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How to assess frailty and the need for care? Report from the Study of Health and Drugs in the Elderly in community dwellings in Sweden (SHADES)

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Abstract

Knowledge about the need for care of elderly individuals in community dwellings and the factors affecting their needs and support is limited. The aim of this study was to characterize the frailty of a population of elderly individuals living in community dwellings in Sweden in relation to co-morbidity, use of drugs, and risk of severe conditions such as malnutrition, pressure ulcers, and falls. In 2008, 315 elderly individuals living in community dwellings were interviewed and examined as part of the SHADES-study. The elderly demonstrated co-morbidity (a mean of three diseases) and polypharmacy (an average of seven drugs). More than half the sample was at risk for malnutrition, one third was at risk for developing pressure ulcers, and nearly all (93%) had an increased risk of falling and a great majority had cognitive problems. Age, pulse pressure, body mass index, and specific items from the modified Norton scale (MNS), the Downton fall risk index (DFRI), and the mini nutritional assessment (MNA-SF) were related to different outcomes, defining the need for care and frailty. Based on the results of this study, we suggest a single set of items useful for understanding the need for care and to improve individual based care in community dwellings.

Keywords: frailty, community dwellings, risk-assessments, cognitive function

1. Introduction

The demographic trend in Western societies will lead to an increased need for the care of elderly individuals in community dwellings. Yet, little is known about the institutionalized elderly population. Risk factors and protective factors of institutionalization have been studied previously, but research confined to elderly individuals already staying at community dwellings in Sweden is limited.

Common risk factors and reasons for institutionalization among elderly individuals are old age; cognitive, functional, or activities in daily life (ADL) problems; high chronic illness burden; and sociodemographic factors such as marital status, fewer living children, income, smaller household size, and social network factors (Greene and Ondrich, 1990; Finlayson, 2002; Hays, 2002; Hays et al., 2003; Chen and Wilmoth, 2004; Van Houtven and Norton, 2004; Gaugler et al., 2005; De Girolami et al., 2007; Ernsth Bravell et al., 2009). Recent studies also indicated that, compared with previous decades, elderly people who enter nursing homes and

community dwellings require greater care (National Board of Health and Welfare, 2005; De Girolami et al., 2007).

Sweden has one of the oldest populations in the world. One of the major criticisms of the elderly care system is that there is a shortage of beds in community dwellings. Statistics demonstrate the number of institutionalized individuals has declined from around 112 600 in the year 2000 to 94 800 in the year 2007; even though Sweden has the highest older population, there are relatively few institutional beds. Therefore, it could be assumed that elderly individuals living in community dwellings are frail and in great need of care and service; yet, the factors that determine the need for care and services need to be established. Co-morbidity and frailty are terms frequently discussed in research, but there is no consensus on how those conditions should be measured. Rockwood et al. (2007) made an attempt to measure and grade frailty in a sample of nursing home patients using the Cardiovascular Health Survey definition (Frail-CHS). They concluded frailty is a robust concept and independent of definition and it is related to increased risk of mortality, disability, and cognitive decline, similar to the results of Gallucci et al. (2009) and Klein et al. (2005).

Co-morbidity is another common covariate when studying outcomes such as mortality, functional status, and use of care in the elderly population, but as in frailty there is no absolute way to measure it. There have been suggestions for defining indexes of diseases, for example with the Charlson co-morbidity index (CCI) (Charlson et al., 1987), or to classify them into three groups: 1) very life-threatening; 2) somewhat life-threatening; or 3) non life-threatening diseases, a classification originally proposed by Gold et al. (2002). Counts or categorizations of diseases have demonstrated weak relations to disability in samples of the very old (Ernsth Bravell, 2007). Due to problems in counting and classifying diseases, frailty has become a more popular term when studying the elderly's need for care and mortality. Since there is no gold standard for how to measure frailty, it is up to the researcher to define the term. However, leading experts in the field agree frailty is more than just the appearance of diseases, but also includes terms such as exhaustion, psychical activities, weakness, and others to describe combinations of aging, diseases, and other factors that make some individuals vulnerable (Rockwood et al., 1999).

The aim of this study was to characterize the relatively unknown population of elderly individuals living in community dwellings, using a sample from the SHADES.

The general aim of SHADES is to describe and analyze mortality, morbidity, health conditions, and drug use among elderly individuals living in community dwellings. The results will provide a better basis for improved and individual based care for the elderly in community dwellings and can be used in the planning of interventions to improve health, optimize use of drugs, and decrease the need of acute hospital care. The aim of this study was to describe morbidity, use of drugs, and risk of severe conditions such as malnutrition, pressure ulcers, and falls and to explore their associations with frailty as determined by functional limitations and somatic and psychological symptoms.

2. Methods

2.1. Sample

A convenient sample from 11 community dwellings for the elderly, in three different municipalities in Sweden, was selected to be involved in the SHADES study. All subjects (468) living in those community dwellings were invited to participate in the study, except for those who only lived in the community dwelling for short term care. Of the invited subjects, 126 chose not to participate (either themselves or their relatives). Twenty-five individuals were excluded from the study due to severe illnesses, palliative care, or language problems. Two subjects were excluded from the analyses because they were younger than 65. Information about age, gender, registered diseases, and drugs, as well as the date of death, if applicable, were collected for those individuals who chose to not participate or were excluded. All together, 315 elderly individuals participated and were analyzed, giving a response rate of 67%. Baseline characteristics of this sample are given in Table 1.

2.2. Data collection

Data was collected by specially trained nurses who examined the participants in their homes at the community dwellings. The nurses also gathered information about the respondents from the staff such as information about the date of the move to the community dwelling, decision from the social services, and social contacts of the elderly respondents. Furthermore, the project nurses collected different types of documentation about the elderly respondents such as, medical records, social services records, and nurses' documentations. Information about the elderly participants' medical diagnoses, use of drugs, rehabilitations plans (if there were

any), emergency events such as admission to hospital care, and prescription and use of antibiotics drugs were collected from these documentations.

2.3. In-person testing

The in-person testing of the respondents included measures of: cognitive function: mini mental state examination (MMSE); mood: Cornell depression scale = CDS; risk-assessments: DFRI; MNA; MNS; and frailty (estimated by a set of questions from SNAC, divided into three categories). The in-person-testing was performed with guidance from the staff at the community dwelling. The project nurses also examined the participants by measuring height, weight, pulse, blood pressure (BP) and body mass index (BMI) was calculated and they drew blood samples to determine the hemoglobin and p-glucose values presented in this paper. Blood pressure was measured in the right arm with the respondent sitting. It was measured three times, one minute apart; for this study, the mean value of the three measures was used for analyses. The blood samples were drawn by following standard procedure.

2.4. Analyses

2.4.1. Independent variables

In statistical analysis, several independent variables were included to determine relations to the outcome variables: somatic symptoms, psychological symptoms, and functional problems. Sociodemographic variables included in the analyses were gender, age, and the time the respondents had spent at the community dwelling. As health indicators, the number and type of diseases, number and type of drugs, both systolic and diastolic BP, b-Hb, and p-glucose were analyzed.

To measure cognitive functioning, the Mini Mental State Examination (MMSE) was used. The MMSE consists of twenty-one questions which measure orientation, memory, naming, constructional ability, and attention (Folstein et al., 1975). The scores range from 0 to 30 and a score of 24 or lower usually indicates some kind of cognitive dysfunction. Mood or depression was assessed using the Cornell scale for depression in dementia (CSDD). The CSDD includes 19 items about mood related signs, behavioral disturbance, physical signs, cyclic functions, and ideational disturbance and is intended for persons with cognitive dysfunction (Alexopoulos,

1988). Each item is scored on a three-graded scale (0 – 2), added together they give a range of 0 – 38 where a score of 10 or more indicates depression.

Three different risk assessments were also included in the analyses; the modified Norton scale (MNS) to assess the risk for developing pressure ulcers; the DFRI to assess the risk for falls; and the MNA to assess the risk for malnutrition. The MNS is well-known and established and is frequently used as a tool to find persons at risk for developing pressure ulcers in Sweden. It includes seven subscales (mental condition, physical activity, mobility, food intake, fluid intake, incontinence, and general physical condition) with four items each. Each item is assessed with a range from 1 (lack of function) to 4 (normal function). The maximum score is 28 and a score of 20-21 indicates an increased risk of developing pressure ulcers (Ek et al., 1989). The DFRI includes 11 risk items concerning previous falls, use of drugs, sensory deficits, cognitive dysfunction, and walking ability. Each item is scored one point and added to give a total score range of 0-11. A score of 3 or more indicates an increased risk of falls (Downton, 1993). The DFRI was used in a previous study (Rosendahl, 2006), which showed it had a high sensitivity but a low specificity in predicting falls among older people living in residential care facilities.

The MNA is divided into a short form (MNA-SF) scale and a full scale (MNA). The MNA-SF consists of six items [loss of appetite, loss of weight, mobility, psychological stress or acute disease, neuropsychological problems, and body mass index (BMI)]. Each item is scored with 0–2 points or 0–3 points alternatively, where 0 indicates lack of function and 2 or 3 indicate normal functions. A score below 10 indicates risk for malnutrition and then, the full scale is recommended (Rubenstein et al., 1999). For this study, only the MNA-SF was used for analyses. The MNA and MNS have recently been used in research and the results demonstrated both the MNS and MNA-SF had very good inter-reliability and they were reasonably understandable and easy to utilize in clinical care (Bååth et al., 2008). The MNA, MNS, and DFRI are all used in clinical practice to assess the risk of different severe conditions to provide high-quality and individualized care and services for the elderly. In an attempt to simplify the assessments of need for care, a factor analysis using Varimax rotation was performed. It included all the variables in MNS, MNA, and DFRI. The factor analysis converged in five extractions: 1) physical ability/motor activity (MNS Physical activity, MNS Motor skills, MNA Motor skills, DFRI motor deficiency, and DFRI walking ability); 2) psychological/cognitive function (MNA

Neuropsychological item, DFRI Oriented, MNS Psychological status, DFRI use of Parkinson Disease drugs, and DFRI use of anti depression drugs); 3) nutritional status (MNS Food intake, MNS Fluid Intake, MNS general physical condition, MNA BMI, MNA decrease in food intake, MNA disease in three months, and MNA loss of weight); 4) sensory function (DFRI unsecured walk, DFRI sensory deficiency, DFRI vision deficiency, DFRI hearing deficiency, and MNS incontinence); and 5) use of drugs (DFRI no drugs, DFRI sedative drugs, DFRI use of hypertension drugs, DFRI other drugs, and DFRI have fallen). The five factor scores were used in a multiple regression model to explore their relation to the dependent variables: somatic symptoms, psychological symptoms, and functional problems.

2.4.2. Dependent variables

Frailty/need for care was the outcome variable in this study. It was measured by a set of 25 questions concerning ADL, need of care, different symptoms, and mood that was initially used by the SNAC. The SNAC-study was initiated in 2001 by the Swedish government to analyze the future needs for care of elderly individuals and the best way to meet them (Andersson, 2003; SNAC, 2010). From these 25 items, a factor analysis with Varimax rotation was performed which resulted in three categories: somatic symptoms, psychological symptoms, and functional problems. These categories were used as outcome variables to measure the need for care and frailty.

Somatic symptoms included the following items: urine incontinence, feces incontinence, vision problems, hearing problems, pain, dizziness, and physical problems. These seven items were assessed with a four-graded scale where 0 = no problems and 3 = severe problems. Physical problem were weighted *6. Another four items were included in the measure of somatic symptoms: urine catheter, pressure sore, chronic sore, and the need for special care. For these items, the answer choices were no = 0 and yes =1. Three of these four items (all but urine catheter) was weighted * 3. Added together all 11 items created a scale of somatic symptoms (alpha = .61) with a range between 0 and 46. Higher values indicated more somatic symptoms and a higher need for care.

Functional problems included 10 items assessed on a three graded scale (0 = independent in managing; 1 = independent to some extent; and 2 = totally dependent) concerning ADL (Activities in Daily Life): cleaning/housework, cooking,

shopping, transportation, doing laundry, eating, bathing, dressing, toileting, and moving from bed to chair. The items were weighted (each item *2) and added together to form a scale (alpha = 0.72) to measure functional problems with a range from 0 to 40. Higher values indicated higher dependency in managing daily life activities.

Psychological/cognitive symptoms included four items, assessed with a four-graded scale where 0 = no problems and 3 = severe problems. The items were anxiety/insecurity, sadness/gloom, cognitive deficiency, and behaviors that are hard to handle/manage. Added together they formed a scale of psychological/cognitive symptoms (alpha = 0.79) with a range from 0 to 12 and higher values indicated more psychological/cognitive problems. Adding all 25 items to one scale, to assess need of care/frailty, gave at total range of 0 – 98 (alpha = 0.84) where higher values indicated prominent need for care.

2.4.3. Statistical analyses

Descriptive analyses (independent samples t-test, chi-square, and Pearson correlation) were used to analyze gender differences in the variables and scales (see Table 1); to demonstrate the risk for malnutrition, pressure ulcers, and falls (see Table 2); and to find correlations among the described variables. To explore associations among frailty/need for care and different health indicators, several linear regression models were analyzed. The out-come variables in the regression analyses were scales of somatic symptoms, psychological symptoms, functional problems, and the total scale of frailty/need for care. For the first regression analyses, those health indicators that demonstrated significant correlation to any of the out-come variables were included (Rovine et al., 1988) together with scores from the risk assessments, MMSE, and the CDS (Table 2). Based on the results from the first regression analysis and the factor analysis, including the risk assessment variables, a second regression analysis was performed. The second regression analysis included variables that demonstrated significant relations to somatic symptoms, psychological symptoms, and/or functional problems in the first regression analysis (age, BMI, pulse pressure, and documented dementia) together with the factor scores from the factor analysis (physical ability, psychological/cognitive function, nutritional status, sensory function, and drugs/falls) (Table 3). A third regression analysis was performed to explore more feasible ways to evaluate

frailty and need for care based on somatic symptoms, psychological symptoms, and functional problems. In this regression analysis, variables from the risk assessments that ranked the highest in each factor score were included together with age, pulse pressure, BMI, and documented dementia.

2.5. Ethical consideration

The SHADES-study has been proved by the Ethical Committee in Linkoping, Sweden, DNR: M 150-07.

3. Results

Elderly individuals living in Swedish community dwelling are usually very old and frail. Due to the nature of aging, they are also suffering from complex, prevalent co-existing conditions such as those related to previous cardiovascular and cerebrovascular events, cognitive dysfunction, neurological disorders, and a variety of functional disabilities. Thus, in many cases, the concomitant medications among these subjects are extended. The elderly respondents in this sample had lived on average for over two years in the community dwelling. They demonstrated both co-morbidity and polypharmacy with an average of three diseases and seven drugs (see Table 1). The most commonly registered diagnoses and prescribed drugs are shown in Table 1 (the diseases and drugs documented for at least 10% of the sample). Dementia was the most common disease and acetylsalicylic acid was the most frequently used drug. Nearly half (44%) of the sample used paracetamol, 40% used diuretic drugs (all but 3 used loop-diuretics), and another 40% used laxatives. The only gender difference found in diseases and use of drugs was in the use of analgesics, where women used significantly more opiod analgesics and paracetamol compared to male subjects. The blood tests demonstrated (not presented in Table 1) that women also had significantly lower b-hemoglobin (mean 124 g/l compared to 129 g/l among the men).

According to the risk assessments more than half of the sample were at risk of malnutrition, one third were at risk of developing pressure ulcers, and nearly all (93%) had a risk of falling. The subjects showed relatively low scores on the CDS (indicating a low risk of depression), but a great majority had cognitive dysfunction according to MMSE (Table 1). Variables included in the first regression model were documented diagnosis of dementia, stroke (CVI), and cardiac insufficiency (CI)

together with age, pulse pressure, number of drugs and scores on the MMSE, CDS, and the risk assessments. The number of diseases did not correlate with somatic symptoms, psychological symptoms, and functional problems; therefore, it was not included in the regression models.

The score on the modified Norton scale (MNS) was the only independent variable that demonstrated significant relations to somatic symptoms, psychological symptoms, and functional problems and also to the sum scale. Cognitive/psychological symptoms were associated with age, pulse pressure, BMI, scores on the MNS, and documented dementia diagnosis and scores on the MMSE. Somatic symptoms were only related to age, scores on the MNS, and scores on the DFRI. Functional problems were related to pulse pressure, BMI, documented dementia and scores on the MNA (SF), and scores on the MNS. Table 3 shows the results from the regression models which excluded the variables that demonstrated no relation to the outcome in the first regression models (Table 2) and included the factor scores from the three risk assessments. The associations to need for care and frailty became clearer in these models (Table 3).

The factor scores of physical ability, psychological/cognitive function, and use of drugs measured in this analysis were related to all outcomes: somatic symptoms, psychological symptoms, and functional problems and to the sum of all items. The factor scores of sensory function were related to three of the outcomes (all but somatic symptoms) and nutritional status demonstrated associations to three outcomes (all but cognitive/psychological symptoms). The factor scores of physical ability, psychological/cognitive function, nutritional status, sensory function, and use of drugs (together with the fall item) were still based on a set of questions; in an attempt to simplify the measure of frailty and need for care, the third regression analysis only included one of the items from the factors, the one that ranked the highest together with pulse pressure, BMI, and age (Table 4).

4. Discussion

Not surprisingly, this sample of elderly individuals living in community dwellings suffered from both co-morbidity and polypharmacy and they had great risks of developing malnutrition, pressure ulcers, and of falling. They also had low scores on the MMSE, indicating cognitive dysfunction. The term frailty has been frequently discussed in recent research but there is no gold standard for measuring this

condition. However, there is an agreement that frailty is more than just the appearance of diseases but also includes terms such as exhaustion, psychical activities, and weakness. For this study, we investigated relations between different types of frailty and the need for care. Functional problems or disabilities are not usually defined as frailties, but a previous study showed disability may lead to frailty and vice versa (Ahmed et al., 2007). Somatic symptoms due to a combination of declines in physiological states in the elderly, diseases, and use of drugs can be defined as frailty due to the vulnerable situation (Pickering, 2004).

Psychological symptoms are also an important aspect of frailty and studies have used, for example, previous mood problems to measure this aspect of frailty (Rockwood et al., 2007). The questions used in this definition of frailty were originally used to define the need for care and services for elderly individuals, which is perhaps the most important reason for defining and measuring frailty. One of the overall aims of SHADES is to use the results to improve individual based care and services for elderly patients. From this point of view, our definition of frailty and need for care make good sense.

The first objective of this study, however, was to describe this sample of relatively unknown, institutionalized elderly individuals. The descriptive analyses showed only 128 (41%) individuals from this sample had a documented diagnosis of dementia, but the majority (71%) of the sample had low (under 24) scores on the MMSE. The question is why? It is not the case that a MMSE-score below 24 defines dementia, but surprisingly many elderly individuals with very low scores lacked some kind of documented diagnosis explaining cognitive dysfunction. It is well-known that cognitive decline is not always observed and investigated among elderly people in Sweden (National Board of Health and Welfare, 2009). For elderly people living in community dwellings, there may be an increased risk that symptoms of cognitive decline are overseen, compensated for, and not further investigated. This was confirmed to some extent by the second regression analysis where documented dementia demonstrated no relation to psychological/cognitive symptoms, but the influence of this variable probably was reduced by the effect of the factor score of psychological/cognitive function (including scores from the MNA Neuropsychological item, DFRI Oriented, MNS Psychological status, DFRI use of Parkinson Disease drugs, and DFRI use of anti depression drugs).

In recent years, several alarming reports have demonstrated the risk of giving elderly individuals too many drugs and consumption must decrease. Still, the 80+ population suffers the most from co-morbidity; they are often in need of drugs at the same time as aging changes and, as a paradox, diseases lead to increased vulnerability. Surprisingly, the number of drugs (an average of seven drugs) did not have an effect on frailty in the first regression. This may be because the very frail elderly use fewer drugs to prevent disease and more drugs to alleviate symptoms. In the second regression, the factor score of use of drugs (including the DFRI variables: have fallen, other drugs, sedative drugs, and no drugs) had an impact on all outcome variables; yet, the third regression analysis demonstrate this effect is probably due to the single item “have fallen”. In this sample of the institutionalized elderly, the number and use of certain drugs have less importance in relation to need for care and frailty. The same pattern could exist for a number of diseases, which similarly demonstrated no relation to the outcome variables even if some diagnoses (dementia, CVI, and CI) showed some relation.

Women had higher systolic blood pressure than men which probably explained the higher pulse pressure in female subjects. However, there were no gender differences in the use of antihypertensive drugs. The results are of significance due to the impact of pulse pressure on the outcome variable cognitive/psychological symptoms and the sum of frailty items. The results indicate that a high systolic and low diastolic blood pressure increases the risk for psychological/cognitive dysfunction. The cut-off limit for when hypertension should be treated in the elderly population is frequently discussed; yet, there currently is no consensus. If systolic blood pressure is treated at the same levels as for younger adults, it may be associated with greater mortality in people aged 85 and older (Molander et al., 2008). Morley (2008) discussed the need for further research in this area and that the guidelines for treatment of hypertension in the elderly need to be modified. Today there are recommendations to evaluate orthostatic hypotension only when a new medication is started and the patient has dizziness, syncope or near syncope, or has nearly-fallen or fallen. Morley (2008) suggested it should be strongly recommended that orthostatic blood pressure is measured in all older persons. The results from this study similarly suggested that even if hypertension (as in high systolic blood pressure) increases the risks for different diseases and symptoms, a low diastolic blood pressure, or at least the pulse pressure, should be monitored. BMI also had an

impact on the outcome variable, cognitive/psychological symptoms; the relation between BMI and cognitive function has been previously discussed were overweight in midlife increases the risk of dementia (Dahl et al., 2009; Hassing et al., 2009) but low BMI in late life the relation is the opposite. Dahl (2009) found that individuals that subsequently were diagnosed with dementia have lower BMI scores about a decade before the clinical onset of dementia compared to those who did not develop dementia. The three different regression models demonstrated further that many of the risk assessments used in elderly care today catch up identical problems. The elderly individuals included in SHADES are very old and due to aging changes, and co-morbidity, they are suffering from complex conditions and a variety of functional disabilities. It is seems therefore fruitless to seek for risks for single conditions such as malnutrition, pressure sores, and falls since those are highly interacted. Medical treatment, care, services and prevention in those elderly individuals should be performed based the complete individual problems which in turn probably will lead to decreased risk of severe conditions. Further, it may not always be necessary to use all these different scales to provide individual based care. The third regression model, that aimed to explore the impact of individual items on need for care, showed age, pulse pressure, BMI, and the items: MNS Motor ability, MNS Psychological status, MNS incontinence, MNA loss of weight, and DFRI have fallen explained the bulk of the variation in need for care and had significant impact on the outcome symptoms.

This study has some limitations. First, the sample used in this study was not randomly selected but selected by convenience from three geographical areas. In addition, community dwellings showing interest in the study were chosen, since the SHADES study is dependent on stable conditions to facilitate repeated measurements over more than three years. Even so, the general estimation of the research group is that the community dwellings included in this sample are typical for Sweden and they do not differ dramatically from other places. The placement of the dwellings in three different municipalities increases the chance that they are representative. It should also be noted that some of the variables in MNS, MNA, and DFRI are similar to the items used for defining need for care and frailty; therefore, the cause and effect could be questioned. However, the risk assessments are created to determine the risk of different conditions and the outcome variables are created to analyze the need for care and services. For this study, it was not possible to analyze whether the

scales predicted what they were supposed to (pressure ulcers, malnutrition, and falls) because too few of the sample had pressure ulcers. There is no golden standard to measure malnutrition, but using the results from the MNA is a relatively common way together with blood samples. Falls are included in the scale of the DFRI and could therefore not be analyzed since both malnutrition and falls would have been biased. These facts should be considered when interpreting the results.

5. Conclusions

Number of diseases and drugs seems less important when planning for care and services of the elderly in community dwellings. Due to their suffering from complex conditions and a variety of functional disabilities it does not seem meaningful to use all these different scales to seek for risk for single conditions. Our results indicate a single set of eight items could be used to measure frailty and to improve individual based care in community dwellings, compared to more extensive models. However, prospective data are still needed for confirmation.

Conflict of interest statement: None.

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Table 1. Baseline characteristics in elderly subjects in the SHADES study 2008, n; mean ± S.D.; n(%)

	Men	Women	Total
Number	90	225	315
Sociodemographics			
Age	83 ± 8	86 ± 7	85 ± 7**
Time at the institution (mo)	24 ± 28	27 ± 26	26 ± 28
Medical variables			
Number of diseases	3.2±1.36	3.2±1.38	3.2±1.37
Dementia	35 (39)	93 (41)	128 (41)
Hypertension	24 (26)	60 (27)	84 (27)
Stroke	24 (26)	50 (22)	74 (23)
Diabetes mellitus	20 (22)	37 (16)	57 (18)
Atrial fibrillation (AF)	15 (17)	37 (16)	52 (16)
Cardiac insuffiency	12 (13)	32 (14)	44 (14)
Number of drugs	6.9±3.11	7.0±2.99	7.0±3.02
Acetylsalicylic acid	48 (53)	121(54)	169 (54)
Paracetamol	28 (31)	109 (48)	137 (44)**
Anti-depressant	39 (43)	93 (41)	132 (43)
Diuretics	36 (40)	90 (40)	126 (40)
Laxatives	37 (41)	88 (39)	125 (40)
Beta blockers	29 (32)	69 (31)	98 (31)
Hypnotics	28 (31)	68 (30)	96 (30)
Vit. B12+folacin	31 (34)	63 (28)	94 (29)
Sedatives	12 (13)	51 (23)	63 (20)
Proton pump inhibitors	16 (18)	44 (20)	60 (19)
Minerals	11 (12)	50 (22)	61 (19)
Opioids	8 (9)	40 (18)	48 (15)*
Neuroleptics	15 (17)	33 (15)	48 (15)
ACE inhibitors	15 (17)	32 (15)	47 (15)
Blood pressure (BP)			
Systolic BP (mmHg)	125±24	136±23	133±24**
Diastolic BP (mmHg)	72±10	73±12	73±12
Pulse pressure	54±20	63±20	60.22±30.37**
BMI	25.0±4.67	25.2±5.35	25.1±5.15
Other parameters			
MNA-SF	9.94±2.69	10.25±2.61	10.18±2.63
≤ 11	56 (62)	131 (58)	187 (60)
MNS	22.33±3.32	22.08±3.74	22.15±3.61
≤ 20	27 (30)	76 (34)	103 (33)
DFRI	4.98±1.68	4.84±1.58	4.89±1.64
≥ 3	83 (92)	211 (94)	294 (93)
MMSE	17.16±6.91	16.25±6.88	16.55±6.88
≤ 24	60 (67)	163 (72)	223 (71)
CDS	2.63±3.79	2.59±3.07	2.64±3.37
≥ 10	3 (3)	9 (4)	12 (4)
Need of care (SNAC-sum)	58.5±15.5	59.5±15.5	58.8±15.5

Notes: for gender difference: *p < 0.05; **p < 0.01

Table 2.
Variables related to need for care/frailty based on somatic symptoms, psychological symptoms, and functional problems according to linear regression, stand. β

	Somatic	Cogn/psychol.	Functional	Total
R^2	0.32	0.27	0.44	0.47
Age	0.14*	-0.16*	-0.01	<0.01
Pulse pressure	0.07	0.25**	0.11*	0.15**
BMI	-0.01	0.19**	0.15**	0.07
Number of drugs	-0.02	0.07	<0.01	0.02
Dementia	0.02	0.22**	-0.14*	-0.05
CVI	0.02	0.04	0.05	0.05
CI	-0.02	-0.06	0.01	<0.01
MMSE	0.10	-0.24**	<0.01	-0.02
CDS	<0.01	0.10	0.04	0.04
MNA (SF)	-0.10	0.14	-0.18*	-0.13
MNS	-0.41**	-0.19*	-0.51**	-0.52**
DFRI	0.19**	0.07	0.07	0.11

Notes: *p < 0.05; **p < 0.01

Table 3.
Variables related to need for care/frailty based on somatic symptoms, cognitive/psychological symptoms, and functional problems, stand. β

	Somatic	Cogn/psychol.	Functional	Total
R^2	0.36	0.39	0.59	0.58
Age	0.18**	-0.13*	0.06	0.09
Pulse pressure	0.04	0.17**	0.07	0.09*
BMI	0.09	-0.28**	-0.03	-0.10
Dementia diagnosis	0.01	0.01	-0.09	-0.06
Physical ability	-0.49**	-0.13*	-0.69**	-0.66**
Psychological/cognitive function	-0.19**	-0.46**	-0.23**	-0.3**
Nutritional status	0.13*	-0.11	-0.13*	-0.11*
Sensory function	-0.02	0.23**	0.16**	0.16**
Use of drugs	0.18**	0.12*	0.17**	0.20**

Notes: *p < 0.05; **p < 0.01

Table 4.
Variables related to need for care/frailty based on somatic symptoms, psychological symptoms, and functional problems, stand. β

	Somatic	Cogn/psychol.	Functional	Total
R^2	0.43	0.33	0.53	0.55
Age	0.15**	-0.20**	0.03	0.03
Pulse pressure	0.05	0.20**	0.07	0.11*
BMI	-0.08	-0.16**	-0.02	-0.05
MNS motor ability	-0.24**	-0.03	-0.57**	-0.67**
MNS psychol. status	-0.19**	-0.37**	-0.09*	-0.41**
MNA loss of weight	-0.07	-0.01	-0.12**	-0.11*
MNS incontinence	-0.43**	0.21**	0.18**	0.28**
DFRI have fallen	0.17**	0.15**	0.06	0.12**

Notes: *p < 0.05; **p < 0.01