



JAMDA

journal homepage: www.jamda.com

Original Study

Nursing Home–Hospice Collaboration and End-of-Life Hospitalizations Among Dying Nursing Home Residents

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A B S T R A C T

Keywords:

 Hospice
 nursing home
 end-of-life hospitalization

Objectives: Nursing homes (NHs) collaboration with hospices appears to improve end-of-life (EOL) care among dying NH residents. However, the potential benefits of NH-hospice collaboration may vary with the patterns of this collaboration. This study examines the relationship between the attributes of NH-hospice collaboration, especially the exclusivity of NH-hospice collaboration (ie, the number of hospice providers in a NH), and EOL hospitalizations among dying NH residents.

Design: This national retrospective cohort study linked 2000–2009 NH assessments (ie, the Minimum Data Set 2.0) and Medicare data. A linear probability model with facility fixed-effects was estimated to examine the relationship between EOL hospitalization and the attributes of NH-hospice collaborations, adjusting for individual and facility characteristics. We also performed a set of sensitivity analyses, including stratified analyses by volume of hospice services in a NH and stratified analyses by rural vs urban NH locations.

Settings: All Medicare and/or Medicaid certified US NHs with at least 8 years of data and at least 30 beds.

Participants: NH decedents resided in Medicare and/or Medicaid certified NHs in the US between 2000 and 2009. We restricted the analyses to those continuously enrolled in Medicare fee-for-service in the last 6 months of life and those who were in NHs for the last 30 days of life. In total, we identified 2,954,276 NH decedents over the study period.

Measurements: The outcome variable was measured as dichotomous, indicating whether a dying NH resident was hospitalized in the last 30 days of life. The attributes of NH-hospice collaboration were measured by the volume of hospice services (defined as the ratio of number of hospice days to the total NH days per NH per calendar year) and the number of hospice providers in a NH (defined as the number of unique hospice providers in a NH per year). We categorized NHs into groups based on the number of hospice providers (1, 2 or 3, and ≥ 4) in the NH, and conducted sensitivity analysis using a different categorization (1, 2, and 3+ hospice providers).

Results: The pattern of NH-hospice collaboration changed significantly over years; the average number of hospices in a NH increased from 1.4 in 2000 to 3.2 in 2009. The volume of NH-hospice collaboration also increased substantially. The multivariate regression analyses indicated that having more hospice providers in the NH was not associated with lower risks of EOL hospitalizations. After accounting for individual and facility characteristics, increasing hospice providers from 1 to at least 4 was associated with an overall 1 percentage point increase in the likelihood of EOL hospitalizations among dying residents ($P < .01$), and such relationship remained in NHs with moderate or high volume NHs in the stratified analyses. Stratified analysis by rural vs urban NHs suggested that the relationship between the number of hospice providers and EOL hospitalizations was mainly in urban NHs.

Conclusions: More hospice providers in the NH was not associated with lower EOL hospitalizations, especially among NHs with relatively high volume of hospice services.

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This work is funded by the National Institute on Aging Grant 1R03AG042648-01A1 for supporting this work.

The authors declare no conflicts of interest.

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<https://doi.org/10.1016/j.jamda.2017.10.020>

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Nearly 25% of decedents in the United States spend the last chapter of their lives in nursing homes (NHs).¹ Hospitalizations among NH residents are prevalent.^{2–5} About 44% of nonhospice NH residents are hospitalized in the last 30 days of their life.³ Many of these hospitalizations are unnecessary and cause significant disruption in care and often result in poor outcomes and additional physical and psychological deterioration of frail NH populations, especially among dying residents.^{6–9} These hospitalizations are also costly and incur a high financial burden on Medicare.^{6,7,10–12}

The use of hospice care (provided through NH-hospice collaborations) appears to reduce end-of-life (EOL) hospitalizations for dying NH residents.^{3,4,13–15} The potential impact of NH-hospice use on NH's EOL practice may be influenced by the attributes of their collaborations,^{16–19} which may vary by the volume of hospice use (ie, the amount of hospice services provided in a NH) and the exclusivity of collaboration (ie, the number of different hospice providers in a NH). Higher volumes of hospice use may have a “practice makes perfect” effect – more frequent exposure to hospice providers may help NHs to better integrate the palliative care philosophies and approaches to EOL care advocated and practiced by hospice.¹⁷ On the other hand, an exclusive collaboration (ie, fewer different hospice providers) is likely to lead to a more successful NH-hospice relationship, with fewer care conflicts and greater rapport, and resulting in better care.^{16,20} The association between these 2 attributes of NH-hospice collaborations, especially the exclusive partnership, and NH hospitalization rates among dying residents has not been adequately studied.

The rapidly expanding hospice market provides us with a unique opportunity to study the association between changing attributes of NH-hospice collaborations and EOL hospitalizations in NHs.^{21,22} For example, the rate of hospice use among NH decedents increased from 14% to 33% between 1999 and 2006, which paralleled the growth in the number of hospices serving NHs (from 1850 in 1999 to 2768 in 2006).²³ Furthermore, there have been great variations in growth rates of hospice providers across regions, which allow us to explore the association between NH EOL care and different patterns of NH-hospice collaborations.^{23,24}

The objective of this study is to examine the association between the attributes of NH-hospice collaborations, especially the exclusive partnership, and EOL hospitalization rates among dying NH residents. Understanding such relationship is necessary for policymakers to adequately evaluate the costs and benefits of hospice use and consider policy changes to the Medicare hospice benefit.

Methods

Data Set

Nationwide data, including the Minimum Data Set 2.0, Medicare claims (inpatient, skilled nursing facility, hospice, home health, and outpatient claims) and Online Survey, Certification, and Reporting [OSCAR, now the Certification and Survey Provider Enhanced Reporting (CASPER) data], between January 2000 and December 2009 were linked. The Minimum Data Set 2.0 data contains detailed information on individuals' sociodemographic characteristics, their health conditions, and their preference of care. Medicare claims capture individuals' health care utilization covered by Medicare, such as hospitalizations, among Medicare fee-for-service enrollees. OSCAR data contains annual information on NH characteristics, and allowed us to capture factors that may change over time (eg, staffing level).

Study Cohort

We included all NH decedents who were in Medicare/Medicaid certified free-standing NHs in the US between 2000 and 2009. We required these residents to be in NHs for the last 30 days of their life

and to be continuously enrolled in Medicare fee-for-service all 6 months before death. Furthermore, we focused the analyses on free-standing NHs with at least 8 years of data and at least 30 beds. In total, we identified 2,954,276 decedents in 14,294 NHs over the study period.

Variables

The outcome variable was EOL hospitalization, defined as whether a dying resident experienced any hospitalization in the last 30 days of life. We constructed 2 variables to represent the attributes of NH-hospice collaborations: (1) the annual volume of hospice use in a particular NH, defined as a continuous variable that reflected the proportion of total hospice days (ie, days on hospice for all hospice residents) to total NH days (ie, days in NH for all NH residents) in a calendar year, and (2) the number of unique hospice providers that provided services in a NH in a year (which reflect the extent of the exclusivity NH-hospice collaborations). We considered a hospice provider as a “valid” provider if the provider provided at least 10 days of services in a single year or over years (which accounted for 90% of the hospice providers that provided any services in NHs). Based on the distribution of the number of different hospice providers in a NH in a particular year, we categorized NHs as having collaborations with no hospice providers, 1 hospice provider, 2 or 3 hospice providers, or 4 and more hospice providers. We also performed a sensitivity analysis by categorizing NHs into groups with 0, 1, 2, and 3+ hospice providers.

Person-level characteristics included individual hospice enrollment status, the presence of do-not-hospitalize or do-not-resuscitate orders, sociodemographic characteristics (eg, age, sex, race, education, marital status), physical functional status (ie, activities of daily living, cognitive functional status (ie, cognitive performance scale), comorbidities (eg, diabetes, congestive heart failure, dementia), and the presence of a terminal prognosis. We also adjusted for the secular trend by including indicators for the year of death. Lastly, we accounted for facilities characteristics that may change over time, such as residents payer-mix (eg, % of Medicaid and Medicare) and staffing (eg, registered nurses hours per residents per day), based on the OSCAR data.

Statistical Analysis

We first examined the changes in the attributes of NH-hospice collaboration (ie, volume and the exclusivity of collaboration) over years. We then examined the relationships between the changes in the attributes of NH-hospice collaborations and the likelihood of EOL hospitalizations by using multivariable regression analyses. The unit of analysis was individual NH decedent. Specifically, we fit a linear probability model with facility fixed-effects and robust standard errors. The model controlled for individual level characteristics, time changing facility effects and year indicators. We chose to use a linear probability model because of its computational efficiency, and its approximation to the logistic regression.²⁵ The fixed-effects model provided estimates of changes in outcomes within a NH facility. By using within facility estimates, we controlled for differences in outcomes because of differences in quality between NHs that were invariant over time, and, thus, allowed us to better isolate the association between NH-hospice collaborations and EOL hospitalization.²⁵

As the potential impact of the exclusivity of NH-hospice relationship may vary with the volume of hospice care in a NH, we performed a sensitivity analyses that stratified facilities by the volume of hospice use (based on the distribution of hospice volume in NHs across all years) and estimated separate regressions in each subgroup. Furthermore, we stratified the analyses by urban vs rural NHs (based on the county of a NH's location) because the availability of hospice providers or hospitals as well as practice patterns could differ in urban

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