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The use of assistive devices and change in use during the ageing process among very old Swedish people

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Abstract

Purpose: To investigate the characteristics and change in use among very old Swedish users and non-users of assistive devices (ADs) for mobility and personal care, over a six-year period, and to investigate factors predicting AD use over a six-year period.

Method: Descriptive statistics and logistic regression were used to analyse quantitative data from a subsample from the Swedish part of the ENABLE-AGE Survey Study, n=154. Variables according to socio-demographics, environment and health were utilised.

Results: The number of users increased over time, particularly those using both types of ADs (mobility and personal care). There were differences in health between users and non-users, while no such differences were seen regarding socio-demographics or environmental factors. Health factors most prominent predicted AD use after six years, but also variables within socio-demographics and the environment had an impact on the use; income for ADs for personal care and aspects in the outdoor environment for ADs for mobility.

Conclusions: As ADs increases over time, it is important, to pay attention to health as well as other factors, among users and non-users of ADs, to provide important information in planning for and supporting healthy and active ageing.

Introduction

Activity and participation in everyday life is important for health and well-being, and the ability to perform activities is crucial to an individual's feeling of independence [1]. Older people often experience decreased functional capacity and increased difficulty in performing activities of daily living (ADL). Assistive devices (ADs) are then used to compensate for functional limitations and to facilitate the performance of activities in everyday life. In Sweden, as in other countries, ADs for mobility and personal care are both common and frequently used by very old people [2, 3] to support and increase independence in everyday life.

The International Classification of Functioning, Disability and Health (ICF) [4] is a well-known framework for understanding and illustrating the complexity of factors influencing health and well-being. According to the ICF, personal functioning; body function and structure, activity and participation contribute to health and well-being. In addition, personal factors such as gender, race, age, social background, education and profession have an impact on personal functioning and health and well-being. Moreover, according to the ICF, environmental factors, such as the physical and the social environment, either hinder or support activity and participation [4]. For example, barriers in the physical environmental can hinder old people when trying to carry out everyday activities. Outdoor environment barriers include the risk of traffic accidents, and physical barriers such as high curbs, uneven pavements [5], poor street conditions and hills in the nearby environment [6]. Indoor barriers are often related to access to rooms and difficulties when carrying out activities in the bathroom, kitchen and bedroom [7]. Since the number of old and very old community living people, aged 80 and above will increase, it is important to study the elderly population and

the ageing process in relation to ADs, taking different factors in account that impact on the use. The ICF, elucidating the interaction between factors, can therefore play an important role and assist in the understanding of the complexity of the use and non-use of ADs [8-10].

The use of ADs has shown to be related to the user´s need, and personal and psychosocial characteristics [11]. Therefore it is important to study the variety of very old users living in different environments, in order to foster the planning of ADs supply and those providing AD. Research on ADs focuses, to a great extent, on the use of ADs according to individuals with specific diagnoses and the outcome of the use of ADs. From prior research, it is also known that the use of ADs increases with age [12-15] and that women use a higher number of ADs than men [16]. Moreover, ADs for mobility have shown to have a positive impact on daily life and a positive influence on the users' mobility, sense of independence, self-esteem and security [17-19]. Studies show that the use of ADs has a positive impact on activity and participation [2, 20]. Studies applying a longitudinal perspective often show an increased use in older age [2, 12]. However, different study designs, variation in sampling, differences in how the use of ADs is measured in relation to functional capacity or to ADL, and the kinds of or number of ADs used, make it difficult to compare and generalise results. Studies from the USA point out differences in the use of ADs due to ethnicity, education and income [16, 21, 22]. How such personal factors impact on ADs use in a European context is not well known.

In the Nordic countries, ADs are often supplied by national health-care systems and are usually allocated based on an assessment of an individual's needs [23]. In Sweden legislative changes are aiming to strengthen the user's involvement and self-management in relation to the supply of ADs. To strengthen an individual's self-management is in line with the

European Commission's Health Strategy for handling an ageing population in Europe [24], where the importance of empowerment in relation to health and health care and the importance of individual responsibility for health and well-being are emphasised. To meet the on-going change in the population structure, which will affect health-care costs, is a huge challenge for society. Still, not much is known regarding the disparities of AD use in the diverse ageing population, or if other factors, besides functional decline, are important for AD use in these countries. An increased understanding of the complexity of and interaction between different factors described in the ICF, that impact on the use of ADs, is useful for policymakers, health-care providers and for those developing ADs. To understand what kinds of ADs are used to assist independent living in old age, factors affecting use and non-use, and how the number of users changes over time, are important factors to consider when developing services with the potential to support and promote healthy and active ageing.

The overall aim of this study was to investigate the characteristics and change in use among very old Swedish users and non-users of ADs according to variables within three domains: socio-demographics, environment and health. The specific research questions were:

- How did the number of users and the use of different kinds of ADs, for mobility and for personal care, change over a six-year period?
- Were there differences, at baseline and after six years, between users and non-users of ADs for mobility and personal care, according to variables within the three domains?
- Which variables, within the three domains, predicted the use of ADs six years later among non-users at baseline?

Method

The study design was longitudinal and was carried out over a six-year period, focusing on the use and change in use of ADs in a sample of very old people. It should be noted that emphasis was placed on describing the baseline and follow-up samples cross-sectionally by users and non-users of two categories of ADs: mobility and personal care. The data used were derived from the ENABLE-AGE Survey Study [25], involving very old people in five European countries. The baseline sample comprised, in total, 1,918 very old people. From this total, 397 lived in Sweden and were drawn at random from the population register, stratified for age and sex (75% women). All participants were, at baseline, single-living people, aged 80–89 years, residing in ordinary housing (i.e. not sheltered/special or assisted housing) in three municipalities in the southern part of Sweden.

Description of the sample

The participants of the current study constitute a subsample of the Swedish part of the ENABLE-AGE Survey Study, i.e. those participating both at baseline and at the six-year follow-up, n = 154 (for a detailed description of the sample, see Table I). Reasons for dropout at follow-up were: death (n = 96), poor health or too demanding to participate in an interview (n = 96). Other reasons were: lack of consent to participate in future studies and no contact established (n = 51).

Insert Table I about here

Instruments

For the ENABLE-AGE Survey Study, a comprehensive questionnaire was used; comprising well-established instruments as well as study-specific questions [26] assessed and observed by trained interviewers. For the current study, a subset of the ENABLE-AGE Survey Study

data collected by means of this questionnaire were utilised according to three domains: socio-demographics, environment and health.

Socio-demographics

Baseline data on age, sex, marital status, education, profession and income were used. Marital status was dichotomised into "married, divorced, widowed" and "never married". Educational level was dichotomised into "basic (elementary school/secondary school)" and "high (gymnasium/high school/collage/university)". Professions were coded according to a national socio-economic classification system [27] and categorised into three groups: "manual workers/self-employed", "non-manual workers", "housewives or male equivalents".

Environment

Type of living area and dwelling was categorised based on study-specific questions. The type of living area was dichotomised into "highly urban" and "semi-urban/rural" and the type of dwelling was dichotomised into "multi-dwelling block" and "one/two family houses/other". The Housing Enabler [28] was used to assess the number of environmental barriers present at the entrance as well as, indoor and nearby outdoor environment and described each participant's home and nearby environment.

For an assessment of the use of ADs, a study-specific part of the questionnaire contained questions regarding different ADs that the participants used [29]. The data were dichotomised into "use of one or more ADs" and "non-use of ADs". This study was delimited to two major types of ADs: those used for mobility and those used for personal care. ADs for mobility included walking frames, walking sticks, crutches, wheeled walking frames, wheelchair (manual or powered) and tricycles. ADs for personal care included devices for going to the toilet, dressing, showering and bathing.

Health

Data on objective as well as subjective health was used. For functional limitations, the personal component of the Housing Enabler [28], covering 13 functional limitations assessed and observed, was used. A symptom list [30] covering 30 self-rated symptoms was used and for cognition four questions from the Mini-Mental State Examination (MMSE) [31], which are considered to be sensitive to the indication of cognitive dysfunction [32], were used. Physical mobility and health were self-evaluated on a scale from 1 "excellent" to 5 "poor" [33].

To measure the level of difficulty regarding independent ADL, a study-specific extension [34] of the ADL Staircase [35] was used. First, based on an interview and observation, five personal activities of daily living (P-ADLs: bathing, dressing, going to the toilet, transfer and feeding) and four instrumental activities of daily living (I-ADLs: cleaning, shopping, transportation and cooking) were assessed as: performed independently, partly dependently or dependently. Next, the participants who reported independence in any ADL were asked if these activity/activities were performed with difficulty. The variables used here are constructed as the number of activities performed without difficulty.

Data analyses

The use of ADs for mobility and for personal care was described at baseline and at follow-up. Change in use was described for each type of AD. Sample characteristics according to variables within the three domains: socio-demographics, environment and health, were described for users and non-users at baseline as well as at follow-up. Differences between users and non-users were tested with the chi-square test for categorical variables and with the

Mann–Whitney U test for continuous variables, at baseline and follow-up. Bonferroni correction was also applied.

Finally, in order to predict the new use of ADs at follow-up, baseline data for non-users of ADs were used in logistic regression analyses [36]. The first step in studying predictors for becoming a new user was to analyse non-users (n = 97 for mobility and n = 99 for personal care) at baseline, for each variable separately, checking for linearity in the log odds for non-categorical variables; when it was judged to be necessary, a recoding was performed. For the logistic regression analyses, perceived health and physical mobility were recoded: 1 = excellent, 2 = very good and 3–5 = good to poor. Number of Functional limitations was dichotomised into less than two and two or more. Number of symptoms was dichotomised into less than six and six or more. And finally, indication of cognitive dysfunction was dichotomised into full score and at least one incorrect answer. The next step was to include all variables within each of the three domains in a regression model. Non-significant variables were removed in a backward stepwise procedure, based on likelihood ratio tests with probability to enter and remove 0.05 and 0.10, respectively. Finally, all variables from all three domains were included in one model and analysed in the backward stepwise manner. The variances in both the full and the reduced models were assessed using the Nagelkerke quantity. P-values < 0.05 were chosen to indicate statistical significance.

Ethical considerations

Written informed consent was obtained before each interview, following national ethical guidelines. All data were confidentially treated. The ENABLE-AGE Survey Study was approved by the local Ethics Committee (Lund University LU 324, 2002).

Results

Change in use

When studying ADs for mobility and personal care respectively, the longitudinal change regarding use shows that one third of the sample were users at baseline while two thirds were non-users. At follow-up the situation was the opposite, i.e. the number of users increased to include two thirds of the sample. Users of both types of ADs at baseline, n = 37, increased to n = 80 at follow-up. Of those using ADs for mobility only at follow-up, n = 20, 10 were non-users of any kind of ADs at baseline. For users of ADs for personal care at follow-up, n = 16, 12 did not use any kind of ADs at baseline (Table II). There were also a few users that became non-users during the study period.

Insert Table II about here

Differences in the characteristics between users and non-users

There were no significant differences between users and non-users of ADs for mobility or for personal care due to socio-demographics or environment variables, either at baseline or at follow-up (Table III).

Insert Table III about here

Users of ADs for mobility as well as users for personal care had significantly more functional limitations than non-users had, at baseline as well as at follow-up. Physical mobility and health were rated significantly lower for mobility device users, both at baseline and follow-up. For personal care devices, users rated physical mobility lower than non-users did at baseline. There were no significant differences between users and non-users according to P-ADL. The users of mobility devices performed fewer I-ADL activities independent and without difficulty at baseline as well as at follow-up, i. e. in the I-ADL activities performed

independently, the users experienced more difficulties than non-users did. Moreover, users of ADs for personal care performed fewer activities independent and without difficulty in I-ADL at follow-up (Table IV).

Insert Table IV about here

Predictors for the use of AD

Initially analysing non-users of mobility devices at baseline, for each variable, showed that one environmental variable (number of outdoor barriers) and two health variables (functional limitations and physical mobility) turned out to be statistically significant predictors for becoming a new user of ADs for mobility six years later (not shown). When all variables from the socio-demographics domain were included in a regression model (Table V), the Nagelkerke quantity explained approximately 7% of the variance, and none of the variables remained statistically significant. By entering all variables from the environment domain into a model, nearly 10% of the variance was explained using the Nagelkerke quantity; number of outdoor barriers remained the only significant predictor; and Nagelkerke was reduced to approximately 7%. When all variables from the health domain were included in a regression model, Nagelkerke quantity was almost 27%; only physical mobility was statistically significant and reduced Nagelkerke to approximately 21%. Finally, when all variables within the three domains were included simultaneously in a combined model, the Nagelkerke quantity was approximately 35%; number of outdoor barriers, cognition and physical mobility remained in the model at the last step; and Nagelkerke was reduced to approximately 24%. Non-users reporting poor-to-good or very good physical mobility at baseline increased the odds of becoming a user of ADs for mobility six years later compared with those that reported having excellent physical mobility (Table V).

When analysing each baseline variable for non-users of ADs for personal care; income, functional limitations and physical mobility turned out to be significant predictors for using ADs for personal care (not shown). When all variables within each of the three domains were included in regression models, the explanatory levels obtained for the socio-demographic, environmental and health domain were Nagelkerke 0.09, 0.018 and 0.173, respectively. One health variable; Independence in ADL remained the only significant predictor; and Nagelkerke was reduced to 0.079. Entering all variables from the three domains together in a combined model, the Nagelkerke quantity explained almost 32% of the variance. In the last step, disposable income and independence in P-ADL without difficulty remained in the model as significant predictors for the use of ADs for personal care, i.e. low income and more difficulties in P-ADL at baseline increased the odds of becoming a user of ADs for personal care after six years (Table V).

Insert Table V about here

Discussion

In this study, differences in the characteristics among users and non-users of ADs, change over time, and factors influencing the use of ADs were in focus. Health aspects, in terms of functional decline, are well-known factors which affect the use of ADs [22, 37, 38], while to gain a more complete understanding of the complexity, for this study it was important to study additional factors.

The fact that variables within the health domain showed significant differences between users and non-users at baseline and at follow-up is in line with previous studies. For example, according to a previous study [22], physical disability was the strongest predictor for AD use.

A noteworthy result of the current study is that the self-assessed health variable on physical mobility turned out to significantly predict the use of ADs for mobility. This question, allowing people to evaluate their own physical mobility, could easily be used by professionals or those responsible for health-care planning, complementing other health assessments, in order to plan for changes in the need for ADs. Not only did the number of users of ADs increase over time, but also those using more than one kind of AD in order to manage their everyday life. The fact that the numbers of users of both ADs for mobility and for personal care were doubled during the study period indicates that the use of ADs becomes more complex over time. This is important information for health-care planning, and the huge challenges related to the marked changes in the population structure, which will affect health-care costs during the coming decades.

A finding in addition to the existing knowledge in this field is that, in a longitudinal perspective, the number of outdoor barriers close to the home turned out to be a significant factor, leading to the individual becoming a user of a mobility AD. This is not surprising, however notable and hitherto not studied. This facet of the results could be seen as a reminder of how the physical environment impacts on older people's ability to maintain active and participate in everyday life. As recently reported the fear of going outdoors is common in older age and can lead to the avoidance of outdoor activities [6]. However, such reactions are presumably not only a question of personal functioning and environmental barriers, but phenomena based on the complex transaction between the person, the environment, including ADs, and their preferred activities. This is also in line with the ICF framework, where hindering or supporting aspects of the environment are considered to impact on activity and participation, and thereby overall health. To perform and participate in activities in everyday life is a complex transaction involving the personal functioning as well as environmental and

personal factors. Considering the proportion of mobility device users in society as a whole, according to current Swedish statistics, nearly 60% of people aged 85 and above use wheeled walkers. The facet of our results showing a high proportion of AD users, enhance the importance of adopting a proactive way of handling environmental issues to support activity and participation in everyday life for the ageing population. Engaging in various social and productive activities is related to higher levels of well-being, reduced physical decline and lower mortality for old people [39]. Consequently, keeping track of and removing environmental barriers, such as high curbs, uneven pavements or absence of benches, is important in relation to prevention and planning to facilitate for old people and users of ADs to perform ADL as well as activities related to personal interests and social contexts outside of the home.

In the cross-sectional part of the current study, no differences between users and non-users were found according to socio-demographic factors. In a longitudinal perspective, however, it is notable that low income significantly predicted use of ADs for personal care. Since variables we studied presumably covariate i.e. health and socio-demographic, there is an obvious need for further studies. Still, at a time when important changes are going on in relation to the supply of ADs in many countries, the results we present are important. When aiming so strongly for increased self-management, it is important to make sure that the intention of empowerment of older people does not turn into the opposite. That is, there might be a risk that individuals cannot afford to get themselves the ADs they need, and not be able to maintain their activity level and participate freely in everyday life. Cost is a common reason for not using ADs [40]. How the provision and financing of ADs will change in the coming years should be of interest to policymakers as well as to suppliers of ADs, in order to support healthy and active ageing without excluding groups of people who do not have

enough knowledge, information or financial resources to obtain the ADs necessary to perform everyday activities. Studies from the USA, which has a totally different system for AD supply than the Nordic countries, show that the use of ADs differs according to level of education, income and ethnic background. White people with higher income and education levels, compared with people from other ethnic backgrounds, lower income and education [41], more often use ADs associated with home modifications and that black people use more simple ADs (walking sticks, crutches, walking frames) than white people do [21]. Further knowledge on how socio-demographic factors affect the use of ADs among European people will then be crucial in order to support healthy and active ageing for all people, despite differences in background and living circumstances.

In this study, a first attempt was made to investigate not only aspects of health, but also other types of variables in how they affect the use of ADs in very old age. As expected, the results indicate that health variables are not the only variables which affect AD use, but more studies are needed. To deepen our understanding, in-depth studies are needed where the impact of cultural and social factors on older people's views and feelings about the use of ADs are the focus.

Not many studies focus on the very old, especially not from a longitudinal perspective. The detailed data available in the ENABLE-AGE Survey Study database made it possible to study characteristics according to the use and non-use of ADs, and to apply a longitudinal perspective by using data from baseline to predict the use of ADs at follow-up. Since the demographic characteristic of the sample studied are well in line with available statistics on this age group in Sweden, we argue that the results are reasonably representative for very old

community-living people. However, in accordance with the samples responding to national censuses, it should be kept in mind that frail older people living in sheltered/special and assisted living facilities were not included. In particular, this means that our results cannot be generalised to groups of very old people with cognitive degenerative disorders (dementia) and severe ADL dependence.

The focus of the current study was on two kinds of ADs: mobility and personal care. In the study-specific instrument used to collect the data, the participants were asked about their use and need for ADs. In this respect, the data used was unusually rich and detailed. To get an overall picture, the data regarding different kinds of ADs were dichotomised into "use/non-use of one or more ADs", resulting in some loss of detail. For this study, this means that a user could use only one or all kinds of ADs: only indoor, only outdoor or both, and it is important to bear this in mind when interpreting the results presented. The purpose to dichotomise data was to gain an overall understanding of users and non-users of two different kinds of ADs according to variables within the three domains. However, taking more details, according to level of use, into account, as well as those not being users of any kind of ADs, will certainly be of interest in future studies.

By using a study-specific extension of the ADL Staircase [34], information on independence without difficulty, as well as with difficulty in ADL was captured, resulting in a more detailed picture of ADL performance than is usually provided. Still, differences between users and non-users of ADs regarding more social or leisure activities, such as visiting friends, participating in club activities or going to the cinema or theatre, remain to be investigated. Likewise, environmental outdoor barriers provide information on the immediate

surroundings of the participants', e.g. pathways, heights and surfaces, distances to car parking areas, zones for getting in or out of vehicles and the absence of benches. This is important information, not often reported in studies on the use of mobility devices, but it is vital if we are to increase our understanding of how environmental barriers can impact on activities and participation among older people.

The results of this study are based on data collected during the ENABLE-AGE Survey Study a number of years ago, i.e. during the period 2002–2008. It is important to bear in mind that there are changes going on in the supply for ADs in Sweden, as in other European countries, and the results might not remain as they currently are in Sweden. Most importantly, in recent years fewer ADs are being granted free of charge, and people now have to buy or rent the ADs. This could pose a risk that increases the differences between users and non-users of ADs of different socio-economic groups. In order to provide health-care services supporting healthy and active ageing on equal terms, further studies will be needed to observe the differences between users and non-users of ADs, taking such factors into account. In conclusion, this study shows that AD use increases over time, in particular for those using both types of AD. The study also shows that a quite simple question regarding very old people's perception of their own physical mobility was significant regarding the prediction of mobility device use. This single health question could contribute and be useful as a complement when monitoring very old people's health and need for mobility devices, ultimately providing health care planners and suppliers of AD with a simple tool to support healthy and active ageing.

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Table I. Sample characteristics at baseline and follow-up (n=154).

Domain variable	Baseline	Follow-up
Socio-demographics		
Age group, n (%)		
80-84 years	85 (55)	
85-89 years	69 (45)	
Sex, n (%)		
Men	36 (23)	
Women	118 (77)	
Marital status, n (%)		
Single living (married, widowed or divorced)	136 (88)	
Never married	18 (12)	
Educational level[1], n (%)		
Basic	125 (82)	
High	27 (18)	
Socio-economic classification, n (%)		
Manual workers/self-employed	63 (41)	
Non manual workers	68 (44)	
Housewives (or male equivalents)	23 (15)	
Disposable income in 100 €, Md (q1-q3)	9 (8 - 12)	

Environment				
Type of living area, n (%)				
Highly urban	129	(84)	128	(83)
Semi-urban/Rural	25	(16)	26	(17)
Type of dwelling, n (%)				
Multi-dwelling block	131	(85)	134	(87)
One family/two family house/other	23	(15)	20	(13)
Number of barriers[2], Md (q1-q3)				
Entrance	12	(8 - 16)	15	(11 - 18)
Indoor	37	(34 - 43)	42	(39 - 46)
Outdoor	12	(10 - 15)	14	(13 - 17)
ADs for mobility[3], users of:				
Walking sticks, crutches, n (%)	48	(31)	70	(46)
Wheeled walking frame, n (%)	27	(18)	75	(49)
Other, n (%)	5	(3)	6	(4)
ADs for personal care[4], users of:				
Toilet, n (%)	33	(21)	61	(40)
Bath, shower, n (%)	40	(26)	87	(56)
Dressing, n (%)	6	(4)	8	(5)
Health				
Functional limitations[5], Md (q1-q3)	2	(1 - 4)	2	(1 - 3)

Symptom[6], Md (q1-q3)	6 (4 - 9)	8 (6 - 12)
Cognitive dysfunction[7], Md (q1-q3)	4 (3 - 4)	3 (2 - 4)
Physical mobility[8], Md (q1-q3)	3 (2 - 4)	3 (3 - 4)
Perceived health[9], Md (q1-q3)	3 (2 - 3)	3 (2 - 4)
Independence in ADL[10], Md (q1-q3)		
P-ADL	5 (3 - 5)	5 (4 - 5)
I-ADL	3 (2 - 4)	2 (1 - 3)

Due to internal missing n varies between 143-154.

1. Basic = Elementary school/Secondary school, High= Gymnasium/high school/ Collage/University.
2. According to the Housing Enabler (28). Higher score indicate more barriers, range 0-49 (entrance), 0-100 (indoor) and 0-33 (outdoor).
3. More than one kind of ADs for mobility could be in use per person. Other refers to walking frame, wheelchair (manual or powered) and tricycle.
4. More than one kind of ADs for personal care could be in use per person.
5. Number of functional limitations (28) assessed or observed, range 1-13. Two questions regarding dependence of mobility device were excluded.
6. Number of symptoms (30) assessed, range 1-30.
7. Assessed by four questions as an indication of cognitive dysfunction (32).
8. Perceived physical mobility on a scale from 1”excellent” to 5”poor” (33).
9. Perceived health on a scale from 1”excellent” to 5”poor” (33).

10. Number of ADL performed without difficulty (34); PADL activities range 0-5 and IADL activities range 0-4.

Table II. Use and change in the use of ADs for mobility and personal care, from baseline to follow-up, (n=154).

	The use of ADs at follow-up				
	Non-use	Mobility, only	Personal care, only	Mobility and personal care	Total
The use of ADs at baseline					
Non-use	33	10	12	24	79
Mobility, only	1	8	0	11	20
Personal care, only	3	1	3	11	18
Mobility and personal care	1	1	1	34	37
Total	38	20	16	80	154

Table III. Description of users and non-users of ADs for mobility and for personal care, socio-demographic and environmental variables, at baseline, (n=154).

Domain	Baseline ADs for mobility		Baseline ADs for personal care	
variable	Users, n=57	Non-users, n=97	Users, n=55	Non-users, n=99
Socio-demographics				
Age group, n (%)				
80-84 year	26 (46)	59 (61)	30 (54)	55 (55)
85-89 year	31 (54)	38 (39)	25 (46)	44 (45)
Sex, n (%)				
Men	9 (16)	27 (28)	7 (13)	29 (29)
Women	48 (84)	70 (72)	48 (87)	70 (71)
Marital status, n (%)				
Single living (married, widowed or divorced)	48 (84)	88 (91)	45 (82)	91 (92)
Never married	9 (16)	9 (9)	10 (18)	8 (8)
Educational level[1], n (%)				
Basic	48 (84)	77 (81)	46 (85)	79 (81)
High	9 (16)	18 (19)	8 (15)	19 (19)
Socio-economic classification, n (%)				

Manual workers/self-employed	23	(40)	40	(41)	22	(40)	41	(42)
Non manual workers	27	(48)	41	(42)	26	(47)	42	(42)
Housewives (or male equivalents)	7	(12)	16	(17)	7	(13)	16	(16)
Disposable income in 100 €, Md (q1-q3)	9	(8 - 10)	9	(8 - 12)	9	(8 - 11)	9	(8 - 12)
Environment								
Type of living area, n (%)								
Highly urban	48	(84)	81	(83)	46	(84)	83	(84)
Semi-urban/Rural	9	(16)	16	(17)	9	(16)	16	(16)
Type of dwelling, n (%)								
Multi-dwelling block	50	(88)	81	(83)	49	(89)	82	(83)
One family/two family house/other	7	(12)	16	(17)	6	(11)	17	(17)
Number of barriers[2], Md (q1-q3)								
Entrance	12	(8 - 16)	12	(8 - 15)	11	(8 - 15)	12	(9 - 17)
Indoor	36	(32 - 42)	38	(34 - 43)	36	(32 - 40)	38	(34 - 44)
Outdoor	12	(10 - 15)	12	(10 - 15)	12	(10 - 15)	12	(10 - 15)

Due to internal missing sample size varies between 143-154.

1. Basic = Elementary school/Secondary school, High= Gymnasium/high school/ Collage/University.
2. According to the Housing Enabler (28), higher score indicate more barriers, range 0-49 (entrance), 0-100 (indoor) and 0-33 (outdoor).

Table IV. Description of users and non-users of ADs for mobility and for personal care, health variables, at baseline and follow-up, (n=154).

	ADs for mobility				ADs for personal care			
	Baseline		Follow-up		Baseline		Follow-up	
	Users, n= 57	Non-users, n=97	Users, n=100	Non-users, n=54	Users, n= 55	Non-users, n=99	Users, n=96	Non-users, n=58
Health variables, Md (q1-q3)								
Functional limitations[1]	4 (3 - 5)	2 (1 - 2)*	3 (2 - 4)	1 (1 - 2)*	3 (2 - 5)	2 (1 - 3)*	3 (2 - 4)	1 (1 - 2)*
Symtoms[2]	7 (5 - 13)	5 (3 - 8)*	9 (7 - 13)	7 (4 - 10)*	6 (5 - 11)	6 (3 - 9)	9 (7 - 13)	8 (4 - 11)
Cognition[3]	4 (3 - 4)	4 (3 - 4)	3 (2 - 3)	3 (3 - 4)	4 (3 - 4)	4 (3 - 4)	3 (2 - 4)	3 (2 - 4)
Physical mobility[4]	4 (3 - 4)	3 (2 - 3)*	3 (3 - 4)	3 (2 - 4)*	3 (3 - 4)	3 (2 - 3)*	3 (3 - 4)	3 (2 - 4)*
Perceived health[5]	3 (2 - 4)	3 (2 - 3)*	3 (3 - 4)	3 (2 - 3)*	3 (2 - 4)	3 (2 - 3)	3 (3 - 4)	3 (2 - 4)
Independence in ADL[6]								
P-ADL	5 (2 - 5)	5 (4 - 5)	5 (4 - 5)	5 (5 - 5)	5 (3 - 5)	5 (4 - 5)	5 (4 - 5)	5 (5 - 5)
I-ADL	2 (1 - 3)	3 (2 - 4)*	1 (0 - 3)	3 (2 - 4)*	2 (1 - 3)	3 (2 - 4)	2 (0 - 3)	3 (2 - 4)*

Due to internal missing sample size vary between 143-154.

Table V. Predictors for use of ADs at follow-up, for mobility and for personal care.

Model	ADS for mobility, n=97				ADs for personal care, n=99			
			95% C.I. for EXP(B)				95% C.I. for EXP(B)	
Explanatory variables	Exp(B)	Sign	(Lower – Upper)	Nagelkerke	Exp(B)	Sign	(Lower – Upper)	Nagelkerke
Socio-demographics				0.040				0.060
High educational level[1]	0.395	0.110	(0.126 - 1.232)		-	-	-	
Disposable income €	-	-	-		0.912	0.058	(0.830 - 1.003)	
Environment				0.072				0.000
Number of barriers[2]								
Entrance	-	-	-		0.977	0.527	(0.908 - 1.051)	
Outdoor	1.138	0.025	(1.016 - 1.275)		-	-	-	
Health				0.207				0.079
Cognition[3]	0.413	0.088	(0.149 - 1.140)		-	-	-	

Physical mobility[4]		0.007			-	-	-
Excellent	1.0	-					
Very good	4.499	0.083	(0.820 - 24.689)				
Poor-to-good	10.974	0.004	(2.198 - 54.797)				
Independence in ADL[5]	-	-	-				
I-ADL					0.616	0.020	(0.409 - 0.928)
Combined model				0.242			0.131
Number of barriers[2]					-	-	-
Outdoor	1.138	0,061	(0.944 - 1.302)				
Cognition[3]	0.387	0.084	(0.132 - 1.135)		-	-	-
Physical mobility[4]		0.037			-	-	-
Excellent	1.0						
Very good	3.300	0.177	(0.584 - 18.652)				
Poor-to-good	7.299	0.018	(1.403 - 37.967)				
Disposable income €	-	-	-		0.894	0.037	(0.805 - 0.933)

Independence in ADL[5]	-	-	-		
P-ADL				0.651	0.032 (0.439 - 0.964)

Notes: Four logistic regression models, representing three domains; socio-demographics, environment, health and finally a combined model, for predicting use at follow-up according to ADs for mobility and personal care respectively. Variance explained is assessed by the Nagelkerke quantity. Sample, each model is based on non-users of ADs at baseline.

1. Basic = Elementary school/Secondary school, High= Gymnasium/high school/ Collage/University
2. According to the Housing Enabler (28). Higher score indicate more barriers, range 0-49 (entrance), 0-100 (indoor) and 0-33 (outdoor)
3. Assessed by four questions as an indication of cognitive dysfunction (32). Dichotomised into, full score or at least one incorrect answer.
4. Perceived physical mobility on a scale from 1"excellent" to 5"poor" (33), recoded into three groups.
5. Number of ADL activities performed without difficulty (34) out of five PADL activities and four IADL activities.

1. Number of functional limitations (28) assessed or observed, range 1-13. Two questions regarding dependence of mobility device were excluded.
2. Number of symptoms assessed, range 1-30 (30).
3. Assessed by four questions as an indication of cognitive dysfunction (32).
4. Perceived physical mobility on a scale from 1”excellent” to 5”poor” (33).
5. Perceived health on a scale from 1”excellent” to 5”poor” (33).
6. Number of ADL activities performed without difficulty (34); PADL range 0-5 and IADL range 0-4 .

*Significant levels: $p \leq 0.005$, after Bonferroni correction.