

## 3 Factors associated with aid and equipment use

This chapter reviews literature on the use of aids and equipment and covers three primary issues—factors associated with the uptake of equipment, reasons people abandon equipment and the suggested greater efficacy of equipment assistance over personal assistance. Most of the literature discussed focuses on the aged population (i.e. people aged 65 years and over) living in North America or Western Europe, as similar research based on Australian populations or on younger adults or children has not received the same level of research attention.

### 3.1 Factors associated with the use of aids and equipment

A range of personal and environmental factors, and factors related to impairment and activity limitation, has been identified as being associated with the uptake and use of aids and equipment for people over the age of 55<sup>2</sup>. Some of these factors, however, display varying associations with equipment use, from study to study. Only those factors found consistently and positively to associate with the use of equipment are described here.

#### Impairment and activity limitation

Increased impairment and activity limitation exhibited the strongest and most consistent relationship with equipment use (de Klerk et al. 1997; Forbes et al. 1993; Hartke et al. 1998; Mann et al. 1995; Zimmer and Chappell 1994). Specific factors found to associate with aids and equipment use include:

- limited functional status, as measured by severity of difficulty performing self-care and domestic activities and the number of days of restricted activity
- mobility limitation, as measured by difficulty changing position, walking inside and outside the home, walking up stairs etc.
- higher number of chronic health conditions
- fair or poor self-assessed health status.

Thus, the more difficult it is to perform an activity, the larger the number of impairments experienced and/or the feeling that one's health is compromised influence people to seek assistance from aids and equipment. These factors have been referred to in the literature as 'need' factors, where the combination and volume of need factors influences an individual's ability 'to cope' without assistance (Zimmer and Chappell 1994).

#### Environmental factors

Systems by which people are able to receive financial assistance for aids and equipment, or access aids by other means (e.g. through equipment schemes), exerts a strong influence on whether people adopt aids and equipment or not (Scherer and Cushman 2001). Ease of access is a critical issue and use of equipment is more readily engaged the more generous (in

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<sup>2</sup> In the literature, factors were categorised as either predisposing, enabling or need factors, based on the Anderson and Newman model of health care access (see Andersen and Newman 1973).

terms of financial assistance and equipment availability) and easier the support system. The receipt of personal assistance, either informal or formal, is also related to equipment use (de Klerk et al. 1997; Zimmer and Chappell 1994). An increased need for assistance due to functional limitation might account for this association, especially in elderly people. Also significant is the attitude of others, in particular relatives and friends, who can have a very significant effect on aid and equipment use (Scherer 2000). Expectations held by others may encourage or discourage the uptake of aid and equipment.

### **Personal factors**

Age was a consistent variable linked with aids and equipment use (de Klerk et al. 1997; Forbes et al. 1993; Hartke et al. 1998; Russell et al. 1997; Zimmer and Chappell 1994). Older seniors (over 75 years) were found to be more likely users of aids and equipment compared with younger seniors (between 55 and 65 years). The increase in activity limitation and severity of impairments associated with increasing age is a probable explanation for this association, although Hartke et al. (1998) found that age remained a significant factor in aid and equipment use after controlling for health status. It has been suggested, therefore, that attitudinal or psychological reasons might also influence use or non-use (Hartke et al. 1998; Zimmer and Chappell 1994). For example, younger seniors may think they are still too young to rely on aids and equipment and therefore avoid their use.

Gender also had some association with use, with females tending to use aids and equipment more often than males. In one study, however, males were found to be more frequent users of equipment while females were significantly associated with multiple use (Hartke et al. 1998). Some association was also found with marital status and living arrangement, with equipment users tending to be unmarried and/or living alone. However, it must be noted that this data was not age-standardised.

Other personal factors such as income, education and place of residence were more inconsistently related to aid and equipment use. A higher income and level of education was predicted as improving the chances of people obtaining aids and equipment by respectively providing the financial ability and access to information to do so (de Klerk et al. 1997). However, when income and education did hold a significant association with use, it was less education and low or average incomes that were associated with higher levels of use.

### **Subjective factors**

Subjective factors have also been identified as predisposing people to use aids and equipment (Vash 1983, cited in Phillips and Zhao 1993; Scherer 1996; Scherer and Cushman 2001). Adjustment to and acceptance of one's disability, and a focus to manage their disability, leads the individual to recognise that assistance in some areas is required and an aid or piece of equipment can provide that assistance. Similarly, setting goals for the future, and associated motivation, may also influence the adoption of methods (such as equipment use) which improve the chance of achieving those goals.

## **3.2 Efficacy and impact of aid and equipment use**

The use of equipment has been suggested as being more efficacious in the management of disability than either personal assistance or a combination of assistance types (Agree 1999;

Verbrugge et al. 1997; Verbrugge and Sevak 2002). For people aged over 55 years, a reduction in disability was uniformly achieved only for those using aids and equipment.

Agree (1999) assessed the level of residual difficulty people aged over 70 years experienced with indoor mobility. Residual difficulty was defined as the level of difficulty still experienced despite the receipt of assistance. People using aids and equipment consistently reported experiencing lower levels of residual difficulty with indoor mobility, compared with people relying on personal assistance alone or a combination of personal and non-personal assistance. Controlling the level of underlying physical impairment did not alter these findings, with the report of residual difficulty still around 1.5 and 3 times more likely for people using personal assistance or both assistance types respectively (Agree 1999).

Aids and equipment also proved to be better at reducing any difficulty associated with carrying out tasks of daily living<sup>3</sup> (Verbrugge et al. 1997; Verbrugge and Sevak 2002). Efficacy was measured as the difference between unassisted and assisted degrees of difficulty (Verbrugge et al. 1997), and found to be greatest for people (aged 55 years and over) using aids and equipment. Estimated rates of improvement were generally high, in some cases above 90%, and at least 10–20% higher than estimates for people using both personal and aid and equipment assistance. These rates were lower still for people relying on personal assistance only.

While it is proposed by Agree (1999) and Verbrugge and colleagues (1997; 2002) that aids and equipment benefit those with an impairment more than the other forms of assistance, variation in its effectiveness can depend on the severity of impairment and, in some cases, the type of health condition. For example, 76% of people with a mild impairment had no residual difficulty (i.e. 'the degree of disablement that remains after (assistance has) ameliorated some part of the total underlying need' Agree 1999:429) if using aids and equipment to perform a task (Agree 1999). This dropped to 65% and 52% of people with moderate and severe impairments respectively.

The combined use of personal and aid and equipment assistance follows the reverse pattern (i.e. the proportion of people experiencing residual difficulty increases with severity of impairment). The efficacy of personal assistance did not vary across severity of impairment, with similar proportions of people experiencing no residual difficulty (between 49–53% of people).

With regard to health condition, Agree (1999) focused on five health conditions—chronic lung disease, stroke, heart disease, arthritis and cognitive impairment—and found that aid and equipment assistance was less effective in reducing mobility difficulties and other task related difficulties for those with chronic lung disease and arthritis. Personal assistance provided greater benefit to people with chronic lung disease, possibly because conventional forms of (mobility) equipment did not immediately alleviate shortness of breath and lack of oxygen, the prime antecedent to mobility impairment in this group (Agree 1999). For those with arthritis, the pain associated with using aids and equipment might necessitate the receipt of personal assistance for certain tasks.

Despite these anomalies, aids and equipment appear from the literature available to be more effective than personal assistance, or at least for people aged over 55 years. Verbrugge and

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<sup>3</sup> These tasks included dressing, bending to pick up clothes, opening jars, standing up from a chair, walking a quarter mile, walking from room to room, and getting in and out of bed, the bathtub or the car.

Sevak (2002) suggest that both objective and subjective facets associated with aid and equipment use influence its efficacy in alleviating disability. Objectively, aids and equipment can be fitted to deal specifically with the functional problems experienced by the user. Furthermore, aids and equipment are readily available which might not always be the case with a personal carer. In subjective terms, aids and equipment promote feelings of autonomy and self-sufficiency in the user.

### **3.3 Abandonment of aids and equipment**

Despite the potential advantage of aids and equipment use, some people still choose not to rely on this form of assistance or abandon (i.e. discard) an aid after a defined period of use. Aids and equipment are abandoned for a multitude of reasons, and reported rates of abandonment for a specific aid range from 8% to 75% (Phillips and Zhao 1993; Scherer 1996). High rates of abandonment are costly 'both in terms of dollars and outcome achievement' (Scherer 1996) and suggest 'a waste of a significant resource in an environment where there is an increased need for cost containment and accountability in the provision of AT (assistive technology)' (Kittel et al. 2002). Just as important is the human cost of abandonment, where people who might have improved their ability to both perform activities of daily living and participate in the wider social and economic field find themselves 'back at square one'.

#### **Rates of abandonment**

In a survey of 227 adults with physical impairments, living in the US and aged 18 years and over, it was estimated that one third of devices reported by the survey sample were 'completely' abandoned (Phillips and Zhao 1993). Mobility aids (e.g. crutches, walkers, canes, wheelchairs, electric scooters) tended to be abandoned more readily than other devices. This higher rate of abandonment might be a manifestation of the survey sample, which consisted of people with long-term disabilities, and in particular mobility impairments, who may have needed to change equipment over time. Phillips and Zhao (1993) also suggest that mobility aids, compared with other devices, are used more often in the social world and users might change equipment until they find one with which they feel more comfortable in social settings.

The first year of use generally sees the highest rates of aid and equipment abandonment (Phillips and Zhao 1993; Scherer 1996). Temporary or never-used aids or equipment may account for some of the abandonment but also includes aids or equipment considered ineffective by the user. A second peak of abandonment occurs around 5 years after the individual first started using the device, which might reflect the need for, and the ability to, change the aid or type of equipment used.

#### **Reasons for abandonment**

Reasons cited for abandoning aids and equipment largely relate to the characteristics of the equipment itself, the needs of the user, and the environment and psychosocial setting in which the aid or equipment is used.

Four significant reasons given for abandoning aids and equipment<sup>4</sup> in Phillip and Zhao's (1993) study were, in order of importance:

- Changes in the needs or priorities of users. Both improvement and deterioration in functional ability induced users to discard the original device(s), either because they did not need them any more or to upgrade to another device.
- Ease of obtaining aids and equipment from a supplier. Aids and equipment that were easier to obtain tended to be abandoned more readily since the consumer believed that these devices, when needed again, could easily be replaced.
- Performance. Users indicated that if aids and equipment met their expectations for effectiveness, reliability, durability, comfort, safety and ease of use, they were less likely to abandon the device. Studies examining device preferences (e.g. Brooks and Hoyer 1989, cited in Phillips and Zhao 1993) specified such features as being important characteristics of a good device.
- The level of consumer involvement in aid and equipment selection. Users felt very strongly that their views and needs be taken into consideration when aids and equipment were being selected for them. It followed that where the user participated in the selection of a device, the device was more often than not retained.

Other, more specific reasons for abandonment have been drawn from the sizeable amount of research on mobility aids, in particular wheelchair, abandonment. Many reasons given by wheelchair users for abandonment focused on the physical properties of the wheelchair itself, including weight (too heavy or too light), manoeuvrability, rolling resistance, overall design, and difficulties transporting the wheelchair (Bates et al. 1993; Bell and Hinjosa 1995; Hesse et al. 1996; Post et al. 1997; Scherer 1996; and reviewed in Kittel et al. 2002). Some users also expressed physical discomfort associated with long periods in the wheelchair; limitations placed on function, mobility and access; poor device performance; and the unaesthetic nature of their wheelchair (Bates et al. 1993; Bell and Hinjosa 1995; Brooks 1991; Phillips and Zhao 1993).

Psychosocial factors can also influence whether a person retains or discards an aid or piece of equipment (Bell and Hinjosa 1995; Brooks 1991). For some, the use of a device 'underscores the existence of impairment' i.e. it constantly reaffirms the nature and extent of their disability. These feelings are especially real for new (and younger) device users. If an individual sees the use of a device as undermining or impeding their independence or social acceptance, the chances of a device being abandoned increase.

Finally, one of the major contributions to dissatisfaction with devices, and hence their abandonment, is poor feature matching and prescription practices (Hesse et al. 1996; Scherer 1996). For example, a small group of South Australian wheelchair users interviewed by Kittel et al. (2002) stated that unsatisfactory interview processes with prescribing therapists led to the prescription of inappropriate devices. Unsatisfactory interviews tended to occur when an individual was being prescribed a device for the first time. While users conceded that some of the problem lay with not knowing what their future needs might be<sup>5</sup>, they also felt that

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<sup>4</sup> Abandonment in this study was defined as 'nonuse' of an equipment type or category, in the context that it was once used or prescribed but never used.

<sup>5</sup> Wheelchair users interviewed in this study had been in rehabilitation facilities up until they were prescribed a wheelchair.

prescribing therapists did not spend enough time exploring options, asking their opinion, and 'feature matching' i.e. translating the users' expressed views on needs and lifestyle to what they would require from their wheelchair. Poor feature matching can and does result in the functional needs of the individual not being met, restricting participation in their social and community roles. Those who feel a device impinges on their independence are likely to report negative experiences with that device.

To improve feature matching and prescriptive practices, consideration must be given to the environment in which the person uses the technology, the individual's characteristics and preferences, and the functions and features of the aid or piece of equipment (Scherer 1996). Consumers need to be involved in the process of aids and equipment selection, including being able to make choices and to have control over the final decision. Without this input, and an improvement in information transferral to consumers, family members and providers, discontent with, and the abandonment of, aids and equipment may be the result.