Acute sarcopenia changes following hospitalization: influence of pre-admission care dependency level.

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ABSTRACT

Introduction. Hospitalization is associated with acute changes in sarcopenia status in older people, but the influencing factors are not fully understood. Pre-admission care dependency level as a risk factor has not yet been investigated.

Objective. Evaluate if pre-admission care dependency level is an independent predictor of sarcopenia changes following hospitalization.

Setting and subjects. Data came from the Sarcopenia 9+ EAMA Project, a European prospective multi-center study. For this study, 227 hospitalised older people were included from 4 different hospitals in Belgium, Spain and Poland, between February 18th 2019 and September 5th 2020.

Methods. Sarcopenia status at admission and discharge were calculated using a combined score (desirability value) based on muscle mass (calf circumference), strength (grip) and function (walking speed). Ratio of admission to discharge status was the outcome (desirability ratio; 1.00 meaning no difference). Predictor variable was the pre-admission care dependency level, classified into three groups: independent older people living at home, dependent older people living at home, and older people living in a care home. Linear regression models were applied, considering potential confounders.

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Results. Mean desirability ratio for dependent older people living at home ("middle dependent group") was lower (0.89) compared to independent older people (0.98; regression coefficient -0.09 [95% CI -0.16, -0.02]) and care home patients (1.05; -0.16 [95% CI -0.01, -0.31]). Adjusting for potential confounders or using another statistical approach did not affect the main results.

Conclusions. Dependent older people living at home were at higher risk of deterioration in sarcopenia status following hospitalization. In-depth studies investigating causes and potential interventions of these findings are needed.

INTRODUCTION

Sarcopenia is a geriatric disease characterized by a severe decrease in muscle mass, muscle strength and/or physical function with ageing. Although different definitions do exist, the three most commonly used definitions, developed by the European Working Group on Sarcopenia in Older People (EWGSOP), the International Working Group on Sarcopenia (IWGS) and the Asian Working Group for Sarcopenia (AWGS), are based on a combination of these three components [1-3]. Over the last decade, sarcopenia has received increased attention due to increasing prevalence and its major health (and societal) impact [4]. The worldwide prevalence of sarcopenia is currently estimated to be between 10% in community-dwelling older people, and up to 40% in older nursing home residents, the people most dependent on care [5]. The major health impact of sarcopenia is reflected in, amongst other things, an increased risk of falls and fractures (Odds Ratio or OR 2) [6], increased hospitalization risk (Hazards Ratio or HR 1.6) [7], functional decline (OR 3.0) [8], decreased quality of life (OR 0.75 on Short Form-36 questionnaire) [9] and increased all-cause mortality (OR 3.6) [8].

While sarcopenia is classically regarded as being a slow pathological process taking place over years, acute events can aggravate this process. Hospitalization has been associated with an acute decline in muscle mass and function in older people [10-12]. This "acute sarcopenia" can recover after hospitalization, but often not completely. One study suggested that older people who are more frail and dependent pre-admission are at higher risk for non-reversible functional decline (Activities of Daily Living or ADL-index) than their more robust and highly functioning counterparts [10]. Friedman et al. conducted a small

hospital observational study in older people measuring functional changes (ADL-index) following hospitalization. Interestingly, they found a functional decrease for people residing in assisted living, but not for older people living independently in the community or nursing home residents [13]. However, neither study looked at sarcopenia specifically, the ADL tool used was not very sensitive, and they excluded those who were functionally highly dependent at baseline from their analysis. To our knowledge, there have been no detailed studies performed to date investigating acute sarcopenia change during hospitalization together with the risk factors for potential changes, including the pre-admission level of dependency.

We aimed to assess if care dependency level, linked to the place of residence, before hospitalization is an independent predictor of sarcopenia change following hospitalization. This could potentially provide a clinically useful tool to help us identify those at increased risk for functional decline during hospitalization, and thus enabling early intervention. Moreover, as the number of (severely) dependent older people residing in their own homes continues to increase, this study provides a timely opportunity to expand our knowledge regarding health effects in this subgroup of older people.

METHODS

Data

Data were obtained from the Sarcopenia 9+ EAMA Project (between 18/02/2019 and 05/09/2020, from four different university hospitals in Krakow, Barcelona, Brussels and Ghent). This is an ongoing prospective multi-center cohort study investigating acute sarcopenia and its risk factors. It is co-ordinated by members of the European Academy for Medicine of Aging (EAMA) and supported by the special interest group on sarcopenia of the European Geriatric Medicine Society (EuGMS) [14]. The study cohort was defined as all patients aged ≥ 70 years admitted to acute geriatric and/or internal medicine wards. The patients were admitted directly to these wards from emergency or equivalent departments within 24 hours of admission. Study information was linguistically customised in each country. Exclusion criteria were anticipated length of hospital stay <24 hours, inability to perform the hand-grip test (reduced consciousness or extreme hand anomaly), hip or lower limb fracture, major amputations of the lower leg, terminally ill patients admitted for palliative care and unwillingness to take part in the

study. Our study followed the ethical principles of the Declaration of Helsinki and received approval by local ethical committees. Each participant and his/her formal represent in case of diminished cognitive functioning signed a consent statement form after receiving written/verbal study information. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement was followed in this manuscript [15].

Variables

Dependent variable (Y)

The influence of pre-admission care dependency level on the change in sarcopenia status following hospitalization was evaluated. Sarcopenia status at admission or discharge was assessed using a composite index consisting of the three validated sarcopenia components: muscle mass, muscle strength and physical function. The change in sarcopenia status was defined as the ratio of sarcopenia status at hospital discharge to sarcopenia status at hospital admission for each patient.

Muscle mass was evaluated with calf circumference. Calf circumference was measured with a non-elastic measuring tape on the non-dominant leg while sitting in a chair with feet resting on the floor. Bedridden participants were asked to bend the knee and rest their feet on the mattress. Measurement was taken on the bare skin at the point of maximum convexity [16]. Grip strength was measured using a dynamometer (Jamar or Saehan) or a vigorimeter (Martin), depending on the center. Two to three readings were taken from each side, and the maximum value of all readings was used for analysis, following the Southampton protocol. To evaluate physical function, patients were asked to walk (at a normal pace) along a straight line 4 m long in distance, including both the accelerating and decelerating phase. Gait speed was subsequently calculated based on the time taken to walk. All assessments were performed within 48 hours of admission and within 24 hours of discharge.

Instead of using categorical cut-offs, we chose to quantify the sarcopenia components using continuous variables. Moreover, in order to integrate the different continuous variables into one physiologically relevant response, a multi-criteria decision technique was employed, using Derringer's concept of desirability [17, 18]. Every sarcopenia response (i.e. calf circumference, grip strength and gait speed) was

first linearly transformed into a dimensionless desirability (d) value, ranging from 0.1 to 0.9, where 0.1 and 0.9 were the lowest and highest obtained value of that response amongst all patients in the study respectively. If the patient died whilst in hospital, the responses were set at 0.1, i.e. the least desirable muscle response. This approach assumes that most older people dying have a very low muscle mass, -strength and – function in the terminal phase. If patients were unable to walk (too weak), the walking speed was set to 0 and translated to a d-value of 0.1 in our model. Also for grip strength, 0 kg (because of high weakness) translated to a d-value of 0.1. In contrast, missing values because of any other reason were not imputed. These three standardized d-values were combined into a global D-value for each patient, which was the geometric mean (robust for outliers; missing values were not imputed). Each component (muscle mass, muscle strength and physical performance) was weighted equally. Inherent to this desirability concept, all D-values lie between 0.1 and 0.9, with 0.1 indicating a relatively high sarcopenic status (low muscle desirability) and 0.9 a relatively low sarcopenic status (high muscle desirability). Each patient included thus had a D-value on admission and discharge (D_admission and D_discharge respectively). The main outcome for each patient was the ratio of these two D-values (D_ratio = D_discharge/D_admission).

Independent variable (X)

We questioned the patient and family to evaluate the patient's "pre-admission care dependency level" before the illness that took him/her to the hospital. This independent variable was divided into three categories: 'independent-home' (living at home independently), 'dependent-home' (living at home, but with needed help from family and/or external carers) and 'care home' (living in a care home). This "order" is often the natural trajectory of older people.

Covariates

For the analyses, the following potential covariates were taken into account: age, sex, sarcopenia status at hospital admission (= D-value at admission), length of hospital stay, level of previous usual physical activity using the Rapid Assessment of Physical Activity (RAPA) score and Charlson comorbidity index. The RAPA is a 9-item scale based on a questionnaire that scores an individual's level of usual

physical activity from 0 (sedentary) to 4 (active) [19]. Charlson comorbidity index (score between 0 and 36) takes into account age and comorbid conditions, including cardiovascular disease, diabetes mellitus, liver disease, and pulmonary disease [20]. This well-validated composite comorbidity tool was used instead of all comorbidities individually to avoid model overfitting.

Analysis

We investigated the association between pre-admission care dependency level and muscle desirability ratio D_ratio (D_discharge/D_admission) using linear regressions. A first set of regressions analysed the difference between dependent and independent older people, both living at home, while a second set of regressions investigated the difference between dependent older people at home vs. care home. To minimize confounding bias, propensity scores using the potential covariates were calculated in a stepwise fashion, followed by use of overlap weighting [21].

To assess the robustness of our findings, we also conducted paired t-tests for D ratio's after matching for age, sex, Charlson comorbidity index, length of hospital stay, RAPA score and D value at admission, every dependent-home patient with an independent-home patient, as well as every care home patient with a dependent-home patient, using the nearest neighbour propensity score method. Moreover, to exclude a bias induced by the older people who died during hospitalisation, linear regressions were conducted removing these patients from analysis. All analyses were performed using RStudio 3.5.2 (R Foundation for Statistical Computing, Vienna, Austria). A p-value < 0.05 (2-sided) was considered statistically significant.

RESULTS

Table 1 shows patient main characteristics for the whole study population, and for the three subgroups by care dependency level. 227 patients were identified for which values of both independent and dependent variable were available: 138 (61%) lived independently at home, 71 (31%) lived at home with support from family and/or formal caregivers, and 18 (8%) resided in a care home. The mean Charlson comorbidity index was 7, indicating a study population with a relatively high disease burden

[22]. Although this composite comorbidity index was only slightly different between the groups, the frequency of the diagnosis dementia showed larger differences: the percentage of participants with dementia increased from independent-home to care home setting. As could be expected, the mean RAPA-score was lower in the dependent-home and care home groups (0.5 and 0.9 respectively) compared to the independent-home group (1.2). Explorative, we also compared the reasons for acute hospital admission between the three groups. For most acute diagnoses, there was an increasing trend from independent-home to care home setting (**Supplementary Table 1**). The mean muscle desirability value at hospital admission (D_admission) decreased from independent-home (0.35) to dependent-home (0.33) to care home (0.29) patients. When using EWGSOP2 definitions of sarcopenia (grip strength <27 kg, men; <16 kg, women and calf circumference <31 cm), 18.1% of the study population was diagnosed with sarcopenia at hospital admission - 16.2% of independent –home, 19.0% of the dependent-home and 29.4% of the care home patients.

Table 1. Characteristics of the study cohort. Categorical variables are shown as numbers (% of column N), while continuous variables are means (standard deviation or SD).

Sample characteristics	Total (N = 227)	Independent-home (N = 138)	Dependent-home (N = 71)	Care home (N = 18)
Age in years, mean (SD)	83.2 (7.0)	82.4 (6.8)	84.6 (7.1)	83.3 (8.0)
Male, n (%)	66 (29.1)	41 (29.7)	21 (29.6)	4 (22.2)
Charlson index, mean (SD)	7.06 (2.2)	7.03 (2.4)	7.03 (1.8)	7.39 (2.7)
Diabetes mellitus, n (%)	70 (30.8)	42 (30.4)	21 (29.6)	7 (38.9)
History of stroke, n (%)	42 (18.5)	26 (18.8)	13 (18.3)	3 (16.7)
Dementia, n (%)	80 (35.2)	38 (27.5)	30 (42.3)	12 (66.7)
Hospital stay in days, mean (SD)	16.4 (12.2)	17.0 (12.6)	15.1 (11.9)	16.8 (10.1)
RAPA-score, mean (SD)	0.96 (1.07)	1.20 (1.14)	0.49 (0.81)	0.89 (0.83)
D_admission, mean (SD)	0.34 (0.09)	0.35 (0.09)	0.33 (0.10)	0.29 (0.08)
D_discharge, mean (SD)	0.32 (0.11)	0.34 (0.11)	0.29 (0.12)	0.30 (0.11)
D_ratio, mean (SD)	0.96 (0.26)	0.98 (0.23)	0.89 (0.27)	1.05 (0.35)

The main outcome, muscle desirability ratio (D_ratio), differed between the three groups. While no difference in mean muscle desirability following hospitalization was observed for patients living independently at home (D_ratio = 0.98), dependent home-living older patients showed a decrease (D_ratio = 0.89) and care home patients an increase (D_ratio = 1.05) in mean muscle desirability (**Figure**

1). These differences between the three groups, were based on differential changes in muscle mass as well as in muscle strength and physical function (**Supplementary Table 2**).

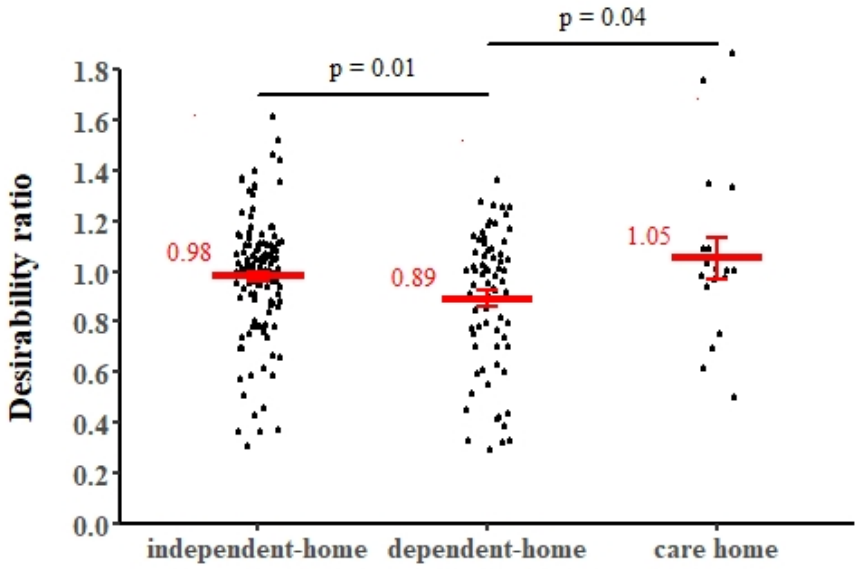

Figure 1. Muscle desirability ratio (muscle desirability at admission/muscle desirability at discharge) during hospitalization on the geriatric ward depending on the pre-admission care dependency level (Means ± SEM in red; dots represent individual patients). Muscle desirability, a continuous composite of muscle mass, strength and function, has a value between 0.1 (least desirable) and 0.9 (most desirable). Student's t-test was conducted to compare independent-home group (n = 138) with dependent-home group (n = 71) and dependent-home group (n = 71) with care home group (n = 18) (P values indicated).

Linear regression analyses without correcting for potential covariates, confirmed these effects with coefficients of -0.09 (95% CI -0.16; -0.02) for dependent vs. independent home-living older people, and 0.16 (95% CI 0.01; 0.031) for care home vs. dependent home-living older people respectively. With stepwise adjustment for different covariates using propensity score overlap weighting, the effect sizes remained in the same order of magnitude, although statistical significance was not always reached due to the small sample sizes (**Table 2** and **Table 3**). Using another approach, i.e. matching patients using nearest neighbour propensity score method followed by a paired Student's t-test, the conclusions did not change (**Supplementary Table 3** and **Supplementary Table 4**). To exclude a bias caused by the patients who died during hospitalization, linear regressions were conducted removing these patients from analysis. This did not affect the conclusions (**Supplementary Table 5** and **Supplementary Table 6**). Also adjusting for hospital country or diagnosis dementia, did not change conclusions (data not shown).

Table 2. Summary of coefficients (Coeff) for muscle desirability ratio (dependent vs. independent home) using propensity score overlap weighted linear regression (n=209).

Adjustments	Coeff (95% CI) dependent vs. independent home	P-value
-	-0.09 (-0.16; -0.02)	0.013
Age, sex	-0.08 (-0.15; -0.01)	0.025
Age, sex, D_admission	-0.08 (-0.15; -0.01)	0.020
Age, sex, D_admission, hospital duration	-0.09 (-0.16; -0.03)	0.008
Age, sex, D_admission, hospital duration, Charlson index, RAPA-score	-0.06 (-0.13; 0.01)	0.098

Table 3. Summary of coefficients (Coeff) for muscle desirability ratio (care home vs. dependent-home) using propensity score overlap weighted linear regression (n=89).

Adjustments	Coeff (95% CI) care home vs. dependent-home	P-value
-	0.16 (0.01; 0.31)	0.038
Age, sex	0.15 (0.02; 0.28)	0.026
Age, sex, D_admission	0.14 (0.01; 0.27)	0.037
Age, sex, D_admission, hospital duration	0.15 (0.02; 0.28)	0.027
Age, sex, D_admission, hospital duration, Charlson index, RAPA-score	0.10 (-0.02; 0.23)	0.119

DISCUSSION

In order to improve sarcopenia status, we desire an improvement of muscle mass, strength and function, i.e. all three together, not only one of these components. Most current sarcopenia definitions incorporate these three components in a stepwise system, using only a yes/no categorical variable as response. However, desirability functions assess a patient's overall response at once, based on multiple outcome measures [23]. Moreover, the desirability approach allows a continuous and hence more sensitive measurement of overall sarcopenia status.

In line with previous hospital studies, we observed a prevalence of sarcopenia at admission using the EWGSOP2 criteria between 15% and 30%, depending on the pre-admission care dependency level [24]. Older people dependent on family and/or carers but still living at home, showed a significant decrease in sarcopenia status during hospitalization compared to those older people living independently at home

or in care homes. These findings are in line with the study of Friedman et al., where more than 50% of the older people in assisted living declined in their ADL-function during hospitalization, compared to fewer than 50% of the older people living in nursing homes or (independently) at home [13]. Both older people living dependently at home and those living in assisted living can be considered as potential transition populations between living independently and living in a care home.

Although the adjusted differential effect sizes (muscle desirability ratios) between 0.06 and 0.09 seem small, these may have clinical importance, considering that these correspond with a calf circumference decrease of 2.5-3.5 cm, a grip strength decrease of 3-4 kg or a decrease in walking speed of 0.16-0.21 m/s if the other two components would remain constant. Moreover, the observed effects are reached already after only one hospitalization of 16 days on average (mean length of hospital stay). As in these populations multiple hospitalizations in a relatively short time-period are common, a possible accumulation of sarcopenia decline would not be improbable. From **Supplementary Table 2**, explorative we observed an absolute decrease in muscle mass and less or not at all in muscle strength and physical function. The stronger decrease in lower leg muscle mass compared to grip strength in the total study population is in line with previous studies [25]. In contrast, the absolute increase in walking speed is somewhat unexpected; Duan-Porter et al. suggested a decrease in gait speed with hospitalisation [26]. However, their baseline gait speed was measured before hospitalization in a healthy, pre-illness condition. Moreover the median hospital duration was 7 days instead of 16 days in our study. It is likely that gait speed (as well as grip strength) is initially negatively affected by the acute stressor causing hospital admission, with improvement during the relatively long hospitalization, but not to the pre-illness level. Regardless of this absolute increase in gait speed, the middle group (dependent at home) showed a relative decrease compared to the independent group and care home group. Overall, our results suggest that the older people living dependently at home represent a highly vulnerable subgroup during hospitalization, which might benefit from a more intense approach to counteract functional decline. Interventions could exist among others of nutritional optimization, exercise and/or neuromuscular electrical stimulation [11, 25, 27, 28].

This analysis did not consider the relative influence of other factors influencing directly or indirectly the pre-admission care dependency level, or the precise reason for hospitalization. For example, the reasons for hospital admission and/or disease severity may differ between the subgroups, which may also influence observed changes in sarcopenia. However, we did adjust for Charlson Comorbidity Index and usual physical activity as a surrogate for their clinical condition at baseline. It is also plausible that dependent older people living at home have different nutritional status and/or gut microbial profile compared to those who are independently living or living in care homes - there is considerable evidence that nutritional status as well as the gut microbial composition influences muscle status in older people [29-31]. Also the medication profile would be an interesting covariate, as chronic drugs such as ACE-inhibitors and statins have shown to affect muscle-related outcomes in older people [32, 33]. It could also be that the medical attention and drug monitoring before or in hospital in the three investigated groups differed.

A limitation from this study is the sample size, resulting in relatively high statistical p-values despite relatively large effect sizes. Data collection for the Sarcopenia 9+ EAMA Project had to be paused due to the Covid-19 pandemic, but several centres are now up and running with data collection again. This will enable us in the future to validate our findings in a larger cohort and include more variables (e.g. reason for admission, drugs, comorbidities and nutritional status and healthcare model influencing hospital admission threshold). Also the effects of age and sex on the strength of the observed associations will be investigated. Another limitation is the use of calf circumference to evaluate muscle mass. Although calf circumference has been validated and widely-used to estimate muscle mass in hospitalized older people, it can be subject to some error due to subcutaneous edema and/or fat.

In conclusion, dependent older people living at home are at highest risk of a worsening sarcopenia status following single hospitalization. Further confirmation and elucidation of potential contributory factors are needed, but these findings certainly suggest a potential high risk group which may benefit from targeted measures.

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Supplementary Information to:

Acute Sarcopenia Changes Following Hospitalisation: Influence of Pre-admission Care Dependency Level

Supplementary Table 1. General reasons for acute hospital admission. Variables are shown as numbers (% of column N). Multiple reasons can exist for each patien (diagnoses are not mutually exclusive).

Reason for admission	*Total (N = 227)*	*Independent-home (N = 138)*	*Dependent-home (N = 71)*	*Care home (N = 18)*
Infection, n (%)	91 (40.1)	51 (37.0)	29 (40.9)	11 (61.1)
Cardiovascular, n (%)	74 (32.6)	41 (29.7)	26 (36.6)	7 (38.9)
Electrolyte disturbance/Renal, n (%)	73 (32.2)	46 (33.3)	19 (26.8)	8 (44.4)
Fall/Syncope, n (%)	41 (18.1)	31 (22.5)	8 (11.3)	2 (11.1)
Anemia, n (%)	40 (17.6)	23 (16.7)	12 (16.9)	5 (27.8)
Pain, n (%)	28 (12.3)	20 (14.5)	6 (8.5)	2 (11.1)
Other, n (%)	31 (13.7)	23 (16.7)	7 (9.9)	1 (5.6)

Supplementary Table 2. Changes in individual components of sarcopenia. Variables are means (standard deviation or SD).

Muscle Mass	**Total (N = 217)**	**Independent-home (N = 133)**	**Dependent-home (N = 68)**	**Care home (N = 16)**
Calf circumference at admission	33.8 (5.28)	33.8 (4.69)	34.3 (6.45)	31.7 (4.06)
Calf circumference at discharge	32.7 (5.90)	32.8 (4.97)	32.5 (7.60)	31.8 (4.89)
Muscle Strength	**Total (N = 203)**	**Independent-home (N = 129)**	**Dependent-home (N = 58)**	**Care home (N = 16)**
Grip strength at admission	15.0 (8.33)	16.1 (7.87)	12.7 (8.93)	13.9 (8.35)
Grip strength at discharge	15.1 (8.37)	16.3 (8.33)	12.5 (8.17)	15.5 (7.59)
Physical Function	**Total (N = 173)**	**Independent-home (N = 108)**	**Dependent-home (N = 51)**	**Care home (N = 14)**
Gait speed at admission	0.44 (0.33)	0.47 (0.35)	0.43 (0.27)	0.23 (0.34)
Gait speed at discharge	0.51 (0.37)	0.54 (0.39)	0.48 (0.31)	0.37 (0.38)

Units: calf circumference in cm, grip strength in kg and gait speed in m/s.

Supplementary Table 3. Characteristics of dependent-home and independent-home group after matching for covariates using nearest neighbour propensity score method. Categorical variables are shown as numbers (% of column N), while continuous variables are means (SD).

	Dependent-home (N = 68)	**Independent-home (N = 68)**	**SMD***
Age in years, mean (SD)	84.5 (7.2)	83.9 (6.9)	0.086
Male, n (%)	19 (27.9)	19 (27.9)	< 0.001
Charlson index, mean (SD)	7.04 (1.9)	6.84 (2.0)	0.106
Hospital stay in days, mean (SD)	14.9 (12.0)	16.0 (11.2)	0.096
RAPA-score, mean (SD)	0.46 (0.80)	0.50 (0.82)	0.054

D_admission, mean (SD)	0.33 (0.10)	0.33 (0.08)	0.030
D_ratio	0.89 (0.28)	0.96 (0.24)	Paired t-test; p = 0.119

* Standardized Mean Difference (SMD)

Supplementary Table 4. Characteristics of care home group and dependent-home after matching for covariates using nearest neighbour propensity score method. Categorical variables are shown as numbers (% of column N), while continuous variables are means (SD).

	Care home (N = 18)	Dependent-home (N = 18)	SMD*
Age in years, mean (SD)	83.3 (8.0)	81.5 (6.7)	0.247
Male, n (%)	4 (22.2)	5 (27.8)	0.129
Charlson index, mean (SD)	7.93 (2.8)	6.83 (2.0)	0.231
Hospital stay in days, mean (SD)	16.8 (10.1)	20.9 (14.9)	0.320
RAPA-score, mean (SD)	0.89 (0.83)	0.72 (0.89)	0.193
D_admission, mean (SD)	0.29 (0.08)	0.27 (0.07)	0.158
D_ratio	1.05 (0.35)	0.94 (0.30)	Paired t-test; p = 0.217

* Standardized Mean Difference (SMD)

Supplementary Table 5. Summary of coefficients (Coeff) for muscle desirability ratio (dependent vs. independent home) using propensity score overlap weighted linear regression (n=197).*

Adjustments	Coeff (95% CI) dependent vs. independent home	P-value
-	-0.07 (-0.13; -0.01)	0.039
Age, sex	-0.06 (-0.12; -0.00)	0.048
Age, sex, D_admission	-0.07 (-0.13; -0.01)	0.027
Age, sex, D_admission, hospital duration	-0.08 (-0.14; -0.02)	0.012
Age, sex, D_admission, hospital duration, Charlson index, RAPA-score	-0.05 (-0.11; 0.01)	0.102

* Patients who died during hospitalization were excluded from analysis.

Supplementary Table 6. Summary of coefficients (Coeff) for muscle desirability ratio (care home vs. dependent-home) using propensity score overlap weighted linear regression (n=82).*

Adjustments	Coeff (95% CI) care home vs. dependent-home	P-value
-	0.14 (0.01; 0.28)	0.039
Age, sex	0.14 (0.02; 0.27)	0.025

Age, sex, D_admission	0.13 (0.01; 0.25)	0.043
Age, sex, D_admission, hospital duration	0.14 (0.02; 0.26)	0.029
Age, sex, D_admission, hospital duration, Charlson index, RAPA-score	0.12 (-0.01; 0.24)	0.061

* Patients who died during hospitalization were excluded from analysis.