Independence through Assistive Technologies

A RESEARCH REPORT

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Foreword

The population is ageing – a fact that is well known and understood, as is the fact that the current healthcare models are unsustainable, due to the cost and the lack of younger care workers in proportion to the baby boomer generation demanding care. This report explores the extent of difficulties with daily activities faced by older people going about their day-to-day lives and the level of usage of commonly available services, tools and assistive technologies in place to support them. The research also explored the types of devices that would be sought in the future to enable independent living and self health-management, ultimatey reducing hospital admissions and allowing health professionals to manage larger case loads of patients.

The research was conducted by the PaCT Lab (Psychology and Communications Technology Lab) at Northumbira University led by Professor Pamela Briggs. The group is interested in helping designers create everyday tools and technologies suitable for older people. The research involved two surveys and focus groups involving a total of 518 participants aged 64-99 living in the North East of England and taking part in the North East Age Research study.

The challenges and opportunities of the global ageing population are a major focus of Cels and our partners in the North East of England, and we are actively building an international network of industrial and academic partners to explore a wide range of issues

Mike Asher
Chief Executive
Cels

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Dr Hartmut Lehfeld, Psychiatric University Hospital, Eriangen, Germany for allowing use of the B-ADL scale.

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Executive Summary

Background
- Assistive technologies (AT) refers to any assistive, adaptive and rehabilitative devices which promote greater independence for the ageing well, as well as for those people with disabilities and/or chronic illnesses.
- Although there are a number of assistive devices available, they do not seem to be reaching the intended audience. Disability advocates have suggested one of the reasons for this is that the technology is often designed without any consultation with, or regard for, the people with disabilities, thereby creating barriers to engagement for many individuals.

Aims
- The aims of this investigation were to determine which difficulties occur in everyday life in an older population, which assistive devices and technologies are in use by this population to help overcome these difficulties, and to elicit the types of devices or equipment this population require, or anticipate they would need in the future.

Method
- 518 participants aged 64-99 (mean age 77.73) living in the North East of England took part in this study which was conducted in 2003.
- The investigation consisted of two surveys. One, which utilised the Bayer Activities of Daily Living (BADL), is designed to assess everyday activities, including general everyday activities, problems with specific everyday tasks and aspects of cognition. The second survey covered aspects of service usage, such as health professionals, mobility devices, personal care items, medical equipment and home adaptations. The surveys were followed up with focus group discussions into the types of problems that are experienced by this age group, the devices/tools in use and those that would be necessary for future use.

Findings
- The results of these surveys show that overall the participants surveyed reported few difficulties with everyday activities. Those that were reported to cause some difficulty include using transport, concentrating on reading, and using domestic appliances. With regards to the devices and equipment available to assist day-to-day living, the use is again low. However, the most commonly used items are those that aid mobility and help maintain independence, such as walking sticks, jar openers, grab rails, help alarms and replacing baths with showers. Those most desired or needed are stair lifts, electric wheelchairs, and shower seats or relocated bathrooms.
The Ageing Population

With the number of individuals over 60 years of age on the increase, and the present proportion of 1 in 10 estimated to increase to 1 in 5 by the year 2050, globally it is estimated that the number of elders is expected to exceed 1 billion by 2020 (United Nations, 2001).

This trend is also evident in the UK where currently 18% of the population, approximately 11 million people, are 65 and over (HMSO, 1998). Over the last 30 years the proportion of the population under 16 has decreased, whilst that proportion aged over 65 has increased. Even the older population itself is ageing, with those over 80 years old being the fastest growing segment (United Nations, 2003). Nationally the number of people aged 85 and over increased by 64,000 in 2005, reaching a record total of 1.2 million (Office of National Statistics, 2005). By 2031 the population over 80 years old is predicted to double (Office of National Statistics, 2005).

Approximately 4% of the population over 65 years are residing in care homes, (3 in 10 of those in the over 90 age group (The Health Survey for England, 2000)), at significant financial cost. It is important that we understand the needs of this population in order to provide the necessary services, such as health care, financial support, and transportation, to support them so that they are able to maintain their lifestyles and live independently as long as possible.

In this report we present a brief overview of the ageing process, including some of the physiological and psychological processes that decline with age. Secondly, the results of two questionnaire based surveys are also presented. The first survey, the Bayer Activities of Daily Living (BADL), was used to assess activities of everyday living in an attempt to determine the types of activities that cause difficulties to the older population and those that do not. The Survey of Service Use investigated the types of existing assistive tools and devices that are in current use by this population, and those they think that they would require in the future. The results of the surveys are then followed by the outcomes of focus group sessions, with participants aged over 65, in an attempt further to elucidate the types of everyday activities that are problematic. These sessions were also used in an effort to determine some of the reasons for the lack of use of many of the assistive devices that are available. The report concludes with some technology and social policy recommendations.
The Ageing Process

Judging the chronological age at which the ageing process occurs is not easy and can be very misleading as the physical and mental effects of the ageing process can vary greatly across individuals, and even cultures. In the world of gerontology, the age of 60 to 65 tends to be used as the age of onset, otherwise known as threshold age (Bromley, 1988; Decker, 1980; Kermis, 1983; Rebok, 1987; Ward, 1984; Stuart-Hamilton, 2000), mostly due to the fact that it is around this age that the physical and psychological changes appear to manifest themselves.

Numerous factors have an impact upon an older person’s ability to maintain their lifestyle and live independently, including their health, available social support and financial situation. The rising incidence of dementias and severely disabling pathologies is, of course, a cause for concern, but it should be noted that most people (approximately 85%) die without experiencing these. However, most elderly people do experience some sensory, cognitive and motor impairments, which collectively can reduce everyday competence and quality of life, leading to dependency. Therefore appropriate support measures need to be available in order to minimise the effects of declines in the health of the living well, and thus increase the likelihood of continued independent living.

The Effects of Ageing

The physical and psychological changes which occur with age include sensory and motor impairments, and decline in areas of cognitive performance. The most apparent sensory changes include losses associated with stimulus identification (Light, 1990), although improvements are possible when stimuli presentation is improved (for example, when stimuli are clear and intense, and contrast with any background stimuli (Welford, 1982)). Other effects include a decline in visual acuity and contrast sensitivity (Pitts, 1982; Owsley et al., 1983) and exacerbation of short sightedness and hearing loss, particularly at the higher frequency range, (Kryter, 1983). Information processing capabilities are also impaired (Welford, 1981; Czaja, 1988), resulting in a general overall slowing of cognitive processing speed. This has an impact on tasks such as working memory, and attention and visual search performance (Sharit and Czaja, 1994). One of the most common complaints from older people concerns failing memory. Aspects of memory shown to be impaired particularly include episodic and working memory (Grady and Craik; 2000), with evidence for failure in prospective memory also (Steel et al., 2004). This is a particularly important aspect of memory to consider in terms of everyday activities of living, as it impacts on the ability to remember to do something in
the future, such as taking medication, locking doors, turning off the cooker, collecting pensions etc.

Declines in motor function are, of course, in part due to the muscular and neuromuscular changes that occur with age (Welford, 1984). However, the age related effects on information processing also include a decline in motor response speed (Salthouse & Somberg, 1982; Welford, 1982) due to changes in central nervous system (CNS) processes. Nevertheless, this slowing of motor control is not widespread across all motor movements, but tends to be more pronounced for complex movements (Light & Spirduso, 1990; Smith et al., 2000a). Information processing is also involved in the overall decline in muscle strength (Bassey et al., 1988) affecting mobility. This latter decline particularly affects older adults’ ability to negotiate stairs and get up from a chair (Bassey et al., 1982), as well as handgrip (Viitasalo et al., 1985). The most commonly reported problems with everyday tasks associated with these declines in motor function include doing the shopping, working in the house and garden, climbing stairs, carrying heavy weights, stooping or kneeling, and getting up from a chair after sitting for a long period (Steel et al., 2004).

**Volunteers**

The two questionnaires were completed by the surviving members from the North East Age Research longitudinal study of ageing. This study began in 1983 when recruitment via newspaper articles, television and radio appeals led to 2,052 people aged over 50 years joining the study, reaching 3,384 volunteers over a 10 year period. All volunteers were community residents who were fit and healthy enough to visit the testing centre. The sex ratio of this panel was 27% males and 73% females with similar age ranges. Volunteers have been tested on a range of cognitive tests periodically to assess speed of processing, cognitive ability, and memory, as well as completing questionnaires on lifestyle and health.

**Current Population**

Inevitably, attrition has also occurred due to death, ill health and moving away from the area. In 2003 all surviving members of the participant population were mailed the two questionnaires. The age range is 64 to 99 years (mean 77.73 years sd = 5.84), with 119 males and 399 females. Population statistics (Government National Statistics, 2007) show that, among the over 50s, women typically outnumber men; this is most pronounced among the over 85 year olds, where there are 40 men for every 100 women. Most (84%) of the volunteers were classed as being in the top three SES groups, indicating a preponderance of white collar, professional and non-manual occupations (see Rabbitt et al. 1993).
As is typical of any volunteer sample, this is not a demographically normal sample of SES in the North East of England. Nevertheless, it is a reflection of the longevity of those in more “middle classes” that is typical of the population as a whole.

Health of Population

Undoubtedly these remaining volunteers are the elite of the panel, since they are still able to visit the testing centre, yet many of them do have health problems typical of that age group (CVD, diabetes, arthritis, hearing and visual deficits). By far the most common health problem is hypertension, with 30% of the sample population listing this as their main health problem. This is followed by cardiovascular disease (25%). Arthritis is also common, but often listed as a second disorder to the above two. Population statistics also reveal that 55% of people aged over 65 years consider their health to be at least ‘fairly good’, although, among the over 85 year olds, 75% of females and 66% of males report a long term illness or disability that restricts their daily life. Any volunteer sample is going to show bias in favour of those who are still able to take part but, even among this elite sample, the range of health and disability reflects that seen in a more general population.

1. Assessment of Difficulties with Everyday Activities

Many studies examining the ability of older people to live independently focus on assessing the functional abilities of the chronically ill and those with dementia. Whilst they may also note difficulties with basic skills of self-care, the emphasis of these investigations tends to focus on disabled populations. There is, therefore, a failure to examine the everyday functional limitations experienced by community residents who do not fit into the category of chronically ill/disabled. In order to improve planning of care services, design of aids, systems and services for the elderly, we need information on the daily tasks that give community residents difficulty, and what assistance they feel that they require.

This investigation therefore aimed firstly to determine the difficulties experienced by older community residents who are generally in good health. It was then concerned with what types of devices/tools and assistance are in current use by this older population in order to maintain their independence, what they would desire to use to improve their quality of life, and what they predict they may need in the future. By focussing on community residents, it seeks to provide information on the majority of older people who do live relatively successfully in the community. The ability to measure disabilities or impaired function in this living, well population is vitally important, as it is a key marker of the health and independence of the population.
For these purposes two questionnaires were administered to a sample of people over the age of 65. The first questionnaire utilised was the Bayer Activities of Daily Living (BADL) (Hindmarch et al., 1998).

Activities of daily living can be grouped into two main types. Firstly there are the basic physical activities, such as washing, dressing, eating, walking and using the toilet, and then there are the more complex tasks, often referred to as instrumental activities, which include shopping, housekeeping and cooking, using the telephone and transportation and self medicating. The BADL questionnaire was chosen because, rather than focusing on basic self-care activities, such as feeding, bathing and dressing, it assesses ability to do everyday activities faced by community residents, with an emphasis on cognitive tasks. Many ADL scales focus on physical tasks, but not on intellectual competences that may impair independence, as indeed cognitive functional limitations are often strong determinants of dependency and poor quality of life in the older population.

The BADL was developed specifically for the assessment of activities of daily living in individuals suffering from mild cognitive impairment (MCI). This questionnaire went some way to including and assessing cumulative effects of small cognitive and sensory changes, as well as those of gross disability. This need to assess cognitive as well as physical problems was highlighted in an earlier study by McInnes and Rabbitt (1998). Following work by Fitzgerald et al (1993) and Wolinsky and Johnson (1991), McInnes and Rabbitt (1998) carried out a principal components analysis of a 27 item activity questionnaire and found it revealed 5 factors relating to:

1. gross physical tasks, such as heavy housework, kneeling and using stairs
2. basic self-care skills, such as getting in and out of bed, dressing, and feeding oneself
3. cognitive tasks, such as handling money, and taking medications
4. fine motor control tasks, such as using fingers to grasp or handle objects
5. using the toilet.

The Bayer ADL questionnaire included more cognitive tasks and assessed a wider range of everyday tasks and so enabled a much better prediction of everyday difficulties and coping.

The scale consists of 25 questions. The first two evaluate everyday activities, and questions 3-20 are designed to assess direct problems with specific everyday tasks. The final five items assess aspects of cognitive function.
The questions are concerned with everyday activities with which individuals may or may not have difficulty. Each question is rated on a scale of 1 to 10, with 1 being ‘never have any difficulty’, and 10 being ‘always have difficulty’. A global score is calculated by summing individual items.

Example Questions

Do you have difficulty ……

Managing your everyday activities?

NEVER       ALWAYS
1     2     3     4     5     6     7     8     9     10

Taking medication without supervision?

NEVER       ALWAYS
1     2     3     4     5     6     7     8     9     10

Correctly counting money?

NEVER       ALWAYS
1     2     3     4     5     6     7     8     9     10

This questionnaire was completed by 496 participants, 135 males and 361 females (mean age = 77.69, sd = 5.84, age range 64-99).

The results from the BADL showed that this cohort did not report any major difficulties with everyday activities across all age groups. Activities with the highest scores are the ones that cause the most difficulties in everyday life. The low scores of the participants suggest that few of the individuals experienced any real problems.
Physical Activities

Basic physical activities, such as washing, dressing, eating, walking and using the toilet, do not appear to cause any particular problems, although the mean level of difficulty does increase with age, with those in the 84+ age group experiencing the most difficulties with personal hygiene, preparing food and general ability to take care of themselves.

Table 1.1. Shows the mean self report scores and standard deviations on the physical daily activities of the BADL for the 3 age groups (64-73, 74-83 and 84+) of participants. The minimum score for each question is 1 and the maximum score is 10.

<table>
<thead>
<tr>
<th>Daily Activity (maximum score=10)</th>
<th>Age</th>
<th>Mean</th>
<th>Std. D</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing everyday activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64-73</td>
<td></td>
<td>2.18</td>
<td>2.08</td>
<td>118</td>
</tr>
<tr>
<td>74-83</td>
<td></td>
<td>2.40</td>
<td>2.21</td>
<td>30</td>
</tr>
<tr>
<td>84+</td>
<td></td>
<td>2.62</td>
<td>2.48</td>
<td>77</td>
</tr>
<tr>
<td>Taking care of yourself</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64-73</td>
<td></td>
<td>1.63</td>
<td>1.551</td>
<td>118</td>
</tr>
<tr>
<td>74-83</td>
<td></td>
<td>1.90</td>
<td>1.876</td>
<td>301</td>
</tr>
<tr>
<td>84+</td>
<td></td>
<td>1.96</td>
<td>2.130</td>
<td>77</td>
</tr>
<tr>
<td>Personal hygiene</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64-73</td>
<td></td>
<td>1.39</td>
<td>1.462</td>
<td>118</td>
</tr>
<tr>
<td>74-83</td>
<td></td>
<td>1.72</td>
<td>1.871</td>
<td>301</td>
</tr>
<tr>
<td>84+</td>
<td></td>
<td>1.84</td>
<td>2.455</td>
<td>77</td>
</tr>
<tr>
<td>Preparing food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64-73</td>
<td></td>
<td>1.53</td>
<td>1.400</td>
<td>118</td>
</tr>
<tr>
<td>74-83</td>
<td></td>
<td>1.71</td>
<td>1.677</td>
<td>301</td>
</tr>
<tr>
<td>84+</td>
<td></td>
<td>1.86</td>
<td>2.088</td>
<td>77</td>
</tr>
<tr>
<td>Using domestic appliances</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64-73</td>
<td></td>
<td>1.75</td>
<td>1.563</td>
<td>118</td>
</tr>
<tr>
<td>74-83</td>
<td></td>
<td>1.85</td>
<td>1.549</td>
<td>301</td>
</tr>
<tr>
<td>84+</td>
<td></td>
<td>2.32</td>
<td>2.648</td>
<td>77</td>
</tr>
</tbody>
</table>

These results are supported by the use of personal care items assessed by the service use report, with very few aids being employed. It is also interesting that, as mobility becomes impaired, a bath or shower seat is seen as the most necessary piece of equipment, along with other items to help with personal care (feeding, bathing, and dressing). Being able to do such tasks without the assistance of others is an important aspect of independent living.
Similarly, the results from the focus groups revealed that, although most basic physical activities are not of concern to this population, many expressed difficulties with the issue of getting in and out of a bath.

“If I go away and there is only a bath I have half a bath, put some water in the bottom and use the shower extension to wash myself without sitting down. I can’t use a shower cubicle, because there is nothing to hold on to.”

“Sometimes I feel that I would love a bath, but I would need help. Even grab rails are not enough help.”

Other activities that seem to cause problems are those that involve fine motor movements of the fingers and that also require some physical strength, such as opening milk bottles, tablet blister packs, pulling out electric plugs, opening child-proof tops.

“I need a little bit of a plastic lip on milk bottles, those without are very difficult to open.”

“Childproof medicine bottles are really difficult, anything that you have to press down and twist. The chemist now gives us our prescriptions without childproof tops because we can’t open them.”

“My husband has problems, all the tablets he has, and he has quite a few tablets, and they all come in these blister packs that you have to push out and he can’t do it, they are too tough. Sometimes I have a job to do it. Some tablets are so tiny you can’t get them out they are almost stuck. If he was by himself he couldn’t get his tablets. I have to take them all out and put them in jars, then he’s alright he doesn’t need me to remind him to take them.”

“Fires which require strength to get it to ignite are a problem and even worse the ones that you have to hold it for a while after you ignite it. Anyone who has difficulty with their hands would have difficulties with pressing down. More thought needs going in to fire controls.”

“I can’t put mine on at home because as you say you’ve got to press and turn. So if there’s nobody else in I can’t put the fire on.”

“A lot of these press buttons are quite stiff; one I’m noticing that I’m having a problem with is the washing machine. These buttons take quite a hard push.”
Mental Activities

However, the BADL did identify certain tasks which have been reported as more problematic than others, in particular those which seem to have a cognitive component, such as concentrating on reading, using domestic appliances, doing two things at the same time, performing tasks when under pressure, continuing with the same task after a brief interruption and finding the way in an unfamiliar place. This is supported by other research which has found the cognitive aspects of ADLs to be impaired (Wolinsky & Johnson, 1991; Fitzgerald et al., 1993; McInnes & Rabbitt, 1998).

Table 1.2. Shows the mean self report scores and standard deviations on the cognitive aspects of the BADL for the 3 age groups (64-73, 74-83 and 84+) of participants. The minimum score for each question is 1 and the maximum score is 10.

<table>
<thead>
<tr>
<th>Daily Activity (maximum score=10)</th>
<th>Age</th>
<th>Mean</th>
<th>Std. D</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrating on reading</td>
<td>64-73</td>
<td>1.75</td>
<td>1.67</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>74-83</td>
<td>2.09</td>
<td>2.05</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>84+</td>
<td>2.13</td>
<td>2.23</td>
<td>77</td>
</tr>
<tr>
<td>Using domestic appliances</td>
<td>64-73</td>
<td>1.75</td>
<td>1.56</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>74-83</td>
<td>1.85</td>
<td>1.55</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>84+</td>
<td>2.32</td>
<td>2.65</td>
<td>77</td>
</tr>
<tr>
<td>Doing two things at the same time</td>
<td>64-73</td>
<td>2.67</td>
<td>2.29</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>74-83</td>
<td>1.85</td>
<td>2.08</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>84+</td>
<td>3.14</td>
<td>2.93</td>
<td>77</td>
</tr>
<tr>
<td>Performing tasks when under pressure</td>
<td>64-73</td>
<td>2.67</td>
<td>2.27</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>74-83</td>
<td>2.71</td>
<td>1.95</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>84+</td>
<td>2.84</td>
<td>2.51</td>
<td>77</td>
</tr>
<tr>
<td>Continuing a task after a brief interruption</td>
<td>64-73</td>
<td>1.74</td>
<td>1.60</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>74-83</td>
<td>1.96</td>
<td>1.86</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>84+</td>
<td>2.06</td>
<td>2.06</td>
<td>77</td>
</tr>
<tr>
<td>Finding way in unfamiliar place</td>
<td>64-73</td>
<td>2.35</td>
<td>1.64</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>74-83</td>
<td>2.72</td>
<td>2.05</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>84+</td>
<td>2.95</td>
<td>2.58</td>
<td>77</td>
</tr>
</tbody>
</table>
Medication Compliance

It is interesting that the participants on the BADL survey did not report any problems with taking medication, as research has shown that prospective memory is impaired in the older population (Salthouse et al., 2004; Steel et al., 2004; Mantyla, 1994). The results indicate that, although there are no significant differences between the three age groups, the older age group (84+) does report more problems with regards to difficulties remembering to take medication without supervision.

![Figure 1.2](image)

Figure 1.2. Depicts the mean scores and standard deviations for the daily activity of ‘taking medication without supervision’ as assessed by BADL for the 3 age groups (64-73, 74-83, 84+) of participants. Minimum score in 1 and maximum is 10.

However, research has also found that older participants are notoriously bad at recognising this within self report measures (Steel et al., 2004). In point of fact, subsequent follow-ups through focus group sessions revealed that remembering to take medication was indeed a problem.

“If you do think you have forgotten but not sure you think well how important is it, should I take another one?”

“Tablet counters are good but only go up to a week; days of the week on them are good too. Can’t imagine anything that would help me remember to take it. Could do with an alarm that says take your tablet now.”

It is clear that a simple, easy-to-use device which could remind individuals to take their medication would be a valuable assistive device.
Independence

Independence has been identified as a vitally important issue to the older population. Key aspects of this include an individual’s mobility which, in turn, can impact on their ability to use public transport and go shopping. Difficulties in any of these areas (e.g. not being able to get to the shops to buy food, or problems with carrying shopping), can result in dependency. These are important aspects as poor diet and nutrition is an issue that has been observed in this population, as well as social exclusion.

Shopping

The results from the BADL showed that there were no significant differences between the age groups in terms of difficulty with doing their shopping. However, the focus group sessions revealed two distinct aspects of difficulties with shopping. The first involved the loss of physical strength, with many older individuals reporting difficulties with carrying heavy shopping bags and manoeuvring them on to public transport. Secondly, reduced mobility was discussed as a problem, from the point of view of examining items or carrying shopping if a mobility device was required, particularly if this was a walking frame or a manual wheelchair. The loss of this activity was viewed as a major barrier in maintaining independence.

“I can’t carry shopping.”

“So how do you get round that?”

“I get a taxi.”

“Shopping’s not a problem my son will always ring when he’s coming and ask what I need. Or I go and get a taxi home. I’ve got to pay for it but I can mange that as I don’t do or go anywhere else.”

“My wife has a wheel chair that she uses for shopping and I’m usually the one pushing it and she finds that when she gets to the shops it is usually better if she gets out to see what’s around her rather than going where she doesn’t want to see, plus sometimes she is unable to see the things around her. They are always too high.”
Public Transport

One everyday task that was of concern was using transport, with those 84 years and over reporting significant problems in this area.

As this area could be described as having both physical and cognitive components it is difficult to ascertain the reason for the difficulties experienced though it seems more likely to be due to cognitive impairment, as this group have reported little in the way of physical disability. This is, however, an important aspect of everyday life, as an inability to use transport could result in social exclusion, inability to access health care professionals, and difficulty in obtaining food etc.

Household Tasks

Interestingly, no significant problems in undertaking household tasks were identified through the BADL. However, the focus groups sessions raised considerable concerns with regards to the problems which arise with maintaining a home and garden.

Issues that arose with regards to housework centred on the physical aspects of the tasks, with problems being reported ranging from vacuuming (due to the weight of the machines) and cleaning windows and floors, to apparently simple tasks, such as changing a duvet cover.

“You tell me where do you find home helps? I have such a job doing the housework; I have to do it in small spurts. Hoovering, doing windows, changing a duvet, washing the floors, I can’t do. I’ve told social services but nothing has been offered, I would gladly pay.”
“Hoovers are not light enough, I bought a small light one but they are not much good. I have a one you pull along but I gave it to my daughter as I just couldn’t get away with it. I have to brush my stairs. I could go into sheltered but I like where I am and my own house.”

“I have a man that comes and does the garden every couple of weeks, keeps it tidy and I can manage to pay for that as I don’t go gadding around.”

Other daily activities that cause problems included those that require climbing a ladder, such as changing a ceiling lamp bulb or batteries in a smoke alarm, or even just reaching for something on a high shelf.

“It would be good if you could get a smoke alarm that doesn’t need to be so high up. When you have to change the battery you don’t necessarily want to be climbing up.”

“Yes I can’t do it.”

“I can’t change the light bulbs, even if you can get up to it you need two hands above your head and you can’t do it, you can’t push and twist at the same time.”

2. Assessment of Assistive Tools and Devices

The second questionnaire, the Survey of Service Usage, was utilised to attempt to assess the types of tools etc that are currently in use by this older population, and what sorts of equipment is deemed desirable in the future. This questionnaire was developed by Reed, Cook and Watson (2002), who produced a report on ‘Older People’s Use of Services: a mixed methods study of the service use patterns and experiences of people over 75 years’. This study reviewed the use of services by older people and was commissioned by Newcastle and North Tyneside Health Authority as part of a move to review and plan services for older people in the area. The questionnaire ascertained which services and devices older community residents currently use, desire to use, and predict they will need in the future. In this investigation, the questionnaire was completed by 518 participants (119 Males, 399 females, mean age = 77.73, sd = 5.84, age range 64-99).

It is separated into 6 sections:

1. Use of health professionals and services

This section asks about the usage of these services over the last 12 months. Services include visits to your GP, outpatients, physiotherapist, chiropodist, day centre, transport via ambulance,
meals on wheels etc. The questionnaire asks how many times the service has been used and whether or not it is a desired service, and whether future need of the service is predicted.

2. Getting out and about in daily life
This sector focuses on the types of mobility devices currently in use that are available, such as walking stick, walking frame, crutches, wheelchair, electric chair, stair lift, joint splints and callipers.

3. Personal care
This section concentrates on specialised equipment that is used for personal care, e.g. shoe horn, sock aid, bath/shower seat, jar/bottle opener, bath hoist etc.

4. Medical devices
The questions in this section are concerned with the types of medical devices in use and covers dressings, syringes, hearing aids, spectacles, incontinence pads, surgical support and blood sugar test kits.

5. Your visitors
In this section the participant records any visitors they have received and the purpose of the visits.

6. Home adaptations
The focus of this section is on any adaptations that have been made around the house. This includes additional heating, concrete ramps, electrical devices, entry phones, grab rails, graduated floor, shower hoist, help alarms, low level bath, redesigned kitchen, relocated bath/shower/toilet, bath replaced with shower, stair-lift, security camera, and joinery work.

For each section the participant is asked to state whether or not they have and use the equipment or device, whether or not it was desired, and if they thought they may need it in the future. For the purposes of this investigation the sections on the use of healthcare professionals and visitors was not included.

Mobility

It is clear that the most commonly used item in terms of mobility is the walking stick and, though this is not a currently desired item, it is also the piece of equipment that is predicted to be required in the future. This may be due to the ease of use of a walking stick; it requires no training, is low cost and is easy to store. The second most popular device with regards to predicted future need is an electric buggy/chair. However, it is not currently used by many individuals, although it is the most desired item. This could be due to the higher purchase cost and/or ease of use of this particular piece of equipment.
Previous research into activities of daily living also found that, for those who reported difficulties with mobility, the most frequently used aid was a stick or cane (Steel et al., 2004).

Figure 2.1 shows the percentage of participants who currently use each type of mobility device (walking stick, walking frame, electric chair/buggy, wheelchair, crutches, joint splint/calliper) and the percentage that reported that they believe they will require a device in the future.

Overall, walking sticks were described in positive terms and seen as acceptable assistive tools. There was little mention of a lack of desire to use one due to them being seen as a disability device. They were described as being of great use for temporary use due to injury or illness. The range of choice for wooden sticks was particularly popular, as was the ability to personalise, rather than using the NHS aluminium ones that were seen as much less desirable. Walking sticks were also seen as easy to use, easy to store, and a valuable aid for the maintenance of independence.

“My husband has one of those sticks that folds up which is very useful as he doesn’t like using it to get on the bus so he can fold it up and put it in the shopping bag.”

“The reluctance of people to use the aluminium ones is probably because of the way they look, they look like crutches and they spell hospital straight away and a lot of people prefer to have a walking stick of their own choice and very often specially carved ones or covered in badges of places they’ve been, in other words they are personal statement.”

“There is always a reluctance to use any aid even walking sticks and what have you because it’s an acknowledge of the fact that you have reached a certain age when you need these things and you would just rather soldier on for as long as you can.”
Conversely, walking frames were described quite negatively in terms of the ease of use. They were described as difficult to manoeuvre when out and about, particularly for getting on and off a bus and, as they also required two hands, it is impossible to carry anything. They were also described as difficult and clumsy to manoeuvre in small areas around the house.

“I use a stick but I would never use a walking frame I would rather go in to a home.”

“I was behind this older lady the other day as I got on the bus and she had a walking frame. It looked like a good one as it was sort of triangle shaped and it collapsed but as she was trying to get on the bus she couldn’t because it was too wide to get between the open gap and the hand rail so she had to collapse it a little but she still couldn’t get on because she couldn’t hold it in this position and lift it at the same time. In the end I had to help her by lifting the frame on the bus and help her up. You see she didn’t have the physical strength to hold the frame in narrow enough and lift at the same time.”

Interestingly, in general, wheelchairs were viewed very negatively, even by members of this ageing population, with the exception of the electric buggy or chair. This device was seen as more desirable than a walking frame etc should an individual’s mobility be too poor for a walking stick to provide sufficient aid. It was felt that this type of aid allowed individuals to remain independent enough to get out and about. Without having to have both hands full, it made shopping possible.

“There are a lot more people out and about in wheelchairs and I know that a lot of people think, you shouldn’t be out here and I must admit I have had the same thought at times when they seem to be blocking the way.”

**Personal care**

Overall, a relatively high percentage of the sample currently used devices such as jar openers, shoe horns and bath/shower seats. The most popular item in use, and currently the most desired item, is the jar opener, with a high percentage of individuals also predicting that they will need one in the future. This handy aid is low cost and simple to use, as is the shoe horn, which was also one of the most popular items assessed by this survey. It is also interesting that, as mobility becomes impaired, a bath or shower seat is seen as the most necessary pieces of equipment, along with other items to help with personal care (feeding, bathing, and dressing). Being able to do such tasks without the assistance of others is an important aspect of independent living.
In contrast, the least used or desired item, the long handled comb, is also the utensil that people do not foresee they will ever need, despite it being an easy-to-use, low cost aid.

Figure 2.2. Shows the percentage of participants who currently use different types of personal care items (jar/bottle opener, shoe horn, bath/shower seat, raised toilet, sock/stocking aid, commode, bath hoist, long handled comb) and the percentage that reported that they believe they will require the device in the future.

“Bottle openers, shoe horns they are very useful. I have used a shoe horn since I was a little girl.”

“I don’t consider a shoe horn an assistive device I have always used one. They save you bending down.”

“They are just everyday useful items.”

“They are also not very expensive.”

Equipment such as bath/shower seats, bath hoists and raised toilets were seen as desirable when poor mobility prevented an individual from bathing safely. This daily activity was seen as one of the most important for independent living, and therefore devices that can facilitate this were highly desirable.

“The bath seat is excellent. I think that they are rather extravagant for the local authority to pay for because people who are disabled only want a bath about once or twice a week. They go up and down and are electric and they are very safe. I used mine once a week because I shower the rest of the time and it’s very good, it’s a seat that lowers because I can’t get out of the bath.”

“Electric bath hoists are only put in if paid for by social services.”

“They are expensive; my friend bought hers for about £3000.”
Medical devices and equipment

Not surprisingly for this section, the most commonly used medical apparatus is spectacles, though they are one of the least desired by people. For those that did not already have hearing aids, these were the most desired device, and predicted to be needed in the future. Also not surprisingly, desired use of many of these items was low, as one would imagine that, if they are needed, they will be used with little choice in the matter.

This was also evident from the discussions. The overall theme that emerged regarding these devices is that they are everyday devices that, if they are required, they are purchased, although some admitted that they put it off as long as possible, rather than admit the age was catching up with them.

“People wear glasses because they have to.”

Home adaptations

This section of the survey concentrated on those adaptations that are available to aid independent living. Falling is a particular problem for the older population and can result in injury and even admittance to institutional care. Of those surveyed for the English Longitudinal Study (Marmot et al., 2003), 32% of people over 60 years old had fallen in the previous two years, with 47.3% of those over 80 reporting falls, and 38.2% requiring medical treatment. It is not surprising that this is of concern to the older population, and this is evident in the types of adaptations that are used, with grab rails being the most popular.
They are also amongst the top three home adaptations that the respondents reported they would like to have.

Again, in terms of mobility impairments, the equipment that was singled out as being the one that would be needed most in the future was a stair lift, which was also a sought-after device. The focus group discussions revealed that, of the home adaptations available, not surprisingly, the ones that were considered the most desirable were those that enhanced an individual’s sense of independence and allowed them to remain living in their own home. These included grab rails, stair lifts or other devices that would aid with the stairs, and devices that facilitated safe bathing, such as a shower replacing the bath. Other aids, such as graduated floors and floor ramps, were not considered to be of any use to this particular cohort. This, however, could be due to the generally good mobility of the group, for whom the use of a wheelchair etc is unnecessary and they may, therefore, be unable to see the benefits of ramps etc. Unexpectedly, shower hoists are used by few of the participants, and are neither desired nor predicted to be of need in the future.

“I have a stair lift, which is broken at the moment and I’m having such trouble getting up and down the stairs, it was supplied by social services, I have a double banister and that is very handy as I can pull myself up whilst I’m waiting for my stair lift to be repaired.”

“In our bungalow there is a handle on the side of the bath, and on the other side and one on the wall so you couldn’t possibly fall, they’re ideal.”

“I find the handles on the bath difficult; I need two handles on the bath to get out, if I go away I’m frightened to have a bath in case I can’t get out.”

Figure 2.4. Shows the percentage of participants who currently use different types of home adaptations (grab rails, shower replacing bath, relocated bath/shower, stair lift, shower hoist, low level bath) and the percentage that reported that they believe they will require the device in the future.
“I have had my bath taken away and now have a walk in shower which is very good as I had trouble getting my legs over the side of the bath.”

Security is another important issue for this age group. Technologies and devices that are involved in the personal safety of an individual are deemed very useful, and indeed necessary, for maintaining independence and peace of mind. Of particular importance were personal help alarms that can be used to attract attention if a person is unwell or suffers a fall.

Help alarms are not only one of the most used systems, but they are also sought after and believed to be of future advantage. This is in keeping with the English Longitudinal Study, which found these to be one of the most used aids to help cope with everyday difficulties (Steel et al., 2004).

Figure 2.5. Shows the percentage of participants who currently use different types of security and/or safety home adaptations (help alarms, entry phones, and security cameras) and the percentage that reported that they believe they will require the device in the future.

“I have a pendent that I push the button if I need help. It’s great. It would be good if the help alarm pendants were water proof because I have to take it off to go in the bath or shower. It’s essential to take it in the bathroom because that’s where an accident is likely to happen but I usually forget it.”

“If I didn’t have a help alarm I think I would think about going into sheltered, yes.”

“I have one also that I wear round my neck, it’s very good. You have to pay for it though. But you can’t use them away from the house.”

“It’s about £6 something a week but its money well spent. They have my keys, and will come round if it goes off and I don’t respond. I know that they’re there if I need them.”
Summary of difficulties with everyday activities

The results from the activities of daily living questionnaire (BADL) showed that, although this cohort did not report any major difficulties with everyday activities across all age groups, the focus group discussions demonstrated that there are areas of everyday living that are cause for concern to some. Basic physical activities, such as washing, dressing, eating, walking and using the toilet do not appear to cause any particular problems, although the level of difficulty does increase with age, with those over 84 experiencing the most difficulties with personal hygiene, preparing food and general ability to take care of themselves. However, one aspect that is of concern to many across all ages is bathing safely, with many reporting difficulties in this area.

The BADL elicited problems with some of the everyday tasks, in particular, those that seem to have a cognitive component, such as concentrating on reading, using domestic appliances, doing two things at the same time, performing tasks when under pressure, and finding the way in an unfamiliar place. Several areas of cognitive performance are known to be affected by the ageing process. In particular, it is recognised that memory declines in later life (Stuart-Hamilton, 2000; Baddeley, 1995; Rabbitt, 1998). Similarly, there are also alterations in reading and linguistic skills (Light & Burke, 1988), though some of these declines could also be due to poorer vision and hearing in this population.

However, surprisingly, they did not report any problems with taking medication. Research has shown that prospective memory is impaired in the older population (Salthouse et al., 2004; Steel et al., 2004; Mantyla, 1994). In contrast, focus group discussions support research which suggests that, in general, older participants are notoriously bad at recognising this failure within self report measures (Steel et al., 2004), with many of the participants reporting difficulties in this area. This is further supported by other research which has found the cognitive aspects of ADLs to be impaired (Wolinsky & Johnson, 1991; Fitzgerald et al., 1993; McInnes & Rabbitt, 1998).

Other everyday tasks that were of concern to this population included using transport (with those 84 years and over reporting significant problems in this area), shopping, household tasks (in particular housework, and gardening), all of which are important aspects of life for independent living. These are all examples of causes of difficulties in everyday life that can end up being of major concern to older individuals.
Summary of the assistive devices in use

The results of the Service Use Survey suggest that the types and numbers of assistive devices in use by this ‘ageing well’ population are limited. Not only did this group report a good level of mobility, but this seems to be supported by the fact that the only mobility device generally used is a walking stick. Equipment that is deemed necessary for the future includes electric wheelchairs and stair lifts. Focus group discussions revealed that mobility is an important issue for the older population, as good mobility is seen as important for everyday activities and independence, and the most commonly used devices are associated with this. In fact, self-reported indicators of physical health tend to be related to the ability to carry out mobility tasks, such as carrying, bending and walking (McInnes & Rabbitt, 1998).

Other popular devices are those that have simple but functional purposes for everyday tasks, such as jar openers, shoe horns and bath and/or shower seats. Similarly, amongst those devices that are desired or believed to be required in the future, the emphasis is on those that can help to maintain independent living, such as additional heating, shower replacing the bath, relocated bath/shower, relocated toilet and low level bath. This also includes security equipment – for instance, help alarms were one of the most popular items in the home adaptations section, with entry phones and security cameras being considered necessary either for the present or future use.

Conclusion

The overall pattern of results is not surprising, as evidence suggests that health status and functional ability are linked in older people (Idler, 1993); previous research demonstrated that, of 1,007 participants assessed, 77.5% rated their health as excellent, with only 1.5% as poor, and that this was coupled with high levels of functional ability (McInnes & Rabbitt, 1998). Although self-rated measures of health were not assessed here, it seems clear that this cohort is relatively fit and well. Undoubtedly, these remaining volunteers are the elite of the panel since they are still able to visit the testing centre, yet many of them do have health problems typical of that age group (CVD, diabetes, and arthritis, hearing and visual deficits). By far the most common health problem is hypertension, with 30% of the sample population listing this as their main health problem. This is followed by cardiovascular disease (25%). Arthritis is also common, but often listed as a second disorder to the above two. Population statistics also reveal that 55% of people aged over 65 years consider their health to be at least ‘fairly good’ although, among the over 85 year olds, 75% of females and 66% of males report a long term illness or disability that restricts their daily life.
Any volunteer sample is going to show bias in favour of those who are still able to take part but, even among this elite sample, the range of health and disability reflects that seen in a more general population.

3. Barriers to Assistive Technology Usage

This third area aimed at determining why the uptake of assistive tools is low in some of the above highlighted types of difficulties that exist in everyday life for the older population.

It is clear that, although there are many types of assistive devices available, in particular technologies that could promote independent living, they do not appear to be reaching the intended audience. It is important to try to elicit the reasons for the lack of usage. One of the aims of the focus group sessions was to try to determine some of the grounds for the lack of use of many of the assistive devices that are available. The outcomes of the focus group discussions elicited four main reasons for this.

1. Need

Many of the devices were viewed as unnecessary for the participants at that time, and it was evident that they had great difficulty envisaging a time when this might change.

“Until you need something you can’t think if anything can you?”

“I would get home adaptations if and when I needed them.”

2. Where to find the appropriate tools?

Many of the smaller everyday items (tap turners, long handled scissors, kettle tippers etc) are considered useful items that would assist daily tasks, but are not in common use because information as to their existence and where to buy them is not readily available. Some problems with existing tools have also been reported. For instance, the handy grabbers are excellent for reaching up into kitchen cupboards on high shelves, but they are only really useful for picking up light round objects, such as cans.

“Small items like examples in the Boots catalogue such as non slip food preparation chopping boards, kettle tippers, one handed bread board, tap turners, free hand tray so you can carry a tray when using a walking stick people just don’t know these exist. I didn’t until you showed me this catalogue.”
“[I have people] ring me to ask how to get aids, disabled devices and I ring my daughter as she works for a disabled distribution company for the council. My sister needed a walk in shower but she didn’t know how to go on about it.”

“It depends on how good your physiotherapist or occupation therapist is when you’re coming out of hospital, but for those not in hospital they don’t know how to get them.”

“People don’t know what’s available and pay vast sums.”

“My auntie needed a hearing aid and got one from an ad in the paper, it cost her a fortune and it’s no use and I’d heard something on the radio, so I said to her go to your GP and mention this hospital and she did and they did her tests and she is going to be fitted up with one next month. But it was pure chance that I tuned into the radio at the right time.”

“Is finding information easy? No. No.”

“It’s difficult.”

“They are marketed in terms of disability instead of great items that are for everyday use.”

“The bulk of the stuff that you get in catalogues through your door are very gimmicky and stuff that is bordering on the useless.”

“There doesn’t seem to be a lot of information of tools from reliable sources. The only one I’ve ever encountered is the Arthritis Association; I think they have a catalogue with aids in.”

3. Finance

With the larger more complex devices (electric wheelchairs, stair lifts, bath hoist), usage is low mainly due to the cost of these items, and the fact that individuals are unaware whom to approach regarding their purchase and installation. They feel that many of the companies that advertise them are simply there to sell at inflated prices in order to make a profit, and they are also unaware what services or financial help may be available to them through the health and social services. A common complaint regarding the loan of devices from, for example, the Primary Health Care Trust, was that of long waiting times for equipment that was no longer needed by the time it was received. Again, there is also the issue of having the information on what is available to assist these activities of daily living that are so important to this ageing population.
4. Attitude

In addition to these problems, there is also the mentality that they must accept the inevitable and adapt to meet the circumstances. This was very clear with some of the comments that were made.

“You make do with what you’ve got, unless you are desperate, you just manage.”

“Us older people are more resourceful.”

“We feel that we are more self sufficient and independent.”

“Yes we don’t like to make a fuss.”

“Some of these tools on offer are designed as if you’re stupid.”

However, overall it is evident that the major barrier for assistive technology usage is lack of information on what is available and where to acquire it. Many of the activities of daily living that were raised in these sessions are vital to independent living and are of major concerns to this population. It is vitally important that, in order to support the independent living of the ‘ageing well’, that these issues are addressed. This would enable the designers of these devices to understand what types of difficulties exist in the older population, and design technologies accordingly.

Technology and Social Policy Recommendations

- One key recommendation is that any devices that are developed and marketed must take into consideration the desire of the older individual to remain independent. This introduces opportunities in several key areas, such as personal healthcare, medication compliance, personal and home safety, diet and nutrition, mobility and public transport. Assistive tools should be able to be introduced seamlessly into an individual’s life to overcome difficulties without drawing attention to any disability, special requirement, or requiring that the user be relocated to a more suitable environment.

- With the number of older population growing rapidly, providing technology that improves everyday living and wellbeing is of vital importance. Previous focus group discussions have shown that lack of appropriate design for this age group is of major significance. One of the frequently cited examples of this was with regard to mobile phones, with problems ranging from the screens being too small to read and buttons too small to press, to the complexity of menus. In order to accomplish this, it is necessary to engage this population in product design through, for
instance, focus groups and product testing, in order to understand not only the needs, but also the success of the devices in day-to-day use in real world applications. This is particularly important for equipment, such as stair lifts and bath hoists, as many individuals live in homes where the installation of these is not possible due to the structure of the house. As many individuals do not wish to leave their homes to live in purpose-built ones, the design of devices to manage these problems is of vital importance for the maintenance of independent living.

- In many cases the cost of desirable items to the individual was considered to be too high, or out of their price range. More information is required as to the availability of funding for items, such as stair lifts, bath hoists and additional heating.

- One obvious recommendation is for the provision of accurate information on the products and services that are available to this ageing population. It was a common feature of the group discussions that one of the major reasons for the lack of use of many tools is simply through a lack of knowledge of their existence.

- The technologies need to be marketed in such a way as to overcome the attitude of ‘getting by’. Devices must be seen as positive accessories to aid the individual rather than admissions of old age.
References


Reed J, Cook & Watson K. (2002) School of Health, Community and Education Studies, Northumbria University, UK.


ActiveAge is a collaborative research programme developed by BusinessLab that will result in knowledge and solutions that will help to enhance the capacity of organisations engaged with and servicing an ageing population.

Please visit www.activeage.org to learn more about the ActiveAge Programme.

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