992) for ADLs and the OARS for IADLs. There was a significant difference in scores among the impairment groups for both these measures. Group 1 had the highest scores for functional status: 85.4 out of 91 on the FIM and 12.5 out of 14 on the OARS. Group 3 also scored relatively high on functional status, and quite close to Group 1: 84.1 on the FIM and 9.4 on the OARS. The three groups with the lowest scores for functional status were those with cognitive impairments: (Groups 5, 6, and 7); of these three, Group 6 was the most dysfunctional, particularly in ADLs. Group 2 and Group 4 appeared similar in functional status. Overall, it appeared that having a cognitive impairment (with or without other impairments) had the greatest negative effect on functional status, followed by physical impairments; vision impairments had the least effect on functional status.

The overall mean for mental status was 24.0 (SD = 8.2), with significant differences among groups. Because the MMSE was used to assign subjects to groups, Groups 5, 6, and 7 all have mean scores below 24, the cutoff for determining whether a person has a cognitive impairment.
Table 1
Description of Consumer Assessments Study Sample

<table>
<thead>
<tr>
<th>Subject Characteristics</th>
<th>Minimally Impaired</th>
<th>Physically Impaired</th>
<th>Vision Impaired</th>
<th>Vision and Physically Impaired</th>
<th>Cognitively Impaired</th>
<th>Cognitively and Physically Impaired</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of subjects</td>
<td>18</td>
<td>56</td>
<td>20</td>
<td>17</td>
<td>10</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td>Age (M Years)</td>
<td>74.6</td>
<td>74.4</td>
<td>73.7</td>
<td>78.1</td>
<td>78.4</td>
<td>77.6</td>
<td>75.6</td>
</tr>
<tr>
<td>Physical disability</td>
<td>11.4</td>
<td>15.8</td>
<td>10.9</td>
<td>21.0</td>
<td>10.1</td>
<td>14.2</td>
<td>13.4</td>
</tr>
<tr>
<td>ADELS FIM (M, Max = 91)</td>
<td>82.0</td>
<td>70.3</td>
<td>84.1</td>
<td>71.6</td>
<td>76.6</td>
<td>55.6</td>
<td>65.1</td>
</tr>
<tr>
<td>Social resources</td>
<td>12.5</td>
<td>8.6</td>
<td>9.4</td>
<td>6.7</td>
<td>2.5</td>
<td>3.2</td>
<td>5.3</td>
</tr>
<tr>
<td>Mental status, MMSE, (M, Max = 50)</td>
<td>10.0</td>
<td>38%</td>
<td>7%</td>
<td>41%</td>
<td>7%</td>
<td>41%</td>
<td>28%</td>
</tr>
<tr>
<td>OARS (M, Max = 16)</td>
<td>10.6</td>
<td>9.7</td>
<td>10.8</td>
<td>11.0</td>
<td>N.A.</td>
<td>9.1</td>
<td>9.7</td>
</tr>
</tbody>
</table>

Note: ADL = activities of daily living, FIM = Functional Independence Measure. IADL = instrumental activities of daily living, OARS = Older Americans Resources and Services. MMSE = Mini Mental State Exam

*No significant difference among groups
*Kruskal-Wallis one-way ANOVA \( \chi^2 = 24.16, p = .0005 \)
*Kruskal-Wallis one-way ANOVA \( \chi^2 = 68.59, p < .0001 \)
*Kruskal-Wallis one-way ANOVA \( \chi^2 = 63.34, p < .0001 \)
*One-way ANOVA F = 21.49 p < .0001
*One-way ANOVA F = 40.71 p < .0001
*Kruskal-Wallis one-way ANOVA \( \chi^2 = 102.070, p < .0001 \)

The overall mean for social resources as measured by the OARS Social Resources Scale was 10.2, with a standard deviation of 2.4. The range on this scale is 0 (no social resources) to 16 (highest level of social resources). No significant difference was found among groups on social resources, which suggests that, on average, subjects have a moderate level of social resources available to them.

The following is descriptive information on this sample not included in Table 1: For 112 subjects on which we have financial data, 6 stated that they cannot meet their monthly expenses, 36 stated that they barely meet their payments, and 70 stated that they do not have a problem in meeting payments. Men constitute 29% of the sample, women 71%; whites constitute 92%, minorities 8%. The mean number of years employed in their last occupation was 24.8 (SD = 17), and the range was 1 to 70 years. Sixty-two percent had a high school education or less, 24% had some college courses, and 14% had at least a baccalaureate degree. Fifty-five percent of subjects were widowed, 35% married, and 12% single. Subjects take an average of 2.4 medications per month (SD = 2.6), spent an average of 1.7 days in the hospital in the 6 months before the interview (SD = 5.2), and visited their physician an average of 4.5 times in the 6 months preceding the interview (SD = 4.7). Eighty-one percent had children, with a mean of 2.4 children per subject. Fifty percent lived alone, 47% owned their own home, and subjects had lived an average of 22.1 years in their present home (SD = 1.4).

Types of Assistive Devices Owned by Subjects

The results relating to assistive devices owned by subjects are summarized in Table 2. On average, subjects owned 13.7 devices each; however, there were significant differences in device ownership among groups. Group 5 owned the fewest number of devices (M = 5.7 per person); they were followed by Group 1 (M = 9.6 per person). This high number for a group we labeled as minimally impaired reflects the seriousness of impairment throughout all seven groups. The one national study of assistive device use in the general population found that 35% of persons aged 75 years or older use at least one assistive device, but did not provide data on total devices owned (LaPlante, Hendershot, & Moss, 1992). To summarize, all groups, even the minimally impaired group, owned a high number of assistive devices. The cognitively impaired groups fell below the mean of all subjects, whereas the physically impaired and vision impaired fell above the mean for all subjects. Persons with severe physical and vision impairments owned the highest number of devices.

The finding that the cognitively impaired groups have the greatest degree of functional disability but also own the fewest numbers of assistive devices suggests that many devices may be too difficult for them to use, or that it is easier for caregivers to complete many tasks that might be possible for the person with an appropriate assistive device. It may also be that fewer devices are
Table 2
Types of Assistive Devices Owned

<table>
<thead>
<tr>
<th>Type of Device</th>
<th>Minimally Impaired</th>
<th>Physically Impaired</th>
<th>Vision Impaired</th>
<th>Visually Cognitively Impaired</th>
<th>Cognitively Impaired</th>
<th>Physically Cognitively Impaired</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>4.8</td>
<td>9.3</td>
<td>2.3</td>
<td>8.3</td>
<td>2.1</td>
<td>6.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Hearing</td>
<td>0.2</td>
<td>0.2</td>
<td>0.7</td>
<td>0.6</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Visual</td>
<td>2.5</td>
<td>1.2</td>
<td>9.1</td>
<td>0.5</td>
<td>0.8</td>
<td>8.1</td>
<td>3.8</td>
</tr>
<tr>
<td>Cognitive</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>1.7</td>
<td>1.1</td>
<td>0.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Other</td>
<td>1.9</td>
<td>4.1</td>
<td>1.5</td>
<td>0.8</td>
<td>1.9</td>
<td>0.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Total devices owned per person</td>
<td>9.6</td>
<td>15.0</td>
<td>16.1</td>
<td>20.1</td>
<td>5.7</td>
<td>10.7</td>
<td>13.1</td>
</tr>
</tbody>
</table>

Kruskal-Wallis one-way ANOVA $\chi^2 = 52.90, p < .0001.$

Kruskal-Wallis one-way ANOVA $\chi^2 = 77.24, p < .0001.$

Kruskal-Wallis one-way ANOVA $\chi^2 = 49.71, p < .0001.$

Kruskal-Wallis one-way ANOVA $\chi^2 = 33.59, p < .0001.$

Kruskal-Wallis one-way ANOVA $\chi^2 = 37.57, p < .0001.$

Table 2 also provides information on the types of devices each group owns. There were significant differences among the seven groups in the types of devices they owned (except for hearing impairments, very few of which were owned). Generally, each group owned the most devices that related closely to the impairment of that group. For example, Group 2 had the highest mean number of devices that address physical impairments (9.3); Group 4 had the highest mean number of devices that address vision impairments. Two of the cognitive groups showed the highest rates of devices designed to address cognitive impairments; however, Group 7 owned no devices for cognitive impairments. Many of the cognitive devices are simply signs and reminders, such as notes taped to bathroom mirrors, and it may be that having both a vision and a cognitive impairment makes it impossible to use such devices. This finding suggests the need to consider the development of easily programmable, easy-to-use, portable memory aids with voice output. Ownership of devices outside the expected device category (on the basis of impairment of subjects) underlines the mix of limitations and large numbers of chronic diseases these subjects face.

Use and Satisfaction Rates of Devices Among Subjects

Table 3 shows the mean number of devices owned by each of the seven impairment groups. Overall, 79% of all devices owned were used. This finding is close to the results reported by Bynum and Rogers (1987). There were differences in device use rates among groups:

Table 3
Rate of Device Use and Satisfaction by Impairment Group

<table>
<thead>
<tr>
<th>Device Use and Satisfaction</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimally Impaired</td>
<td>9.6</td>
<td>15.0</td>
<td>16.1</td>
<td>20.1</td>
<td>5.7</td>
<td>10.7</td>
<td>13.1</td>
<td>15.7</td>
</tr>
<tr>
<td>Physically Impaired</td>
<td>7.2</td>
<td>12.4</td>
<td>13.7</td>
<td>14.9</td>
<td>4.0</td>
<td>7.5</td>
<td>11.6</td>
<td>10.8</td>
</tr>
<tr>
<td>Vision Impaired</td>
<td>75</td>
<td>83</td>
<td>85</td>
<td>74</td>
<td>70</td>
<td>70</td>
<td>89</td>
<td>79</td>
</tr>
<tr>
<td>Physically Cognitively Impaired</td>
<td>7.2</td>
<td>11.2</td>
<td>12.3</td>
<td>13.4</td>
<td>3.8</td>
<td>6.9</td>
<td>9.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Cognitively Impaired</td>
<td>75</td>
<td>75</td>
<td>76</td>
<td>67</td>
<td>67</td>
<td>64</td>
<td>74</td>
<td>72</td>
</tr>
</tbody>
</table>

$^a$See Table 2

$^b$One-way ANOVA $F = 6.16, p < .0001$

$^c$One-way ANOVA $F = 5.52, p < .0001$
Group 7 had the highest rate of device use (89%); the other two cognitive impairment groups had the lowest rate (70%). Groups 2 and 3 also showed a rate of use higher than the overall mean; Groups 1 and 4 showed a lower rate. It is probable that many devices were not used or were abandoned because the person’s condition changed; the subject had a hip fracture but regained ambulation and no longer needed a walker, or strength and balance declined and the cane no longer provided sufficient support, so the subject began using a walker. Other possible reasons for nonuse of devices relate to selection of the wrong device from the start or lack of training in the use of the device. It is more difficult to interpret the difference among groups in rates of use, and additional study in this area is needed.

Table 3 also reports the mean number and percentages of devices with which subjects are satisfied. Overall satisfaction with devices owned was 72% with a range from 64% for Group 6, up to 76% for Group 3 and 4. Overall, subjects were satisfied with 3 out of 4 devices they own. Although 4 out of 5, or 5 out of 5, would be preferable, this rate of satisfaction is higher than some earlier studies on device abandonment. For Group 6, however, subjects were dissatisfied with 1 out of 3 devices they owned; this rate is high enough to suggest a closer examination of the problems they are having with their devices. Persons in both groups 4 and 6 have at least two severe impairments, and the interaction of these impairments may make devices, at least as they are currently designed, difficult to use. Dissatisfaction may also reflect the lack of appropriate devices or device recommendation practices for more complex impairments.

Problems With Devices Owned

Table 4 provides a breakdown of the mean number of problem devices experienced by each group for each device category, as well as totals. A problem device is one for which the person had at least one complaint. Overall, the mean number of problem devices is 3.9. About half of these devices are in the physical impairment category. There is also a significant difference among the 7 groups in the mean number of problem devices for physical impairments: the cognitive group reported the lowest number of problems with devices (M = 0.4) and the vision and physically impaired group reported the highest number of problems with devices (M = 3.4). Again, the combined effect of two major impairments makes it difficult to use assistive devices, and may point to the need for designing devices that can better address the needs of older persons with multiple impairments.

Examples of the types of problems experienced by each subgroup are shown in the Appendix. An analysis of the problems suggests that each one could be placed in one of three categories: (a) the device does not do what it was meant to do for the person; (b) the device may help, but is inadequate in fully meeting the needs of the person; or (c) the device may help, but calls unwanted attention to the person. The result is that many of these problem devices are not used. Others are used, but the user is dissatisfied, and in some cases the use of the device may actually be dangerous, as when a Group 5 subject tripped over the quad cane while using it.

Correcting problems with assistive devices might take one of several forms. In any case, it should start with the assistance of an informed service provider, typically an occupational therapist, who would conduct an assessment of the person, the home, and the current use of devices. Some devices would be replaced with others, such as a more appropriate cane or a walker. Other devices might be modified or repaired where necessary. In some cases an assistive device may not be the best solu-

Table 4

<table>
<thead>
<tr>
<th>Device Category</th>
<th>Minimally Impaired</th>
<th>Physically Impaired</th>
<th>Vision Impaired</th>
<th>Vision and Physically Impaired</th>
<th>Cognitively Impaired</th>
<th>Cognitively and Physically Impaired</th>
<th>Cognitively and Vision Impaired</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>1.40 (1.50)</td>
<td>2.50 (2.46)</td>
<td>0.60 (0.88)</td>
<td>5.40 (2.74)</td>
<td>0.40 (0.84)</td>
<td>2.50 (2.46)</td>
<td>1.00 (2.41)</td>
<td>2.00 (2.50)</td>
</tr>
<tr>
<td>Hearing</td>
<td>0.11 (0.32)</td>
<td>0.05 (0.23)</td>
<td>0.05 (0.39)</td>
<td>0.06 (0.24)</td>
<td>0.50 (0.71)</td>
<td>0.11 (0.52)</td>
<td>0.00 (0.54)</td>
<td>0.10 (0.54)</td>
</tr>
<tr>
<td>Vision</td>
<td>0.30 (1.13)</td>
<td>0.20 (0.62)</td>
<td>0.00 (4.00)</td>
<td>0.20 (0.77)</td>
<td>0.00 (0.48)</td>
<td>0.50 (3.45)</td>
<td>0.00 (2.25)</td>
<td>0.30 (2.25)</td>
</tr>
<tr>
<td>Cognitive</td>
<td>0.00 (0.97)</td>
<td>0.00 (0.97)</td>
<td>0.00 (0.97)</td>
<td>0.00 (0.97)</td>
<td>0.60 (0.97)</td>
<td>0.30 (0.97)</td>
<td>0.00 (0.97)</td>
<td>0.00 (0.97)</td>
</tr>
<tr>
<td>Other</td>
<td>0.40 (0.92)</td>
<td>0.90 (1.84)</td>
<td>0.90 (1.42)</td>
<td>0.90 (1.14)</td>
<td>0.40 (1.70)</td>
<td>0.60 (1.92)</td>
<td>0.10 (1.40)</td>
<td>0.70 (1.40)</td>
</tr>
<tr>
<td>Total</td>
<td>2.40 (1.69)</td>
<td>3.80 (2.50)</td>
<td>3.80 (3.50)</td>
<td>7.50 (4.47)</td>
<td>1.90 (1.91)</td>
<td>3.86 (5.10)</td>
<td>3.40 (5.05)</td>
<td>3.90 (5.05)</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses are SD

a Kruskal-Wallis one-way ANOVA $X^2 = 29.38 p = .0001$

b Kruskal-Wallis one-way ANOVA $X^2 = 29.38 p = .0001$

c Kruskal-Wallis one-way ANOVA $X^2 = 23.12 p = .0008$
tion, and personal care services may be required. Needs for an assistive device to compensate for an impairment may change with time: many persons improve after an acute illness, a stroke, or hip surgery. Others will show a decline in functional status. Assessment, therefore, must be an ongoing process involving the person, the family, and all service providers.

**Devices Older Persons Need But Do Not Have**

Table 5 provides a summary of the devices that subjects said they need but do not have. The device categories are ranked according to the total frequency of reports. Mobility or balance devices, including wheelchairs, wheeled carts, walkers, and canes, were the category with the highest expressed need. Vision devices, including handheld or hand-free magnifiers, enlarged numbered devices, talking dictionaries, clocks, bright lights, and reading machines, ranked second. Grab bars ranked third and the category of other bathroom devices ranked fourth.

It is important to note how many of these needed devices relate to safety, and in particular to the prevention of falls. Why do older persons who own an average of 13.7 devices per person not purchase the additional devices they say they need (1.6 devices per person)? Subjects frequently offered a common, though simplistic, answer: the devices are too expensive or are not reimbursable under third-party payment systems. More than half the devices these subjects own were purchased out of pocket; this method of payment for assistive devices reflects the findings of a national survey (LaPlante et al., 1992). In some cases, expense is a likely factor in the decision not to purchase a needed device; however, for many of these devices, especially those that cost less, expense cannot explain the failure to purchase a needed device. The authors suggest that there is a hesitation factor: Many older persons delay purchase of a device because they are not sure that they really need it, or that the device will work if they get it. Although more investigation is needed in this area, the results suggest the need for professional assistance in assessing for and in recommending assistive devices, and for an opportunity for consumers to see and try devices before purchasing them.

**Conclusion**

Older persons with impairments face a major challenge in maintaining independence. These persons own and use a relatively large number of assistive devices; older persons with multiple impairments that include physical disabilities use the greatest number of devices. On the average, these older persons are satisfied with two thirds to three fourths of the devices they own, with some differences among impairment groups in rates of satisfaction with devices. The types of problems older persons have with their assistive devices vary with the type of impairments they have. Subjects also expressed a need for additional devices. Their expressions and other findings indicate a need for more professional guidance in the assessment, provision, and training associated with the use of assistive devices.

This study found a strong relationship between the type of impairment or impairments faced by older persons and the types of devices they own and use. Furthermore, a relationship was established between type of impairment and types of problems with devices, and the categories in which older persons thought they needed additional devices. However, given the mix and the large number of chronic diseases and impairments found in the sample, subjects still owned and used many assistive devices outside their major impairment category. Therapists must consider an at-risk older person’s need for assistive devices in light of multiple impairments and chronic conditions.

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Appendix

Examples of Problems With Assistive Devices

Group 1 (Minimally Impaired)
Physical: Quad cane is too heavy
Hearing: Hearing aid in the ear amplifies background noise. Subject cannot distinguish speech
Vision: Magnifier for use with insulin syringe is not powerful enough
Other: Buttons of remote TV control are too small

Group 2 (Physically Impaired)
Physical: Reacher cannot pick up piece of paper because of poor gripping
Hearing: Listening aid for TV picks up background noise, which is distracting
Vision: Hand-held magnifying glass is difficult to hold with other items in hand such as reading material or a mug
Other: Emergency alerting device is too expensive

Group 3 (Visually Impaired)
Physical: Cane is inconvenient when getting in car
Hearing: Hearing aid does not improve hearing significantly and amplifies background noise
Vision: Large playing cards are hard to see because of glare
Other: Difficult to set microwave oven timer due to contrast

Group 4 (Visually and Physically Impaired)
Physical: Grab bars were installed in wrong position
Hearing: Hearing aid does not improve hearing significantly and amplifies background noise
Vision: Magnifying glass blurs for reading newspaper
Other: Microwave oven controls are too small to read

Group 5 (Cognitively Impaired)
Physical: Subject trips over quad cane when using, and at times drags it behind her
Hearing: Subject is too embarrassed to use hearing aid
Vision: Calendar does not help, subject needs verbal reminders
Other: Subject cannot remember how to use remote control for TV

Group 6 (Cognitively and Physically Impaired)
Physical: Rubber pants leg cuts too high and does not prevent leakage
Hearing: Subject continually plays with hearing aid
Vision: Glasses are not strong enough
Cognitive: Subject has insufficient comprehension of time to understand card with clock “will be back.” Subject has not learned how to use remote control for TV

Group 7 (Cognitively and Vision Impaired)
Physical: Subject is embarrassed to use cane
Vision: Talking clock is difficult to set, loop to pull thread through in needle threader is difficult to find

References


