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Original Study

Differentiating Between Home Care Types to Identify Older Adults at Risk of Adverse Health Outcomes in the Community

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A B S T R A C T

Objectives: Acute hospitalization, recurrent admissions, institutionalization, and death are important adverse health outcomes. Older adults receiving home care are especially at risk of these outcomes, yet it remains unclear if this risk differs between older adults receiving different types of home care and older adults not receiving home care.
Design: Retrospective cohort study using national claims data from 2019.
Setting and Participants: Community-dwelling Dutch individuals aged ≥ 65 years (N = 3,174,953).
Methods: Participants were categorized: no home care, household help, personal care, household help combined with personal care, or nursing home care at home. The primary outcomes were the number of people experiencing acute hospitalization, recurrent admissions, institutionalization, or death. Logistic regression models were applied.
Results: In total, 2,758,093 adults were included in the no home care group, 131,260 in the household help group, 154,462 in the personal care group, 96,526 in the household help combined with personal care group, and 34,612 in the nursing home care at home group. The risk of adverse outcomes differed between home care groups, with all showing higher odds compared with the no home care group. Individuals receiving household help combined with personal care had the highest odds for acute hospitalization [odds ratio (OR), 2.60; 95% CI, 2.55−2.64] and recurrent admissions (OR, 2.60; 95% CI, 2.55−2.65), while those receiving nursing home care at home had the highest odds for death (OR, 7.59; 95% CI, 7.35−7.85) and institutionalization (OR, 63.22; 95% CI, 60.94−65.58).
Conclusions and Implications: Differentiating between the type of home care older adults receive identifies subpopulations with different risks for adverse health outcomes compared with older adults not receiving home care. Older adults receiving personal care (nurse based) are at high risk for these outcomes and represent a substantial population with prevention potential. Future research should focus on developing effective interventions for this group.

Acute hospitalization, recurrent admissions, institutionalization, and death are important adverse health outcomes in older adults.[1-3] These outcomes present challenges to many countries on a population level because they increase the need for care in societies with rapidly aging populations and limited health care personnel.[4,5] Multiple risk factors have been associated with these adverse health outcomes in older adults, such as geriatric syndromes, multimorbidity, low socioeconomic status, and living alone.[6-10] Older adults receiving home care are particularly prone to these risk factors,[9,11] but few studies have investigated the effect of different types of home care on the risk of adverse health outcomes.

Restrictions apply to the availability of the original data, which were used under ethical approval so are not publicly available. Approval can be obtained from Statistics Netherlands. All outputs and analyses of the current study are reported in the article.

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A prospective 3-year follow-up study in 1300 older Finnish adults who presented with urgent geriatric health problems showed that home care was independently associated with a more than twofold increased risk for institutionalization after correction for age, gender, living alone, falls, cognitive status, number of medications, contact with health services, and a selection of diseases.[12] In addition, a national register-based cohort study showed that older Danish adults who received home care were at increased risk of readmission and mortality within 30 days of a short emergency department (ED) admission (<48 h).[13] They also showed that the number of minutes of home care received was associated with an increased risk of readmission and mortality. For example, >120 min of home care per week increased the risk of readmission twofold and the risk of dying within 30 days fourfold.

Furthermore, in the United States, 2 retrospective cohort studies of Medicare beneficiaries, one involving 18,555 patients discharged from surgical medical units and the other involving 95,531 patients discharged after hospitalization for heart failure, found higher hazards for hospitalization, readmissions, and death within 1 to 3 months after discharge in those receiving home health care than in those not receiving home care.[14,15] Moreover, our recent study on an older Dutch population living in the community showed that older adults receiving home care have a higher risk of visiting the ED and that this risk differs depending on the type of home care received.[16]

Taken together, these studies in acute care, post-acute care, and community cohorts show that older adults receiving home care are at risk of acute hospitalization, recurrent admissions, institutionalization, and death. However, how these adverse outcomes are affected by the type of home care remains unknown. Differentiating between the type of home care received may help us identify older adults in the community who are at risk of developing these adverse outcomes and to target preventive interventions accordingly.

Since the 2015 long-term care reforms in the Netherlands, the home care system has evolved to offer various types of support tailored to individual needs, enabling older adults to maintain independent living. Funded by government budgets through social taxes and mandatory health care premiums, the system aims to provide support to all in need. Household help involves non–health care professionals performing domestic tasks, and is covered under the Social Support Act, managed by municipalities, and requires a minor contribution from the recipient.[17] Personal care is provided by qualified nurses for medical diagnoses and functional limitations, and is funded by health insurance companies under the Healthcare Insurance Act.[18] Household help and personal care can be combined if needed. Long-term or nursing home care can also be provided at home under the Long-Term Care Act, and requires an income-dependent contribution from the recipient.[19] This comprehensive care includes up to 24/7 assistance by qualified nurses or nurse assistants for severe medical, psychological, or functional limitations expected to be present until death. When care needs exceed the maximum possible care that can be provided at home, older adults are institutionalized. Most Dutch older adults are community-dwelling and live in a private household without home care. A minority receive home care so they can stay at home.[20]

This study aimed to compare the risk of adverse health outcomes in older adults receiving different types of home care with those not receiving home care in a national Dutch cohort. It also aimed to determine how quickly these outcomes occur to determine whether there is a window for prevention.

Methods

Study Design and Participants

We conducted this retrospective cohort study using national aggregated claims data from 2019. We selected data from 2019 because this was after the long-term care reforms were introduced in the Netherlands in 2015 and before the COVID-19 pandemic. We recovered data on demographics, home care status, acute hospitalization, and institutionalization from Statistics Netherlands, which covers the entire Dutch population. Dates of death were obtained from the death registry (see Supplementary Material 1 and 2). Ethics approval was not required because the data were anonymized and Statistics Netherlands provides guidelines for use and output control. This study was developed using the STROBE guidelines.[21]

We included community-dwelling Dutch adults who were 65 years or older on January 1, 2019. We categorized participants into the following 5 groups based on their home care status as in a previous study: no home care, household help, personal care, household help combined with personal care, and nursing home care at home.[16] A description of these types is included in Table 1. Participants who had received at least 1 day of home care in January 2019 were categorized in a home care group, in concordance with earlier analyses by the Dutch health care authority.[22]

Outcomes

The primary outcomes were the number of people in each group experiencing acute hospitalization, recurrent admissions, institutionalization, or death in 2019. The secondary outcome was the time to the adverse event, starting on January 1, 2019, for all adverse events except institutionalization, which was measured from February 1, 2019.

Measurements

The age, gender, demographics, and socioeconomic status of all groups were determined on January 1, 2019, as previously described.[16] Medication use was reported in an ATC-4 registration file that recorded the number of drugs prescribed per person in 2019.

Study Definitions

We categorized home care status as household help, personal care, household help and personal care, and nursing home care at home (Table 1). We defined acute hospitalization according to the Dutch health authority, including a clinical nursing day following within 24 h of an acute presentation to any department in a hospital.[23] We defined institutionalization as admittance to a nursing home under the Long-Term Care Act. We used the Statistics Netherlands definitions of income class and socioeconomic status.[24] Income class referred to a percentage of the social minimum household income of the household income registry and socioeconomic status referred to a composite score (socioeconomic status score of the SES-WOA registry) of education, income, and employment. The score ranges from −2 to 1, with a lower score corresponding to lower income, education, and/or employment. The reference SES-WOA score is 0 and represents the mean score of all Dutch adults.[25]

Statistical Analysis

To compare baseline differences between all groups, we used χ^2 tests for dichotomous variables. For continuous variables, we first used *t* tests to compare the no home care group with each home care group separately. Then, we used one-way analysis of variance (ANOVA) to compare the different home care groups. Logistic regression was used to investigate the association between home care types and all primary outcomes after 1-year follow-up (11-month follow-up for institutionalization). Two models were used for the analyses. In model 1, the multivariate logistic regression was adjusted for age and gender. In model 2, regression was adjusted for age, gender, and death. We used only model 1 to analyze death to avoid double correction because

Table 1
Description of Home Care Types With Their Combinations and Definitions

Household help	Act	Social Support Act.[17]
	Purpose	To ensure that Individuals who have difficulty managing daily household tasks can continue to live independently in their own homes.
	Types of service	Assistance with cleaning, laundry, and other household tasks.
	Provided by	Non−health care personnel.
	Time	Varies depending on what is needed, from once to a few times a week; mostly a few hours a week.
	Eligibility	Available to all Dutch inhabitants who can demonstrate that they are unable to perform household tasks independently due to age, illness, disability, or other limitations, and who have an insufficient support system to assist them with these tasks.
	Responsibility	Coordinated by municipal governments responsible for assessing care needs, arranging services, and monitoring quality and effectiveness.
	Procedure	Individuals can apply for household help from municipalities. A municipal consultant assesses the application, conducts a home visit, and advises the municipality to what extend care is needed.
	Funding	Social taxes.
	Contribution	Approximately 20 Euros per month.
Personal care	Act	Health Care Insurance Act.[18]
	Purpose	To provide medical care and treatments at home needed to maintain, improve, or restore health.
	Types of service	Medical nursing care, such as wound care, injections, and other medical procedures. Helping with activities of daily living.
	Provided by	Qualified nurse (often referred to as district nurse).
	Time	Varies depending on what is needed, from once per week to a few times a day; mostly a few hours per week.
	Eligibility	Available to all Dutch inhabitants needing medical care for medical diagnoses and functional limitations.
	Responsibility	Organized by health care insurance companies in collaboration with health care providers, managing insurance coverage, reimbursing health care costs, and contracting with providers.
	Procedure	Individuals can apply for personal care from district nursing providers. A district nurse assesses the application, conducts a home visit, and indicates to what extend care is needed.
	Funding	Social taxes and health care insurance premiums.
	Contribution	None.
Household help combined with personal care		See household help and personal care.
Nursing home care at home	Act	Long-Term Care Act.[19]
	Purpose	To provide intensive care or supervision, often for a long period or the rest of the recipient's life.
	Types of service	Medical nursing care and helping with disabilities more complex and intensive in nature than those needing personal care.
	Provided by	Qualified nurse (often referred to as district nurse) or nurse assistant.
	Time	Varies depending on what is needed, from once per day to 24-h care; mostly a few hours a day.
	Eligibility	Available to all Dutch inhabitants with an expected need for around-the-clock care or supervision for the remainder of an individual's life due to medical, psychological, or functional limitations.
	Responsibility	Organized by care offices, which are part of healthcare insurance companies, managing assessment, coordination, quality assessment and financial management.
	Procedure	Individuals need to submit a formal application to the Care Needs Assessment Centre (CIZ), an independent governing body operating under Dutch government supervision. In the application they need to explain how they meet the eligibility criteria along with their medical file for examination by CIZ. Once approved, care offices, overseen by government and linked to health insurance companies, facilitate the necessary care.
	Funding	Social taxes.
	Contribution	Income depended, maximized at approximately 800 euros per month.

model 2 already adjusted for it. For the secondary outcomes, cumulative incidence curves were used to analyze the time to acute hospitalization and time to institutionalization, whereas Kaplan-Meier curves were used to visualize time to death. The incidence of these outcomes over time was visually assessed. This method was chosen because it only provided information on the potential window for prevention alongside the primary outcome if there was a substantial deviation of the curve during the follow-up period. No cumulative incidence curves were made for recurrent admissions because this would have entailed plotting the time to the second ED visit, which was not the aim of the study. Older adults were allocated to groups based on their home care status in January 2019, whereas the time to institutionalization was reported from February 1, 2019, onward. This 1-month difference between institutionalization and the other outcomes influenced the results.

Results

Population Characteristics and Differences in Adverse Health Outcomes per Group

In total, 3,174,953 community-dwelling persons in the Dutch national population were aged 65 years and older at baseline. Of these, 2,758,093 (86.9%) persons were included in the no home care group, 131,260 (4.1%) in the household help group, 154,462 (4.9%) in the personal care group, 96,526 (3.0%) in the household help combined with personal care group, and 34,612 (1.1%) in the nursing home care at home group.

Table 2 reports the baseline characteristics of the population as well as the number and rate of each adverse event per home care group. Adults in the home care groups were significantly older than those in the no home care group ($P < .001$). They were also more often female, living alone, had a lower SES-WOA score, had a lower income, and used more medication ($P < .001$). Older adults in the household help or household help combined with personal care group were more often female (74.4%), lived alone more often (73.7%), had a lower SES-WOA score (−0.6), and used more medication than older adults in the other groups ($P < .001$).

The number of persons who experienced an adverse health outcome was significantly higher in the home care groups than in the no home care group ($P < .001$). The rates of acute hospitalization and recurrent admissions were highest in the personal care combined with household help and the personal care group. The rate of adverse outcomes was lowest in the no home care group, even though the number of persons experiencing acute hospitalization (176,681) and recurrent admissions (56,655) was highest in this group because of

Table 2
Study Population Characteristics and Incidence of Acute Hospitalization, Recurrent Admissions, Institutionalization, or Death Within O-Year Follow-Up

Characteristics and Outcomes	NO	HH	PC	HH + PC	NHH	*P* Values
n	2,758,093	131,260	154,462	96,526	34,612	
Age, y, mean [SD]	73.1 [6.2]	78.9 [7.4]	81.1 [7.7]	82.3 [7.7]	83.2 [7.8]	< .001
Gender, female	51.0%	74.4%	58.2%	75.1%	64.5%	**< .001**
Lives alone	26.8%	73.7%	48.2%	77.5%	42.6%	**< .001**
SES-WOA score,* mean [SD]	−0.1 [0.5]	−0.6 [0.5]	−0.3 [0.5]	−0.6 [0.5]	−0.3 [0.5]	< .001
Income,† mean [SD]	238.0 [128.0]	143.9 [54.2]	188.4 [97.7]	143.2 [57.0]	178.2 [92.6]	< .001
Medication,‡ mean [SD]	5.5 [4.2]	8.8 [4.7]	9.9 [5.0]	10.9 [5.0]	9.0 [4.8]	< .001
Number of persons with acute hospitalization after 1 year (%)	176,681 (6.4%)	17,726 (13.5%)	35,681 (23.1%)	22,798 (23.6%)	6903 (19.9%)	< .001
Number of persons with recurrent admissions§ after 1 year (%)	56,655 (2.1%)	6246 (4.8%)	13,754 (8.9%)	8866 (9.2%)	2414 (7.0%)	< .001
Number of persons institutionalized after 1 year‖ (%)	10,117 (0.4%)	2001 (1.5%)	11,592 (7.5%)	8541 (8.9%)	12,007 (34.7%)	< .001
Number of persons who died after 1 year (%)	51,583 (1.9%)	6199 (4.7%)	25,141 (16.3%)	13,158 (13.6%)	7206 (20.8%)	< .001

NO, no home care; HH, household help; PC, personal care; HH + PC, household help combined with personal care; NHH, nursing home care at home.

*The SES-WOA score is a mean composite score of education, income, and employment that ranges from −2 to 1. A lower score corresponds to a lower education, income, and/or employment. The reference SES-WOA score is 0 and is the mean score of all Dutch adults 25.

†Income is reported as a percentage of the social minimum, where 100 corresponds to a mean income equal to the social minimum.

‡Medication is the mean cumulative use over a year of distinct prescribed drugs based on a 2019 ATC-4 code. *P* values in bold were calculated using the χ^2 test, and all other *P* values were calculated with ANOVA tests. The variables tested with ANOVA were tested again between the home care groups and the NO group, and all *P* values were significant (<.001).

§Recurrent admissions were defined as more than 1 acute hospitalization.

‖Older adults were allocated to groups based on their home care status starting in January 2019, but the time to institutionalization was measured from February 2019 onward. This 1-month difference influenced the end results.

the large group size. The rates of institutionalization and death were highest in the nursing home care at home group, and there was more variation in the rate of institutionalization between the groups than the other adverse events.

The Association Between Home Care Types and Adverse Health Outcomes

Table 3 shows the results of the logistic regression analysis. All home care groups had a significantly higher risk of all adverse events than the no home care group. The risk of acute hospitalization [odds ratio (OR), 2.60; 95% CI, 2.55–2.64] and recurrent admissions (OR, 2.60; 95% CI, 2.55–2.65) were highest in the household help with personal care group. The risk of institutionalization (OR, 63.22; 95% CI, 60.94–65.58) and the risk of dying (OR, 7.59; 95% CI, 7.35–7.85) were highest in the nursing home care at home group.

How Quickly Adverse Health Outcomes Occur per Group Over Time

Incidences of acute hospitalization, institutionalization, and death increased gradually in most groups during follow-up. In contrast, the incidence of institutionalization increased substantially in the nursing home care at home group in the first 6 months before stabilizing to a more gradual rate (Figure 1). All other curves are presented in Supplementary Material 3.

Discussion

This national study shows that older adults receiving home care have a higher risk of acute hospitalization, recurrent admissions, institutionalization, and death than those not receiving home care. Compared with individuals who do not receive home care, the risk of these adverse health outcomes also differed depending on the type of home care received. The risk for acute hospitalization and recurrent admissions was approximately twofold higher in those receiving household help and threefold higher in those receiving personal care than for those receiving no home care. The chance of institutionalization was higher in those receiving personal care (7.5%–8.9%; 12-fold increase) and nursing home care at home (34.5%; 60-fold increase). The chance of death was also two- to sevenfold higher in groups receiving home care. These adverse outcomes increased gradually during follow-up, except for institutionalization in the nursing home care at home group, which increased substantially in the first 6 months.

Earlier studies have compared the risks of adverse health outcomes between older adults who receive home care and those who do not.[12-15,26] In line with these studies, we found higher risks for acute hospitalization, recurrent admissions, institutionalization, and death in older adults receiving home care. The increases we observed in the risk of acute hospitalization and recurrent admissions were similar to those found in earlier studies.[13,27,28]

However, our study revealed a greater increase in the risk of institutionalization (threefold to 60-fold vs two- to threefold in Salminen et al) and death (adjusted five- to eightfold vs unadjusted two- to fivefold in Elkjær et al).[12,13] These discrepancies can partly be explained by a lower incidence of institutionalization and death in those not receiving home care in our cohort compared with cohorts published in other studies (0.4% incidence of institutionalization in our cohort compared with 5% reported by Salminen et al and a 1.6% incidence of death in our cohort compared with 10% reported by Elkjær et al).[12,13] The odds of adverse events were calculated by comparison with the no home care group, so the low rate we observed in our comparison group increased the risk in the home care groups substantially. Higher incidences were observed in the comparison groups of Salminen et al and Elkjær et al because these groups comprised older adults seeking emergency care, who have acute illnesses and therefore a higher chance of adverse outcomes than individuals not receiving home care.[11-13,29] These observations indicate that differentiating in the type of home care is potentially more effective at identifying older adults at risk for institutionalization or death in the community than in those seeking emergency care.

It is already known that sicker and more cognitively or physically impaired older adults will need more home care and may ultimately end up with acute problems or require 24-h nursing home care, especially when home care is insufficient because of nursing staff shortages and deficient funding.[1,3-5,9,30-35] However, our findings have helped identify large subgroups that are most at risk of adverse outcomes and that would benefit greatly from prevention strategies. This knowledge is vital for implementing intervention strategies effectively on a population level.

One high-risk subgroup is older adults receiving personal care with or without household help, who constitute 8% of the older community-dwelling Dutch population. This subgroup faces high risks for all adverse outcomes, particularly for acute hospitalization

Table 3
Adjusted ORs for Acute Hospitalization, Recurrent Admissions, Institutionalization, and Death per Home Care Group

Groups	OR Acute Hospitalization	95% CI	OR Recurrent Admissions*	95% CI
NO				
Model one†	**Ref**		**Ref**	
Model two‡	**Ref**		**Ref**	
HH				
Model one†	**1.88**	(1.85–1.92)	**2.03**	(1.97–2.09)
Model two‡	**1.80**	(1.77–1.83)	**1.80**	(1.77–1.84)
PC				
Model one†	**3.12**	(3.07–3.17)	**3.41**	(3.33–3.49)
Model two‡	**2.35**	(2.31–2.38)	**2.34**	(2.31–2.38)
PC + HH				
Model one†	**3.24**	(3.18–3.30)	**3.64**	(3.54–3.74)
Model two‡	**2.60**	(2.55–2.64)	**2.60**	(2.55–2.65)
NHH				
Model one†	**2.40**	(2.33–2.48)	**2.46**	(2.35–2.59)
Model two‡	**1.56**	(1.52–1.60)	**1.55**	(1.50–1.60)

Groups	OR institutionalization	95% CI	OR death	95% CI
NO				
Model one†	**Ref**			
Model two‡	**Ref**		**Ref**	
HH				
Model one†	**2.60**	(2.46–2.75)	**1.96**	
Model two‡	**2.55**	(2.42–2.70)	-	(1.90–2.02)
PC				
Model one†	**11.49**	(11.12–11.88)	**6.11**	(5.99–6.23)
Model two‡	**10.30**	(9.96–10.65)	-	
PC + HH				
Model one†	**12.80**	(12.34–13.28)	**5.00**	(4.87–5.12)
Model two‡	**11.59**	(11.17–12.03)	-	
NHH				
Model one†	**70.20**	(67.71–72.79)	**7.59**	(7.35–7.85)
Model two‡	**63.22**	(60.94–65.58)	-	

NO, no home care; HH, household help; PC, personal care; HH + PC, household help combined with personal care; NHH, nursing home care at home.
*Recurrent admissions was defined as more than 1 acute hospitalization.
†Model one was corrected for age and gender.
‡Model two was corrected for age, gender, and death.

and recurrent admissions. These outcomes cause functional decline for the patient and extensive health care costs for the system.[1,3,36] Acute care demands of those receiving personal care have already been reported, and frailty, comorbidity, and severity of acute disease have been identified as important contributing factors.[11,37-39] Comorbidity and frailty also increase the need for more intensive home care and nursing home care.[9] Furthermore, previous studies have shown that when registered nurses are involved in care, there may be more referrals to the ED, for example, as the nurses can identify concerns and will refer whereas a housekeeper might not.[16,22,27,40,41] There is a great potential for prevention in older adults receiving personal care, because they are often visited daily by trained nurses, and their acute care demands have been shown to originate gradually over days to weeks. Furthermore, earlier reports have indicated that these nurses often refer patients to the ED because they have insufficient time, resources, and back up from primary care physicians or intermediate-care facilities to address developing demands effectively.[37,40-42] Moreover, multiple studies have demonstrated that intensifying home care can prevent these referrals and adverse health outcomes by providing nurses with the support they need.[26,35,39,40,43,44]

We also showed that older adults receiving nursing home care at home face very high risks for death and institutionalization within a year, with transitions to a nursing home often occurring within 6 months. These results seem logical given the severe and permanent impairments that qualify individuals for this most intensive form of home care, raising questions about whether these adverse outcomes can be prevented at such an advanced stage. Furthermore, earlier reports show that acute care demands in this group are often met by admission to nursing homes rather than referral to a hospital ED.[16,45] This suggests that aggravating care needs in this group are better addressed in nursing homes than in hospitals or at home. Instead of focusing on prevention strategies, it may be more beneficial to concentrate on optimizing the quality of life and care for this group through advanced care planning, whether in a home or nursing home setting. Taken together, our findings suggest that prevention strategies should prioritize older adults receiving personal care, and that advanced care planning could be more beneficial to those receiving nursing home care at home.

Home care organization varies widely across countries because of differences in health care systems, government policies, and cultural norms.[46-49] In (northern) Europe and Canada, home care is available to all residents and is funded publicly through social insurance or taxes, whereas in the United States, the emphasis is on private care. Whether care can be covered by public funds depends on the type of care needed and the individual's income. In Western societies, care is often organized with formal services, whereas in Asia, care is traditionally centered around family and community—although this has recently evolved toward more formal care. Despite these differences, the challenges in providing sufficient home care across the United States, Canada, Europe, and Asia are similar, and include increasing demand and health care costs, personnel shortages, and effective coordination of care.[4,40,46-49]

Strengths and Limitations

A strength of this study is the size of the study sample, which provides a national perspective. There are also some limitations to our study. First, we did not have accurate data on the exact daily or weekly duration of home care received within each home care group, so did not include this in our analysis. Second, relevant data on comorbidities and geriatric syndromes were unavailable in the Statistics Netherlands database, which limits our ability to compare the underlying risk factors for adverse outcomes between groups. However, the impairments caused by these comorbidities and geriatric syndromes are reflected in the eligibility criteria for the different types of home care, as described in Table 1. Third, we limited our correction in the regression analyses to age, gender, and death to prevent overcorrecting. However, other measurements could have had a confounding effect. Fourth, this study focused on a Dutch national sample receiving home health care within the Netherlands. We have made efforts to thoroughly characterize the sample and the Dutch home health care system to assess the generalizability of our findings. Finally, there are inherent limitations to this type of study—for example, group risk may not always reflect individual risk and causal factors may vary—and these limitations need to be considered when developing interventions.

Practical Use and Future Research

The type of home care older adults receive can be used by government and municipal policymakers to identify older adults at risk of adverse health outcomes on a population level. Further research is needed to optimize prevention strategies for older adults with profiles similar to those in our personal care group. Multiple studies have shown that sufficient home care can prevent an increase in home care demand and that system integration, caring case management, and relational continuity are essential.[26,40,42-44,50] To optimize the quality of personal care, research should determine whether addressing factors such as frailty, comorbidity, and the development of acute disease

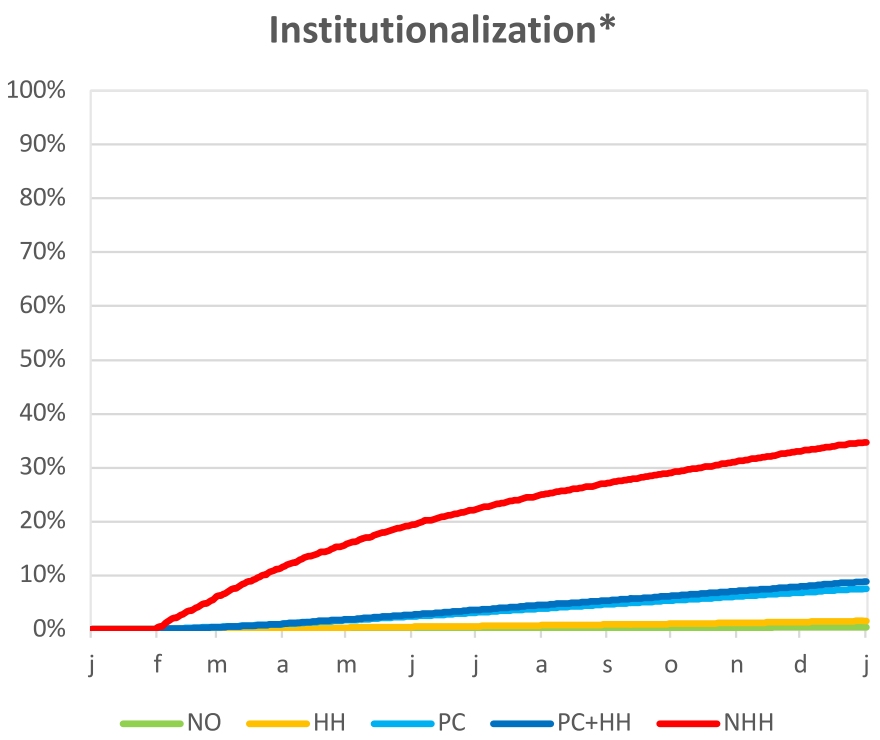

Fig. 1. Cumulative incidence curve of institutionalization per home care type. NO, no home care; HH, household help; PC, personal care; HH + PC, household help combined with personal care; NHH, nursing home care at home. *Participants were allocated to groups based on their home care status in January 2019, whereas the time to institutionalization was measured from February 2019. This 1-month difference influenced the end results. Recurrent admissions were not included because the time to the second admission would have had to be included, which was not the aim of the outcome.

can reduce adverse events in older adults receiving personal care.[11,37,38] The timely deployment of health care personnel can be optimized by early detection of health deterioration through prediction models and through collection of real-life data on activity via robots or domotics. In addition, interventions can be assessed by integrating home care into simulation models of health care systems, which traditionally focus on acute care but can also be used to assess the effects of long-term care. Using the type of home care to predict adverse outcomes in these models is attractive because this information is simple, easy to access, and has minimal data requirements, making it suitable for regions with limited population data.

Conclusions and Implications

This study shows that the type of home care can identify subpopulations at increased risk of acute hospitalization, recurrent admissions, institutionalization, and death compared with community-dwelling older adults who do not receive home care. Older adults receiving nurse-based, medically, and functionally indicated personal care are particularly at risk of acute hospitalization and recurrent admissions, which can lead to further health deterioration and an increased need for care. These adults form a substantial population in the community and have skilled nurses visiting them frequently, so there is potential for prevention. However, further research is needed to determine the causal factors, such as comorbidity, developing frailty, acute disease, and insufficient care, and to investigate whether targeting these factors improves prevention. The type of home care can be used to help policymakers target prevention and model its effect on national and regional scales.

Disclosures

The authors declare no conflicts of interest.

Supplementary Data

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.jamda.2024.105257.

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