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Risk factors for inpatient facility admission among home health care patients with diabetes

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Abstract

Background: Home health care (HHC) patients with diabetes are at high risk for inpatient admissions.

Purpose: To identify variables associated with inpatient admissions among adults age ≥50 with diabetes receiving HHC in the community and in assisted living (AL).

Methods: Retrospective HHC data (collected October 2021 to March 2022 in the Southern United States) from the Outcome and Assessment Information Set D were analyzed with logistic regression (n = 5,308 patients).

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CRediT Statement

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Declaration of Competing Interest

The authors declare no conflicts of interest.

Discussion: The inpatient admission rate was 29.5%. For community-dwelling patients, multiple hospitalizations, depression, limited cognitive function, decreased activities of daily living (ADL) performance, and unhealed pressure ulcer or injury ≥stage 2 were significantly associated with inpatient admission. For those in AL, multiple prior hospitalizations and decreased ability to perform ADLs were associated with inpatient admission.

Conclusion: Understanding risk factors for inpatient admissions among patients with diabetes can support the identification of at-risk patients and inform interventions.

Keywords

OASIS; Hospitalization; Inpatient transfer

Introduction

Diabetes is one of the most common diagnoses in home health care (HHC) patients; in 2017 and 2018, 45% of HHC patients had diabetes (Sengupta et al., 2022). Adults (age ≥45) and older adults (age ≥65) with diabetes are at high risk for complications that may lead to hospitalization or nursing home admission (Abdelhafiz et al., 2015; Bick & Dowding, 2019; Valiyeva et al., 2006; Wang et al., 2019; Young et al., 2015). Timely HHC services (skilled nursing care and physical, occupational, and speech therapy) may reduce the risk of hospitalization (Smith et al., 2021b), but HHC patients with diabetes are still three times as likely to be hospitalized compared to HHC patients without diabetes (Fortinsky et al., 2006). Although HHC has primarily been provided for community-dwelling patients within their homes, it is increasingly provided for patients in residential supportive care settings such as assisted living (AL) (Nazareno et al., 2020; Wang et al., 2021). Preventing inpatient admissions is a priority because older adults often experience declines in physical function while hospitalized or when admitted to a nursing home (Covinsky et al., 2003; Masciocchi et al., 2019). In addition, costs attributed to diabetes amount to almost $70 billion per year in the United States for hospital inpatient services (ADA, 2018; Neuwahl et al., 2018).

HHC patients in AL tend to be older and have greater impairments in cognition and activities of daily living (ADLs) than HHC patients living in the community (Nazareno et al., 2020). While their cognitive and physical function place them at higher risk for inpatient admission, they also receive services in AL that may be protective (Nazareno et al., 2020; Wang et al., 2021). In addition, AL residents are more likely to use home health services for health maintenance rather than following an acute hospitalization (Nazareno et al., 2020). Due to these differences between community-dwelling patients and those in AL, it is important to consider them as unique groups. There is a lack of literature comparing risk factors for hospitalization among HHC patients living in the community versus in AL.

Three known studies have examined risk factors for hospital readmission in HHC patients with diabetes (Chen et al., 2015, 2017a, 2017b). These studies identified the following individual risk factors: 1) sociodemographic factors (e.g., older age, African American race); 2) chronic conditions (e.g., congestive heart failure, peripheral vascular disease, renal failure, pressure or stasis ulcer, depression/anxiety); 3) needing assistance with medication management; and 4) having paid supplementary care (Chen et al., 2015, 2017a, 2017b).

These studies focused narrowly on readmissions (i.e., patients discharged from the hospital and admitted again within 30 days) due to specific preventable conditions and did not specify patients' living situations.

Andersen's Behavioral Model of Health Services Use has been widely used to guide studies examining factors that influence hospital or nursing home admissions (Andersen, 1995; Chen et al., 2015, 2017a, 2017b; Dobbs et al., 2012; Fortinsky et al., 2006; Kattan & Wan, 2018). The model asserts that one's health care utilization is influenced by predisposing, enabling, and need factors (Andersen, 1995). Predisposing factors include demographic characteristics (e.g., age, gender) and social structure factors (e.g., race/ethnicity) that are unalterable and may influence the utilization of resources and the need for health services (Andersen, 1995; Fortinsky et al., 2006). Enabling factors include resources that may influence whether health care services are utilized during an illness, such as income, health insurance, and availability of care (Andersen, 1995; Fortinsky et al., 2006). Finally, need factors are related to physical, mental, and functional health issues that may impact the need for health services (Andersen, 1995; Bick & Dowding, 2019; Fortinsky et al., 2006; Lohman et al., 2018). The Behavioral Model of Health Services Use guided the selection of variables in the current study.

Identifying risk factors influencing whether adults aged ≥50 with diabetes have an inpatient admission while receiving HHC is an important step toward developing interventions aimed at preventing inpatient admissions. As HHC utilization is likely to increase for people with diabetes with the growing prevalence of the disease, it is also important to understand unique risk factors for inpatient admissions for patients in the AL setting and how they compare to risk factors for community-dwelling patients. Therefore, the purpose of this study was to identify variables associated with inpatient facility admissions among adults aged ≥50 with diabetes receiving HHC in the community and in AL facilities.

Methods

Design

This retrospective study was exempt from institutional review board approval by the Indiana University Human Research Protection Program (protocol #15614), and informed consent was not required. Andersen's Behavioral Model of Health Services Use guided this study, and we used data from the Outcome and Assessment Information Set D (OASIS-D), a standardized, comprehensive assessment used for Medicare and Medicaid HHC recipients. The assessment includes items related to patient sociodemographics, clinical and functional status, and service needs at the time of HHC admission, transfer to an inpatient facility, and/or discharge from HHC.

Procedures

According to routine HHC documentation, a registered nurse or a therapy professional completed the OASIS-D HHC assessments through interviews, observations, and reviews of clinical documentation. To conduct this secondary analysis, we obtained a deidentified

composite file of the OASIS-D assessments from the HHC agency according to a data use agreement (#1153529).

Sample and Setting

Patients included in our study received HHC from a single HHC agency in the Southern United States (i.e., Alabama, Florida, Mississippi) and were admitted any time between October 1, 2021 and March 31, 2022 (the two most recent quarters at the time we acquired the data). Inclusion criteria were 1) diagnosis of type 2 diabetes, as indicated by International Classification of Diseases 10th Revision codes as the primary diagnosis or the first or second "other" diagnosis (International Classification of Diseases 10th Revision category E11), 2) age ≥50 years, and 3) availability of follow-up data (inpatient admission or HHC discharge documentation) during the same 6-month period listed above. This age group was targeted because hospitalization frequency may increase sharply after age 50 in patients with diabetes (Gajewska et al., 2013). We excluded patients admitted to hospice during this period.

Measures

The outcome of interest for this study was whether a patient was admitted to an inpatient facility while receiving HHC. Inpatient facilities included hospitals, rehabilitation facilities, and nursing homes. We obtained this information from OASIS-D Transfer forms. The group variable was living arrangements. Clinicians recorded patients' living arrangements as living alone, living with others in the home, or living in a congregate setting (including AL facilities, residential care homes, or personal care homes). We refer to the latter group as "assisted living" because these are all settings where assistance, supervision, and/or oversight are provided. Those living alone or with others in the home were classified as "community-dwelling."

We obtained the following predisposing, enabling, and need factor data from the OASIS-D assessment at the start of HHC.

Predisposing Factors

Sociodemographic characteristics included gender, race/ethnicity, and age. We are using the term gender to be consistent with OASIS-D terminology, but the assessment only included "male" and "female" response options. The OASIS race/ethnicity item is "mark all that apply," but our dataset included only one response per patient. We calculated age using the date of birth and the date of assessment.

Enabling Factors

Clinicians recorded the availability of assistance as around-the-clock, daytime, night time, occasional/short-term, or no assistance available. For the purposes of analysis, we dichotomized the availability of assistance as around the clock or less than around the clock.

Need Factors

Five variables reflected need factors. First, clinicians recorded whether the patient had multiple hospitalizations (≥2) in the 6 months prior to their HHC admission (yes or no).

As part of the routine OASIS-D documentation, clinicians used the Patient Health Questionnaire-2 (PHQ-2), a valid, reliable instrument, to assess depression in all patients (Caycho-Rodríguez et al., 2021; Richardson et al., 2010). They asked patients how frequently they experienced depressed mood and anhedonia over the last 2 weeks on a scale from 0 (not at all) to 3 (nearly every day). The scores from the two items are summed for a total score ranging from 0 to 6, with higher scores indicating greater depressive symptoms.

Clinicians recorded patients' cognitive function at the time of the assessment (taking into consideration the preceding 24 hours) across five categories ranging from alert/oriented to totally dependent. For this analysis, we dichotomized responses into the following two categories to aid interpretation: alert/oriented or requires assistance/totally dependent due to cognitive function.

Clinicians recorded patients' abilities to complete nine ADL activities, each rated on a Likert-type scale ranging from independent to totally dependent/unable to complete. A composite score was calculated based on an established formula that accounts for the different number of potential responses on each ADL activity item and is more accurate than using raw scores (Asiri et al., 2014; Fortinsky et al., 2003; Scharpf & Madigan, 2010; Wang et al., 2021). The ADL composite score ranges from 0 (total independence) to 9 (totally dependent/unable to complete). See Table A1 for a full list of the ADL activity items and the composite score formula.

Lastly, we extracted data on the presence of unhealed pressure ulcers/injuries, which clinicians recorded as yes or no.

Data Analysis

We used Stata/SE 17.0 to conduct all analyses (StataCorp, 2021). We described the sample using means and standard deviations (SDs) as well as frequencies and percentages where appropriate. We compared the characteristics of patients living in the community versus in AL at the start of care using *t*-tests and Chi-square tests.

We used logistic regression to explore factors associated with admission to an inpatient facility. We completed separate models with the same independent variables for patients living in the community and patients in AL to examine whether associated factors were similar or different between the two groups. We included predisposing (5-year increase in age, race/ethnicity), enabling (availability of assistance), and need factors (multiple previous hospitalizations, depression, cognitive function, ADL score, and unhealed pressure ulcer/injury ≥stage 2) as independent variables. We initially examined 29 possible independent variables from the OASIS-D assessment and limited the number of independent variables in the models to not utilize more than 10 independent variables (noting that the categorical variable race/ethnicity is represented by 3 indicator variables). This was based on the 10 events per variable rule (Peduzzi et al., 1996) and the number of inpatient admissions that occurred in the AL sample, as it was a smaller number than those living in the community. See Box 1 for the list of variables considered.

We selected variables for inclusion in the final models based on (in order of most important to least important criterion) previous literature supporting their importance, conceptual uniqueness, measurement validity, and size of odds ratios (ORs) in bivariate analyses. We chose the predisposing (age, race/ethnicity) and enabling (assistance available) factors based on previous literature supporting their importance. We considered including payment sources for home care as an enabling factor, but the sample size of patients with documented Medicaid was too small (< 1%). For the need factors, we chose variables from the following conceptually unique categories: one variable representing a recent history of acute health care utilization, one mental health variable, one functional ability variable, one physical health variable, and one cognitive variable. We chose the mental health (depression) and function (ADL performance) variables because they had the greatest measurement validity within their categories. Within the acute health care utilization, cognitive, and physical health categories, several variables had equal measurement validity, so we selected the variables with the highest ORs in bivariate models (multiple hospitalizations in the last 6 months, cognitive function, and unhealed skin ulcer/injury). We checked for multicollinearity using the variance inflation factor method and a cutoff < 10. Given our need to limit the number of independent variables, we did not include gender in the model as other predisposing factors had stronger literature support in prior work with this population, but we included it in Table 1 to describe the sample.

Findings

Start of Care Characteristics—The final sample included 5,308 HHC patients (n = 5,013 community-dwelling; n = 295 living in AL). Table 1 displays the sociodemographic and health characteristics of the sample at the start of care. We found significant sociodemographic and health characteristics differences between the HHC community-dwelling and AL groups. Both groups were primarily female and White, but there was a greater diversity of race/ethnicity among community-dwelling patients than those residing in AL. The AL sample was older, with a mean age of 81.3 years (SD 9.9) compared to 75.3 years (SD 9.4) in the community-dwelling sample.

Patients in AL were more likely to have assistance available around the clock (92.9% vs. 66.0% of those who live *with others* in the community vs. 7.8% of those who live *alone* in the community; see Table A2 for full information on the availability of assistance). They also had decreased ADL performance (5.4 vs. 5.2) and were more likely to require assistance/be dependent due to cognitive functioning (59.0% vs. 39.5%) and to have at least one unhealed pressure ulcer/injury ≥stage 2 (5.7% vs. 3.3%). More patients living in the community had multiple hospitalizations in the past 6 months (38.9%) than those in AL (32.5%).

Inpatient Facility Admissions—Table 2 shows the outcomes for the number and types of inpatient facility admissions. There were no significant differences in these outcomes between community-dwelling patients and patients in AL. The majority of inpatient admissions in both groups were to a hospital.

Variables Associated With Inpatient Admissions—Table 3 shows the results of the logistic regression models for both samples. For community-dwelling patients with diabetes, the following variables were associated with being admitted to an inpatient facility: multiple hospitalizations in the past 6 months, a Table 3 higher depression score, limited cognitive function, decreased ADL performance, and an unhealed pressure ulcer or injury ≥stage 2. For patients with diabetes in AL, the following variables were associated with being admitted to an inpatient facility: having multiple hospitalizations in the past 6 months and decreased ADL performance.

Discussion and Recommendations

We believe this is the first study to explore factors that influence inpatient admissions in HHC patients with diabetes separately for those living in the community and those in AL. Overall, 29.5% of adults aged ≥50 with diabetes had an inpatient facility admission while receiving HHC. Based on Andersen's Behavioral Model of Health Services Use (Andersen, 1995), several factors at the start of HHC were associated with inpatient admission in community-dwelling patients with diabetes, including multiple hospitalizations in the past 6 months, higher depression scores, limited cognitive function, decreased ADL performance, and an unhealed pressure ulcer/injury. In HHC patients with diabetes residing in AL, only multiple hospitalizations and decreased ADL performance were associated with inpatient admission.

At the start of HHC, community-dwelling patients and those in AL were significantly different in predisposing characteristics and enabling resources. For predisposing characteristics, those in AL were older, which is expected as the majority of AL residents are 85 years and older (Mollica et al., 2012). Additionally, lower racial/ethnic diversity in AL was in line with previous evidence that Black older adults are less likely to move into AL than White older adults (Jenkins Morales & Robert, 2020). Potential reasons for this include systemic racism that limits access to socioeconomic resources, residential racial segregation that leads to AL facilities being built in higher-income areas with lower proportions of Black older adults, and differences in care preferences (Jenkins Morales & Robert, 2020). For enabling resources, AL residents were more likely to have around-the-clock assistance, consistent with the services provided in AL facilities.

Patients living in the community and those living in AL were significantly different in several need factors. First, those in the community were more likely to have multiple hospitalizations in the 6 months prior to HHC. This may be explained in part by the fact that AL residents tend to use HHC for different reasons than people living in the community. As previously mentioned, community-dwelling patients often receive HHC following an acute hospitalization, while patients in AL are more likely to receive HHC for health maintenance without a recent hospitalization (Nazareno et al., 2020). Second, community-dwelling patients with diabetes were more often alert and oriented and had better ADL performance than those in AL. This is consistent with common reasons for moving into AL and with past findings in HHC patients (Nazareno et al., 2020; Wang et al., 2021). Lastly, HHC patients with diabetes in AL were more likely to have an unhealed pressure ulcer/injury. Prior literature comparing the prevalence of pressure ulcers/injuries in

community-dwelling older adults versus AL residents is lacking, but these skin issues are common in other types of long-term care facilities due to factors such as weight loss and immobility (Park-Lee & Caffrey, 2009).

The admission rate in the current study (29.5%) was higher than previously reported in HHC patients with diabetes. Chen et al. (2015) reported a hospital readmission rate of 20% for preventable conditions in HHC patients with diabetes. The higher rate in our study is likely due to our broader focus on any type of inpatient admission, regardless of whether patients were hospitalized prior to HHC. Our sample was also living in the Southern United States, a region with documented higher rates of diabetes-related inpatient stays (Weiss & Jiang, 2020). We found that HHC patients in AL had higher nonsignificant inpatient admission rates than those living in the community, which was not consistent with previous findings in a general HHC population. Wang et al. (2021) found that AL residents receiving HHC had a lower risk of hospitalization than those living in the community alone or with others and suggested that the support provided in AL may help residents avoid acute care admissions. The higher odds of inpatient admission in our study may indicate that the care provided in AL was not as protective for residents with diabetes.

We found that two need factors were significantly associated with the odds of inpatient admission both in patients with diabetes living in the community and in AL. First, we found that HHC patients with diabetes living in the community and in AL who had multiple hospitalizations in the past 6 months had 2.2 and 3.3 times greater odds of inpatient admission, respectively. This is consistent with past research (Lohman et al., 2018). The second factor significantly associated with inpatient admissions in both groups was decreased ability to perform ADLs independently. This finding is supported by previous literature suggesting that decreased functional or ADL ability increases the risk for hospitalization in the overall HHC population and increases the risk of transfer to a nursing home or skilled nursing facility in HHC patients in AL (Bick & Dowding, 2019; Chase et al., 2020; Chen et al., 2015; Fortinsky et al., 2003; Kenny et al., 2008; Lohman et al., 2018; Maxwell et al., 2013).

For community-dwelling patients with diabetes, three additional need factors were associated with increased odds of inpatient admissions: depression, decreased cognitive function, and an unhealed pressure ulcer/injury. The relationships between these variables and the odds of hospitalization are also found in the broader HHC population (not specific to those with diabetes) (Bick & Dowding, 2019; Chase et al., 2020; Lohman et al., 2018; Rönneikkö et al., 2017; Sheeran et al., 2010). Specific to HHC patients with diabetes, Chen et al. (2015) similarly found that depression, but not ADL function, was associated with rehospitalization.

Unlike our findings among community-dwelling patients, depression, cognitive function, and pressure ulcers/injuries were not significantly related to inpatient admission in AL residents (even though the AL group had higher rates of limited cognitive function and pressure ulcers/injuries). This supports the notion that the services provided to AL residents may be protective against inpatient admission for these particular factors. Services provided in AL vary but may include activity assistance, medication management, symptom

monitoring, basic wound care, and medical consultation (Beeber et al., 2014; Wang et al., 2021). AL also provides opportunities for social support from staff or other residents that may be protective (Wang et al., 2021). In addition to the support provided by AL staff, those in AL may also have received higher levels of HHC services based on their needs assessed at the start of care. There may be other factors not included in this study that contribute to inpatient admissions in AL residents. For instance, previous literature has suggested that comorbidities and the ability to maintain balance may also influence inpatient admissions in AL residents (Kenny et al., 2008).

The findings of this study have implications for HHC practice and policy. The factors identified can serve as a basis for assessing the risk of inpatient admission in patients with diabetes and for developing care plans to minimize that risk. The findings may also inform quality improvement initiatives and HHC guidelines. While some risk factors we identified are not readily modifiable, other factors (e.g., depression, decreased ADL performance, and unhealed skin ulcer/injury) may present opportunities for intervention. Previous literature supports that addressing ADLs improves health outcomes and reduces hospitalization; this factor can be directly addressed by therapy services provided through HHC (Bick & Dowding, 2019; Chase et al., 2020; Lohman et al., 2018). Future research should explore additional risk factors and develop interventions aimed at preventing inpatient admission in HHC patients with diabetes.

This study had some limitations. The sample was primarily White. Unfortunately, previous research has shown that patients with diabetes from racial/ethnic minority groups other than Black were less likely to be referred to HHC (Smith et al., 2021b). We could not distinguish between planned and unplanned inpatient admissions (such as for a planned surgery) because this information was not recorded within OASIS-D. We also could not account for diabetes disease severity or number of comorbidities as these variables are not fully captured in OASIS-D. In addition, the AL group had a smaller sample size and fewer inpatient admissions, limiting the number of factors we could include in the models. Because the OASIS-D assessment is intended for clinical use, the psychometric properties of some OASIS-D items for use in research are unclear. “Multiple hospitalizations” was added to OASIS recently and has not been psychometrically evaluated, but the other items used in this study have shown moderate to high internal consistency reliability and/or inter-rater reliability (O’Connor & Davitt, 2012; Staples et al., 2019). Validity is also strong for cognitive function, ADL, and PHQ-2 depression scores (O’Connor & Davitt, 2012; Staples et al., 2019). Given that the patients received HHC from a single agency in the Southern region of the United States, the results may not be broadly generalizable.

In conclusion, many adults aged ≥50 with diabetes who received HHC experienced an inpatient admission. Multiple hospitalizations in the past 6 months, increased depression, limited cognitive function, decreased ability to perform ADLs, and unhealed pressure ulcer/injury were associated with higher odds for inpatient admission in community-dwelling HHC patients. In AL residents with diabetes receiving HHC, multiple hospitalizations in the past 6 months and decreased ability to perform ADLs were the only significant factors. These results can assist in identifying patients at greatest risk and highlight that additional work is needed to identify risk factors for AL residents. Helping adults aged ≥50

with diabetes avoid inpatient admissions and age in place will have important health and economic benefits.

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Appendix

Appendix

Table A1

The Range of Scores for Each ADL Performance Item

ADL Activities	Score Range
Grooming	0–3
Upper body dressing	0–3
Lower body dressing	0–3
Bathing	0–6
Toilet transferring	0–4
Toileting hygiene	0–3
Transferring	0–5
Ambulation	0–6
Feeding or eating	0–5

Note. ADL, activities of daily living.

The ADL composite score = grooming score/3 + upper body dressing score/3 + lower body dressing score/3 + bathing score/6 + toilet transferring score/4 + toileting hygiene score/3 + transferring score/5 + ambulation score/6 + feeding or eating score/5.

Table A2

Full Information on Living Situations and Availability of Assistance

Living Arrangement	Availability of Assistance				
	Around the Clock	Regular Daytime	Regular Night Time	Occasional/Short-term Assistance	No Assistance Available
Patient lives alone	*N = 391*	*N = 96*	*N = 27*	*N = 703*	*N = 65*
Patient lives with other person(s) in the home	*N = 3,307*	*	*	*N = 202*	*N = 13*
Patient lives in congregate situation (for e.g., assisted living, residential care home)	*N = 274*	*	*	*N = 18*	*N = 0*

* Indicates cells that are redacted due to confidentiality concerns with counts ≤10. Additional cells are suppressed to prevent the ability to calculate the suppressed cell(s).

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Box 1

OASIS variables considered for inclusion and those selected (*) for the regression model.

Predisposing Characteristics
*Age
*Race/Ethnicity
Gender

Enabling Resources
*Availability of assistance
Types and sources of assistance
Payment source for home care

Need Factors

Acute healthcare utilization
*Multiple hospitalizations in the past 6 months
Inpatient discharge in past 14 days
Multiple ER visits in the past 6 months

Mental health
*Depression
When anxious

Functional abilities
*ADL performance
Mobility
Self-care
Medication management

Physical health
*Unhealed pressure ulcer/injury
Peripheral vascular or arterial disease
Unintentional weight loss
Exhaustion
BMI
Vision
Frequency of pain interfering
Stasis ulcer
Surgical wound
Urinary incontinence
Bowel incontinence
Shortness of breath

Cognitive function
*Cognitive functioning
When confused

Table 1

Sociodemographic and Health Characteristics at the Start of Care

Characteristic	Overall	Community-Dwelling	Assisted Living	*p*-Value*
Number of patients	5,308	5,013	295	
Predisposing factors Mean age (SD)	75.6 (9.5)	75.3 (9.4)	81.3 (9.9)	< .001†
Gender, number (%)				.69
Male	2,254 (42.5%)	2,132 (42.5%)	122 (41.4%)	
Female	3,054 (57.5%)	2,881 (57.5%)	173 (58.6%)	
Race and ethnicity, number (%)				< .001†
White	3,809 (71.8%)	3,547 (70.8%)	262 (88.8%)	
Black or African-American	1,204 (22.7%)	1,179 (23.5%)	25 (8.5%)	
Hispanic or Latino	227 (4.3%)	‡	‡	
Other race/ethnicities	68 (1.3%)	‡	‡	
Enabling factor Availability of assistance, number (%)				< .001†
Around-the-clock assistance	3,972 (74.8%)	3,698 (73.8%)	274 (92.9%)	
Less than around-the-clock assistance	1,336 (25.2%)	1,315 (26.2%)	21 (7.1%)	
Need factors Multiple hospitalizations (past 6 mo), number (%)				.03†
No	3,264 (61.5%)	3,065 (61.1%)	199 (67.5%)	
Yes	2,044 (38.5%)	1,948 (38.9%)	96 (32.5%)	
Mean PHQ-2 (Depression) Screening Score (SD)	0.43 (0.87)	0.42 (0.87)	0.51 (0.91)	.09
Cognitive functioning, number (%)				< .001†
Alert and oriented	3,152 (59.4%)	3,031 (60.5%)	121 (41.0%)	
Requires assistance or dependent	2,156 (40.6%)	1,982 (39.5%)	174 (59.0%)	
Mean ADL composite score (SD)§	5.2 (1.3)	5.2 (1.3)	5.4 (1.3)	.01†
Presence of at least one unhealed pressure ulcer/injury ≥stage 2, number (%)				.03†
No	5,125 (96.6%)	4,847 (96.7%)	278 (94.2%)	
Yes	183 (3.5%)	166 (3.3%)	17 (5.8%)	

Note. ADL, activities of daily living; mo, months; HHC, home health care; PHQ-2, Patient Health Questionnaire-2; SD, standard deviation.

* *p*-values for *t*-tests and Chi-square tests comparing start-of-care characteristics of HHC patients living in the community versus in assisted living.

† *p*-values < .05 are considered statistically significant.

‡ Indicates cells that are redacted due to confidentiality concerns with non-zero counts ≤10. Additional cells are suppressed to prevent the ability to calculate the suppressed cell(s).

§ Higher ADL score represents greater dependence in ADLs.

Table 2

Inpatient Admission Outcomes

Characteristic	Overall	Community-Dwelling	Assisted Living	*p*-Value*
Number of patients	5,308	5,013	295	
Total admissions to inpatient facilities, number (% of patients with inpatient admission)	1,565 (29.5%)	1,464 (29.2%)	101 (34.2%)	.07
Type of inpatient admission				.43
Hospital, number (% of admissions)	1,505 (96.2%)	1,410 (96.3%)	95 (94.1%)	
Rehab facility, number (% of admissions)	45 (2.9%)	†	†	
Nursing home, number (% of admissions)	15 (1.0%)	†	†	

Note. HHC, home health care.

*p-values for t-tests and Chi-square tests comparing inpatient admission outcomes for HHC patients living in the community versus assisted living (p-value < .05 considered significant).

†Cells that are redacted due to confidentiality concerns with non-zero counts ≤10. Additional cells are suppressed to prevent the ability to calculate the suppressed cell(s).

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Table 3

Logistic Regression for Admission to an Inpatient Facility

	Odds Ratio (95% CI)	
	Community-Dwelling	**Assisted Living**
Number of patients	5,013	295
Number of inpatient admissions	1,464	101
Age (5-year increase)	0.99 (0.95, 1.02)	0.97 (0.84, 1.12)
Race/ethnicity		
White	(Reference)	(Reference)
Black or African-American	1.12 (0.97, 1.30)	0.84 (0.32, 2.20)
Hispanic or Latino	0.73 (0.53, 1.01)	0.30 (0.03, 2.92)
Other race/ethnicities	1.00 (0.57, 1.77)	2.56 (0.12, 53.1)
Availability of assistance		
Around-the-clock assistance	(Reference)	(Reference)
Less than around-the-clock assistance	1.05 (0.91, 1.21)	1.28 (0.48, 3.47)
Multiple hospitalizations (past 6 mo)		
No	(Reference)	(Reference)
Yes	2.20 * (1.93, 2.50)	3.26 * (1.87, 5.67)
Depression (PHQ-2 score)	1.09 † (1.02, 1.17)	0.98 (0.74, 1.31)
Cognitive Function		
Alert and oriented	(Reference)	(Reference)
Requires some or considerable assistance or dependent	1.24 ‡ (1.08, 1.41)	0.94 (0.55, 1.61)
ADL Score	1.17 * (1.11, 1.23)	1.30 † (1.05, 1.60)
Unhealed pressure ulcer or injury ≥stage 2		
No	(Reference)	(Reference)
Yes	1.98 * (1.43, 2.74)	0.89 (0.29, 2.75)

Note. ADL, activities of daily living; CI, confidence interval; mo, months; PHQ-2, Patient Health Questionnaire-2.

Variance inflation factor was ≤1.2 for all variables.

* $p < .001$.

† $p < .05$.

‡ $p < .01$.