The Use of Technical Aids Among Community-Based Elderly

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As gains are made in life expectancy, industrialized nations are experiencing an increasing proportion of elderly persons in the population. The proportion of elderly persons with disabilities is projected to increase over the coming decades (Manton, 1989). The implications for health care are considerable. In Sweden, the ability of the future working population to support and care for the growing needs of the older population is questionable (Thorslund, 1991). We must therefore give elderly persons with disabilities every opportunity to maintain their independence and to care for themselves. Appropriate assistive technology, such as technical aids and housing adaptations, can help such persons maintain independent functioning, postpone or eliminate the need for institutionalization, and reduce the amount of personal assistance required (Congress of the United States, Office of Technology Assessment, 1985).

The implications for occupational therapists and their role in home health care also are considerable. "Occupational therapy's emphasis on adaptation, individualization of environments to promote optimal functioning, and life satisfaction makes the home a natural setting for treatment" (Stoffel & Gwin, 1989, p. 501). This perspective, combined with a knowledge of technical aids and housing adaptations, makes occupational therapy essential in community-based care for the elderly.

Occupational Therapy in Sweden

Sweden, with a population of 8.4 million, has 4,080 active occupational therapists (Landstingsförbundet, 1989). Occupational therapy education is uniform throughout Sweden; all eight schools of occupational therapy share a standardized curriculum. All students are trained in technical aids; some therapists specialize and become technical aid counselors. There are 2,923 occupational therapists working in primary care and 157 therapists working at technical aid centers as counselors. Occupational therapy within primary care covers a wide spectrum of ages and disabilities. Treatment is carried out in the home, in the clinic, in the workplace, and in institutions. Occupational therapists who are technical aid counselors evaluate, fit, and train people to use aids and also assist with housing adaptations.

Occupational therapists are unevenly distributed throughout the country. Many rural areas cannot fill available positions, whereas urban areas have a slight surplus of therapists. The government's health care recommendations for the 1990s stress the development of primary care, with an emphasis on rehabilitation and prevention. According to the Swedish Association of Occupational Therapists (Förbundet Sveriges Arbetsterapeuter, 1990), the current rate of newly graduating therapists will fall far short of the estimated need in the year 2000. The interest in occupational therapy education has dropped sharply in the past few years, perhaps due to the profession's rela-
tive anonymity and to its being primarily a female profession with the accompanying low social status and low salary.

**Provision of Technical Aids in Sweden**

Disabled persons in Sweden have access to technical aids regardless of their age, economic means, or place of residence. Virtually all technical aids are issued free of charge through a national provision system. One disadvantage of this system is that decisions about who receives which aids are made solely by health care personnel. The users, therefore, are not always informed about the range of aids available. Additionally, information about technical aids is seldom available to the general public. Persons with mild disabilities or frailties may be unaware of existing aids that could make their lives easier. Only recently have technical aids become available on the free market and then only in certain areas of the country.

To obtain a technical aid, a person must go to a physician, occupational therapist, physical therapist, or district nurse employed by the county. Sometimes this involves a waiting period due to a lack of qualified personnel. The therapist or other prescriber assesses the person's needs and issues the appropriate aids. Usually this is done in close consultation with the client and sometimes involves a home visit.

Simple aids, such as canes or long-handled tongs (i.e., reachers), are usually issued through outpatient clinics or hospitals. More complex aids, such as wheelchairs, may involve a visit to the technical aid center for evaluation, fitting, and training. Technical aid centers are located in every county and are staffed by occupational therapists specializing as trained aid counselors. Simple adaptations in the home, such as grab bars by the bathtub, can be ordered by the therapist during the home visit. More extensive alterations require a complicated process of approval by the county government agencies. Centers specializing in aids for hearing and visual impairments exist, as do separate orthopedic workshops for prostheses and orthoses (Stromgren, 1987).

No organized system of follow-up care exists after aid provision. Clients who maintain contact with their prescriber, for example, those receiving therapy or nurse's visits on a regular basis, receive informal follow-up. Many clients, however, are evaluated and issued aids on a one-time basis. Additionally, there is no organized system for the collection and recycling of aids no longer used, with the exception of some expensive aids, such as electric wheelchairs. It is usually up to the client to return those aids that can be reused.

**Study Purpose**

The purpose of this study was to describe the use of assistive technology for a group of community-based elderly persons known to have difficulties with activities of daily living. Some of the questions addressed were as follows:

1. Which aids and housing adaptations are prevalent among the disabled elderly?
2. Are the aids being used? If not, why not?
3. How important are aids? Would the subject be able to perform activities of daily living without them?

**Method**

This study took place in Tierp, a rural municipality in central Sweden with about 20,000 inhabitants, 22% of whom are over 65 years of age. This percentage of elderly is somewhat higher than the nationwide figure of 18%. The ratio of elderly in Tierp living at home, however, does not differ significantly from that of the nation as a whole (Smedby, Caruso, Håglund, & Korpela, 1987). Our sample was drawn from a 1986 study of the elderly in Tierp that included all persons over 84 years of age who were living at home (N = 267) as well as a random sample of 75- to 84-year-olds living at home (N = 171). Of the citizens of Tierp aged 75 to 84 years, 91% lived at home (90% nationally). Of the citizens of Tierp over age 84 years, 60% lived at home (64% nationally). Seventeen of those questioned did not respond. The total number of subjects assessed through interview by a district nurse, therefore, was 421. The study procedure as well as a discussion of its quality is reported elsewhere (Thorslund & Wahlstrom, 1990). The assessment identified that 66% of subjects aged 75 to 84 years and 83% of those over age 84 years had technical aids. These figures include subjects with only one aid, such as a hearing aid or a cane, as well as those with several aids. To look more closely at those persons with difficulties in performing activities of daily living, we identified a subgroup of persons who met one or more of the following criteria: (a) needs a walking aid, (b) has difficulty getting up from a chair, or (c) has three or more technical aids. Of the 165 subjects who met these criteria, a random sample of 60 was selected for an in-depth assessment by an occupational therapist. Three of these subjects died before the assessment could be carried out, leaving a total of 57 in the subgroup, all of whom agreed to participate in this study.

The assessments were carried out in each subject's home by a therapist from another district who had been trained in survey interview techniques. As in a typical occupational therapy evaluation, the therapist asked about specific activities of daily living and the subject to demonstrate how he or she performed certain activities. Thus, the therapist could observe how the subjects used their aids and how they had found their own solutions to problems.

Table 1 shows the age and sex distribution of the sample and the therapist's evaluation of activities of daily
living and dependence in instrumental activities of daily living (the older age group is overrepresented because the sample was drawn from the above study, which had a majority of older people). Activities of daily living involved mobility (both indoors and outdoors), eating, personal hygiene, toileting, dressing, transfer (from bed to chair to standing), and communication. Instrumental activities of daily living involved food preparation, shopping, laundry, housecleaning, mobility for longer distances, and entering and leaving a dwelling.

**Independence** was defined as needing no personal assistance with activities, regardless of whether or not technical aids were used. Persons who needed assistance only with foot care were also assessed as independent. **Partial dependence** was defined as being able to participate in tasks but not able to complete them without personal assistance. **Dependence** was defined as needing personal assistance for all steps of a task. Most of the subjects were partially dependent in activities of daily living and instrumental activities of daily living. Only 4 subjects were independent in instrumental activities of daily living.

The occupational therapist also evaluated the living environment and any changes that had been made to compensate for functional impairments. All of the aids that could be found were recorded. The subjects were also asked the following:

1. Was the aid being used? If no, why not? If yes, how and when?
2. If the person did not have the aid, would he or she be able to perform the activity of daily living that the aid was intended for, or would personal assistance be necessary?

After each interview, the therapist recorded her recommendations for changes in technical aids or for housing adaptations. She then discussed her recommendations with the subject and asked for permission to pass these recommendations on to someone who could enact them. Sometimes the subject did not think this was necessary and the matter was dropped. If permission was granted, however, the recommendations were passed on to the district nurse or district occupational therapist.

### Results

A total of 422 aids were found in the homes of the 57 subjects. Every subject had at least one technical aid, and one subject had 24 aids. The mean number of aids per person was 7.4. Of these aids, 29% were for mobility (e.g., canes, walkers, wheelchairs); 20%, for personal hygiene (e.g., raised toilet seats, bathtub benches, dressing aids); 20%, for communication (e.g., hearing aids, telephone and doorbell amplifiers); 16%, for environmental adaptation (e.g., cushions, grab bars, adjustable chairs); and 5%, orthoses or prostheses. Other aids (e.g., eating aids, reachers, special scissors) constituted 11% of the total number of aids used.

The most common limitations in activities of daily living for this sample were in the areas of personal hygiene (i.e., bathing and toileting) and mobility. Most of the subjects with these limitations had technical aids to help them.

### Bathing

Fifty-one subjects (90%) had difficulty bathing, 75% of whom had aids for this limitation. The most common problem was foot care. Forty subjects relied on personal assistance to wash their feet and trim their nails. Twenty-four subjects needed assistance to wash their hair, and 22 subjects needed assistance with bathing apart from foot and hair care. However, only 4 subjects needed assistance with simple hygiene, such as washing hands and face and brushing teeth.

The second most common problem was getting into and out of the bathtub, which was most often solved with technical aids. Twenty-six subjects had some kind of bathtub bench or chair. Furthermore, the therapist recommended to 7 subjects that they obtain an aid to help them get in and out of the tub. Fifteen subjects already had a shower stall; the therapist recommended a shower stall for 7 more subjects. Twelve subjects did not bathe or shower, but rather, sponge-bathed on a chair by the bathroom or kitchen sink. Three of these subjects did not have a bathroom in their home.

Another common problem was mobility into and within the bathroom. Most Swedish bathrooms have raised thresholds that cannot be removed due to building regulations. This obstacle as well as narrow doorways makes entry difficult for persons with walking aids. Many subjects left their aids by the door and supported themselves by holding onto the door frame, the sink, or the edge of the tub.
Toileting

The major problem with toileting was mobility within the bathroom, that is, the same problems described above. Forty-three of the 57 subjects had problems with toileting, 86% of whom had aids for their limitations. One subject could not get to the toilet at all, and 4 subjects needed personal assistance. Thirty-eight subjects were able to manage independently despite difficulties, and 32 subjects had raised toilet seats with arm supports or bedside commodes. Grab bars were also common near the toilet.

Indoor Mobility

Forty-five of the 57 subjects had difficulty in this area, 80% of whom had aids for their limitations. Nearly everyone who had difficulty walking had a walking aid. Even some subjects who could walk without support had an aid because they were afraid of falling. A common problem was sitting down and getting up, which was solved with a combination of technical aids and the subjects' own solutions. Walking aids were often used as support, as was any furniture nearby. Several subjects used cushions—both special cushions from the technical aid center and their own—to raise seating height. Two subjects used patio chairs because of their higher seats and arm supports. Although some subjects used reachers, individual solutions, such as the use of scissors or brooms to retrieve objects from the floor, were more common.

Entering and Leaving a Dwelling

Several subjects who could walk unsupported indoors needed to use aids outdoors. Stairs, thresholds, and other hindrances caused difficulties for 28 subjects, and opening and closing doors was a problem for 10 subjects. One subject could not go out at all, 13 subjects needed personal assistance when they went out, and 24 subjects managed to go outside despite difficulties. Of the subjects with difficulty in this area, 74% had aids.

Food Preparation

Of the 57 subjects, 15 could manage food preparation and 11 were not responsible for this activity. Of the 31 subjects who had difficulties, 3 could not prepare food at all, 9 needed personal assistance, and 19 managed to prepare food despite difficulties. Of these 31 subjects, 74% had aids. A major problem was mobility in the kitchen. Walking aids are often awkward in the kitchen and the lifting and carrying of objects is difficult when hands are needed for support. Walking aids with trays or baskets were appreciated. Retrieval of items from cupboards was another common problem. One solution was to arrange the cupboard so that items used daily were accessible. A few subjects could use reachers or canes to retrieve things, whereas other subjects needed personal assistance. Although more than half the sample had difficulty with food preparation, 90% were able to prepare a simple breakfast and heat up prepared food.

Communication

Thirty-eight of the 57 subjects in the sample had difficulty communicating with others. Hearing was the most common problem: 38 subjects had difficulty, 16 of whom had hearing aids. Although no one was completely incapable of communication, the therapist judged 5 subjects as needing some personal assistance. Twenty-four subjects had difficulties using the telephone, mainly with hearing the ring or the other person's voice over the receiver, but also with getting to the phone in time. Forty-two subjects had receiver amplifiers, and 15 had telephone and doorbell amplifiers. Of the total number of subjects with difficulty in this area, 68% had aids for their limitations.

Dressing, Feeding, and Transfers

Subjects with limitations in these activities were least likely to have aids for their limitations. Instead, they often relied on personal assistance or on their own inventiveness, or they simply did not perform the activity. Subjects who could not tie their shoes, for example, wore only slippers or left their shoes untied. Personal assistance was required by 12 persons for donning coats. In total, 36 subjects had difficulty dressing, 28 of whom used aids.

A total of 14 subjects had difficulty with feeding, 14% of whom had aids. Six subjects required help with eating.

Thirty subjects had difficulty with transfers, 27% of whom had aids. Getting into and out of bed was often an arduous task, but the subjects found their own solutions, such as holding on to furniture or walkers. As one woman said, "You develop little tricks; you can't be in a hurry" (Nordrup, 1987, p. 25).

Recommendations

Eighteen subjects needed new aids and 25 had aids that needed repair or accessories. The therapist recommended a total of 30 new aids for the 18 subjects in need of them and assessed 38 aids belonging to the 25 subjects whose aids needed repair or accessories. Some of the items needed were as follows: (a) 2 hearing aids, (b) 6 telephone or doorbell amplifiers, (c) new rubber grippers for 9 reachers, (d) studs for 5 canes so as to enable them to be used in the winter, and (e) repair or replacement of 11 raised toilet seats and bath benches. These figures do not include those items that the therapist recommended but that the subjects did not want. In several cases, the therapist recommended a new or different aid but the...
Use of Aids

Seventy-five percent of the aids found in the homes were being used. Of the aids for communication, 87% were being used. All 15 of the telephone and doorbell amplifiers were being used, as were 13 of the 16 hearing aids. Of the environmental adaptation aids, 83% were used: cushions, grab bars, and adjustable chairs showed high rates of use. Thirty-four percent of the mobility aids and 25% of the personal hygiene aids were not being used at the time of the interview. An analysis of the average cost of the unused aids revealed that they were neither more nor less expensive than those aids that were being used.

The 12 aids across all categories that were used incorrectly did fill a function, but not the function that was intended. For example, one woman used a walker to help her get into and out of a low chair, but did not use the walker for walking.

More than half of the unused aids were not being used either because the subject's physical condition had changed (15 had improved, 27 had worsened) or because the aid had actually been prescribed to another person (this was true for 12 aids). It should be noted, however, that several aids that were being used had been inherited from another person, usually a relative. Of the 42 aids not used because of a change in the subject's condition, 15 were canes and 5 were other walking aids. Many of the persons who had aids that they did not need (this was true of 28 aids) had another aid for the same function or believed that they could manage without it. Nine aids were not used because they were considered awkward; these aids were magnifying glasses, upper extremity orthoses, and eating aids. Other reasons that subjects gave for not using aids (given for 13 aids) were that the aid did not fulfill the intended function, that the subject had recently received the aid and had not yet tried it, or that personal assistance was preferred.

Most of the 318 aids being used were considered by the occupational therapist to be essential to the performance of activities of daily living. Of these, 118 aids were necessary for the person to carry out the intended activity autonomously. Not having this aid would increase the need for personal assistance. Forty-four of these aids were for mobility.

There were 171 aids that were considered so important that the person could manage the activity it was intended for without use of the aid, but only with difficulty. A typical example is the raised toilet seat: Many of the subjects could manage with a low toilet seat but found the raised seat much easier to use (see Table 3).

When we focused on the number of persons using aids rather than on the number of aids used, we found that 42 (74%) of the 57 subjects had at least one technical aid that granted autonomy. That is, if these subjects did not have technical aids, they would need more personal assistance. Fourteen subjects (25%) could still perform activities of daily living without the aid, but with difficulty. Only 1 subject would be unaffected by not having aids, but that subject was totally dependent on personal help for all activities of daily living.

Housing Adaptations

The therapist also looked at what adaptations had been made in the home and made recommendations for adaptations that would help compensate for the subject's functional disabilities. Fourteen subjects had one or more housing adaptations. Bathroom adaptations were the most common and involved the installation of showers and one-hand-controlled faucets and the removal of doorway thresholds both in the bathroom and throughout the home. The therapist recommended these adaptations to an additional 14 subjects.

Discussion

Sweden's policy of enabling people to live in their homes as long as possible is supported by a system for

<table>
<thead>
<tr>
<th>Aid Category</th>
<th>Aids Used Correctly (%)</th>
<th>Aids Used Incorrectly (%)</th>
<th>Aids Not Used (%)</th>
<th>Total No. of Aids</th>
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<tbody>
<tr>
<td>Mobility</td>
<td>66</td>
<td>1</td>
<td>34</td>
<td>122</td>
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<tr>
<td>Communication</td>
<td>82</td>
<td>5</td>
<td>13</td>
<td>83</td>
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<td>70</td>
<td>5</td>
<td>25</td>
<td>83</td>
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<td>Environmental</td>
<td>79</td>
<td>4</td>
<td>16</td>
<td>68</td>
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<tr>
<td>adaptation</td>
<td>65</td>
<td>0</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>Orthoses and prostheses</td>
<td>72</td>
<td>0</td>
<td>28</td>
<td>46</td>
</tr>
<tr>
<td>Other</td>
<td>72</td>
<td>3</td>
<td>25</td>
<td>422</td>
</tr>
</tbody>
</table>

Note: Percentages have been rounded.

Table 3

<table>
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<tr>
<th>Subject Could Manage Activity Without Aid</th>
<th>Subject Could Manage With Difficulty</th>
<th>Subject Could Not Manage</th>
<th>Total No. of Aids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>7</td>
<td>5</td>
<td>37</td>
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<tr>
<td>Communication</td>
<td>8</td>
<td>5</td>
<td>42</td>
</tr>
<tr>
<td>Personal hygiene</td>
<td>6</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>Environmental adaptation</td>
<td>14</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Orthoses and prostheses</td>
<td>0</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>24</td>
<td>92</td>
</tr>
</tbody>
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Note: Percentages have been rounded.
the provision of home care, both social and medical, and a centrally organized system for the provision of technical aids.

To ensure that these systems are effectively serving the needs of the disabled elderly, we must increase our knowledge of their living situation. The aim of this study was to identify the limitations of activities of daily living and instrumental activities of daily living experienced by a group of community-based elderly persons with disabilities and to examine the role of technical aids in their daily lives.

The most common limitations found were in the areas of personal hygiene and mobility. Most of the subjects with these limitations had technical aids to help compensate for their limitations. A study of the general population of 70-year-olds in Gothenburg, Sweden (Gosman-Hedstrom, Aniansson, & Persson, 1988), also showed that aids were most commonly used for personal hygiene and mobility.

Seventy-five percent of the aids were being used. Our finding that aids were not being used due to changes in physical condition indicates a lack of follow-up by health care personnel. It also reveals the lack of an organized collection of unused aids. A consequence of this lack of follow-up was that 38 aids were found to need replacement parts or accessories.

Several subjects found their own solutions to many problems with activities of daily living. Some solutions were satisfactory, such as the wearing of loafers instead of laced shoes. Other solutions seemed less satisfactory, and a better solution could have been found with different aids or instruction. Finally, some solutions seemed unsafe, such as the use of furniture or the bathroom sink for support.

From the number and category of aids that were considered essential to autonomy and from the number of people who had aids that gave them autonomy, we have concluded that technical aids play an important role in the lives of elderly people with functional disabilities. Three fourths of the sample had at least one aid that enabled them to perform the intended activity of daily living task independently.

Many of the problem areas concerning activities of daily living that were identified in this study, such as the presence of doorway thresholds, the need for assistance with foot care, and the lack of continuity in the provision system, confirm the observations of therapists and other professionals working in the home. Illumination of the problem areas can give valuable direction for change. For example, most of our subjects relied on personal assistance for foot care, which suggests that formal services for the provision of foot care should be organized. Additionally, if we can demonstrate that 90% of the disabled elderly can heat up prepared food, then this would support the development of such services as Meals On Wheels. The need for housing adaptations can guide present building standards.

This study has several limitations. Because the sample was limited to 57 subjects over 74 years of age who lived in one Swedish municipality, it is not representative of the general population of older persons living at home. Additionally, we relied on the experience and competence of one occupational therapist. Future studies might compare the evaluations of a number of occupational therapists as well as those of other professionals, thereby lending more validity to the study.

Conclusion

The importance of technical aids to the independence of the elderly substantiates the importance of occupational therapy in home care. Swedish occupational therapists have a wide knowledge of available technical aids and possible housing adaptations. Further, occupational therapists focus on function and independent living more than other disciplines do (Hasselkus & Kiernat, 1989). While the need for occupational therapists specializing in home care is increasing, we are experiencing a personnel shortage in our field. This means that the therapists in home care may not have direct contact with every person who needs technical aids, but must advise and support other care providers, such as home health aides, nurses, and physicians.

Acknowledgments

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