Published in final edited form as:

Home Health Care Serv Q. 2014 ; 33(3): 159–175. doi:10.1080/01621424.2014.931768.

Frontloading and Intensity of Skilled Home Health Visits: A State of the Science

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Abstract

Frontloading of skilled nursing visits is one way home health providers have attempted to reduce hospital readmissions among skilled home health patients. Upon review of the frontloading evidence, visit intensity emerged as being closely related. This state of the science presents a critique and synthesis of the published empirical evidence related to frontloading and visit intensity. OVID/Medline, PubMed, and Scopus were searched. Seven studies were eligible for inclusion. Further research is required to define frontloading and visit intensity, identify patients most likely to benefit, and to provide a better understanding of how home health agencies can best implement these strategies.

Keywords

frontloading; rehospitalization; skilled home health; visit intensity

INTRODUCTION

Reducing unplanned and possibly preventable hospital readmission among older adults has been a priority of the Centers for Medicare and Medicaid (CMS), as well as acute and postacute care providers. Hospitalization costs for fee-for-service Medicare beneficiaries rose from \$110 billion in 2006 to \$120 billion in 2012 (Medicare Payment Advisory Commission [MedPAC], 2014). The MedPAC (2007) estimates that 75% of Medicare readmissions are potentially preventable costing CMS \$15 billion every year.

Reducing 30-day hospital readmissions is of particular interest due to CMS's Hospital Readmissions Reduction Program. It reduces payment to hospitals with excess 30-day readmissions following hospitalizations for acute myocardial infarction, heart failure, and pneumonia, effective October 1, 2012 (CMS, 2013). CMS (2013) is expected to expand the program to include chronic obstructive pulmonary disease and patients admitted for elective total hip arthroplasty and total knee arthroplasty in fiscal year 2015.

Not only is hospitalization costly for payers, but it poses immeasurable costs for patients. Hospitalization exposes already vulnerable older adults to the risk of medical errors (Institute of Medicine [IOM], 1999, 2003), and is associated with reduced functional status (Cornette et al., 2006; Graf, 2006), reduced quality of life (Naylor, Stephens, Bowles & Bixby, 2005), and a shorter time to death (Lum, Studenski, Degenholtz, & Hardy, 2012; Mandawat, Mandawat, Mandawat, & Tinetti, 2012). Often in partnership with acute care organizations and primary care physicians, Medicare-certified home health providers have been seeking ways to reduce 30-day readmissions among Medicare-reimbursed home health patients. Frontloading of skilled nursing visits is one way home health providers have attempted to tackle this issue. In fact, frontloading was found by the Briggs® National Quality Improvement/Hospitalization Reduction Study (Briggs Corporation, 2006), to be one of 15 best practices routinely employed by 64% of the home health agencies who were most successful at reducing hospitalizations.

Frontloading is a concept that can be operationalized in a variety of ways. Key dimensions include the timing of home health visits, number of visits, and discipline of staff providing visits. Whether to frontload the visits provided to all patients or only those with specific conditions is another consideration. Despite being poorly understood, frontloading was endorsed by the Home Health Quality Improvement National Campaign (launched in 2007) as one best practice aimed at preventing unnecessary hospitalizations (Esslinger, Kevech, Anderson, & Knowles, 2008; Home Health Quality Improvement [HHQI], 2010). It is thought that providing more visits in the first few weeks of home health allows clinicians to identify issues earlier in the home health episode, intervene to prevent an avoidable hospitalization, and to maximize teaching opportunities (HHQI, 2010).

The purpose of this state of the science is to provide a critique and synthesis of published empirical evidence related to frontloading and visit intensity among home health beneficiaries. In this literature review, we discuss the gaps in knowledge and identify opportunities for future research to further our understanding of the impact frontloading and

visit intensity may have on preventable hospitalizations among skilled home health beneficiaries.

METHODS

A panel of specialists in home health care and research helped refine the review, key research question, and methodology. The search was limited to research published in English. A review of the literature began with OVID/Medline and PubMed using frontloading as the search term. Forty-eight articles were found but only 1 article related to frontloading visits in home health was found (Rogers, Perlic, & Madigan, 2007). Due to this low number of studies, Scopus was then employed to search for additional studies that have cited the original seminal work of Rogers et al. (2007). A total of 10 publications have cited Rogers and colleagues' (2007) study providing three additional studies for inclusion in this review (Madigan et al., 2012; Markley, Sabharwal, Wang, Bigbee, & Whitmire, 2012; Riggs, Madigan, & Fortinsky, 2011). Seven of the 10 articles that cited Rogers and colleagues (2007) were not research studies designed to further our understanding of the impact of frontloading. These seven articles merely cited Rogers and colleagues, describing that frontloading has been found to reduce the need for hospitalization among skilled home health patients and were, therefore, not included in this analysis. Upon review of the frontloading evidence, visit intensity emerged as being closely related to frontloading. An additional search was conducting using the terms home health and intensity. Fifty-one additional articles were found and yielded 2 research studies related to visit intensity among skilled home health patients (Adams, DeFrates, & Travis, 2000; O'Sullivan & Volicer, 1997). The reference lists of articles were also examined yielding one additional study related to visit intensity (Brega, Jordan, & Schlenker, 2003).

Articles were selected if frontloading or visit intensity among patients receiving skilled home health services was studied (Figure 1). Articles that merely reported on the HHQI campaign or wrote in support of frontloading were not included. Articles were entered into a table of evidence, summarized, and critiqued based on study design, sample size, and significant findings (Table 1). Since a single universally accepted tool to evaluate the level of research evidence does not exist, we applied the seven levels of evidence described by Melnyk and Fineout-Overholt (2011). Level I is the highest level of evidence consisting of systematic reviews and meta-analyses of randomized controlled trials or clinical guidelines based on systematic reviews or meta-analyses. Level VII is the lowest level of evidence consisting of expert opinion.

FINDINGS

One hundred ten articles were reviewed. Of these, seven studies were eligible for inclusion in this review and were organized into two themes: frontloading and visit intensity. All studies included in this analysis were conducted in the United States. Sample sizes among the studies varied between 84 patients, using only one home health agency (Rogers et al., 2007), and 74,580 patients using a national data set (Madigan et al., 2012). One study did not report number of patients (Markley et al., 2012). We included the findings from the visit

intensity studies as they contribute to the home health literature and extend our knowledge regarding how home health visit intensity relates to patient outcomes (Table 1).

Frontloading

Two of the seven published studies reviewed investigated frontloading among skilled home health patients (Markley et al., 2012; Rogers et al., 2007). Both studies were prospective and utilized convenience samples. One study included patients with either heart failure or diabetes mellitus (Rogers et al., 2007) while the other study included all diagnoses (Markley et al., 2012); however, it is unclear if the 29 home health agencies in this study frontloaded visits for specific disease populations or for all patients. The sample sizes for the 2 frontloading studies were 84 patients with diabetes and 246 patients with heart failure from 1 home health agency in Ohio (Rogers et al., 2007); and 29 home health agencies, 5 community hospitals, 11 skilled nursing facilities, 2 inpatient rehabilitation facilities, and 1 large physician clinic all located in Texas (Markley et al., 2012). Markley and colleagues (2012) did not report the number of patients included.

Both studies considered frontloading of skilled nursing visits only. Rogers and team (2007) defined frontloading as providing 60% of the planned visits within the first 2 weeks of the home health episode. Upon conclusion of the study, the researchers made suggestions regarding the frequency of skilled nursing visits within the first 2 weeks of home health based upon a patient's New York Heart Failure Classification (Heart Failure Society of America, 2002).

Markley and colleagues (2012) did not specify how home health agencies operationalized frontloading, but stressed that agencies relied upon the Home Health Quality Campaign materials which mirrored the recommendations of Rogers and colleagues' (2007). Both frontloading studies looked at rehospitalization but differed on the time points. One study looked at rehospitalization within 14 and 60 days (Rogers et al., 2007) and the other at 30 days (Markley et al., 2012). Analytic methods among the two frontloading studies included calculating percentage changes (Markley et al., 2012) and chi squares (Rogers et al., 2007). Neither study employed random selection of sample subjects indicating the possibility of biased samples.

Overall, the findings across both studies indicate that frontloading reduced the need for rehospitalization among skilled home health patients. However, among patients with diabetes, frontloading was ineffective at reducing the need for rehospitalization, and had no impact on patient satisfaction or in reducing length of stay in home health (Rogers et al., 2007). Frontloading was found to be significantly associated with the reduced need for overall rehospitalization among patients with heart failure (Rogers et al., 2007) and 30-day readmission among 88% of home health agencies that employed this intervention (Markley et al., 2012). However, it should be noted that frontloading was one strategy among many employed to reduce 30-day readmissions by Texas home health agencies participating in the quality improvement organization demonstration. Authors report that the quality improvement organization was unable to identify any one intervention that most affected readmissions (Markley et al., 2012). Finally, significant findings ($p < .05$) indicate that patients with heart failure who received frontloaded skilled nursing visits received fewer

visits overall, a shorter home health length of stay, fewer visits per week, and had higher satisfaction rates compared to patients with heart failure who were not frontloaded (Rogers et al., 2007). The level of evidence related to these two studies varied from a Level IV (Markley et al., 2012; well-designed case-control and cohort studies) to Level VI (Rogers et al., 2007; single descriptive study).

Visit Intensity

Visit intensity among skilled home health patients was examined in five of the seven published studies reviewed. Two studies were prospective (Adams et al., 2000; Brega et al., 2003) and three were retrospective (Madigan et al., 2012; O'Sullivan & Volicer, 1997; Riggs et al., 2011). The studies included patients with heart failure only (Riggs et al., 2011; Madigan et al., 2012); patients with heart failure or diabetes (Brega et al., 2003); patients with heart failure or total hip replacement surgery (O'Sullivan & Volicer, 1997); and patients with cardiovascular disease, chronic obstructive lung disease, diabetes, pneumonia, and orthopedic conditions (Adams et al., 2000). The sample sizes ranged from 107 to 74,580 patients. The number of home health agencies employed for each study ranged from four in Washington State (Adams et al., 2000) to 44 home health agencies in 8 different states (Brega et al., 2003). Only one study used a national sample (Madigan et al., 2012). Data from all five studies were collected between 1994 and 2005.

The calculation of visit intensity differed across all five studies. Three studies calculated visit intensity by dividing the total number of visits by the length of stay in days and multiplying by 7 (Madigan et al., 2012; O'Sullivan & Volicer, 1997; Riggs et al., 2011). One study defined visit intensity by calculating the average total minutes of care per discipline and the average visit length per discipline (Adams et al., 2000) while the final study considered visit intensity to be the number of visits per day a patient received while on service (Brega et al., 2003).

Four studies employed all visit types—skilled nursing, physical therapy, occupational therapy, speech-language pathology, medical social worker, home health aide—in its total visit calculation (Adams et al., 2000; Brega et al., 2003; Madigan et al., 2012; O'Sullivan & Volicer, 1997) and one study included skilled nursing only in its calculation (Riggs et al., 2011). Moreover, the way in which investigators defined low and high visit intensity also differed. One study considered high nursing visit intensity to be between 1.51 to 8.17 skilled nursing visits per week (Riggs et al., 2011) while another considered 4 or more all-discipline visits per week to be high visit intensity (Madigan et al., 2012).

The outcome measures also differed across all five visit intensity studies. Outcomes included visit intensity's association with change in activities of daily living (ADL) status, instrumental activities of daily living (IADL) status, and improvement or stabilization of dyspnea (Riggs et al., 2011); 30-day rehospitalization (Madigan et al., 2012); and predicting the likelihood of patients achieving home health goals (O'Sullivan & Volicer, 1997). Direct care time (Adams et al., 2000) and number visits per day (Brega et al., 2003) when caring for patients with specified diagnoses also were described without examining their impact on any outcomes. Analytic methods differed among the five studies and ranged from calculating averages (Adams et al., 2000), least squares regression (Brega et al., 2003),

logistic (Riggs et al., 2011) and multiple regression (O'Sullivan & Volicer, 1997; Riggs et al., 2011), to a Cox proportional hazards model (Madigan et al., 2012).

Findings from the five visit intensity studies indicate that patients with diabetes received the most skilled nursing time and patients with pneumonia received the least; and that skilled nurses averaged the shortest visits while social workers averaged the longest (Adams et al., 2000). Statistically significant findings ($p < .05$) indicate that a lower visit intensity was found among older patients while a higher visit intensity was provided to patients who lived alone, required a home health aide and complex management, were discharged from a nursing home or rehabilitation facility 14 days prior to home health, were functionally disabled, had one or more Stage 1–4 ulcers, had physician involvement, or were served by proprietary home health agencies (Brega et al., 2003). One study reported 62.6% of study participants received a higher nursing intensity (1.51 to 8.17 skilled nursing visits per week; Riggs et al., 2011) while another reported only 25% of the study sample received 4 or more visits per week (all-disciplines; Madigan et al., 2012).

Findings also indicate that compared with four or more all-discipline visits per week (higher intensity), three or less all-discipline visits (lower intensity) was associated with a decreased probability of rehospitalization, and decreased hazard of early rehospitalization. It is important to note that these associations are nonlinear (1–1.99 visits/week associated with best outcomes); and should be noted that statistical correction for the nonrandom assignment of heart failure patients to different levels of visit intensity was not applied, thus limiting their ability to identify a causal relationship between visit intensity and rehospitalization (Madigan et al., 2012).

Improvement in ADL status was associated with receiving a lower nursing visit intensity while improved or stabilized dyspnea upon home health discharge was associated with receiving a higher nursing visit intensity. Skilled nursing visit intensity had no effect on IADL status (Riggs et al., 2011). Increased all discipline-visit intensity was associated with increased odds of meeting home health goals among total hip replacement patients but odds decreased with increased intensity of visits for heart failure patients (O'Sullivan & Volicer, 1997). The level of evidence among the five visit intensity studies varied from a Level IV, well-designed case-control and cohort studies (Madigan et al., 2012; Riggs et al., 2011); to a Level VI, a single descriptive study (Adams et al., 2000, Brega et al., 2003; O'Sullivan & Volicer, 1997).

DISCUSSION

Overall, the two frontloading studies included in this analysis indicate that frontloading may be an effective tool in reducing rehospitalization among skilled home health patients while lower visit intensity was found to be associated with reduced rehospitalization; however, adjustments were not made for confounding factors. While the HHQI promoted frontloading for all populations, one study focused only on patients with heart failure or diabetes (Rogers et al., 2007) and it is unclear if home health agencies participating in the Texas quality improvement organization demonstration applied frontloading to patients with particular disease states or the entire population served (Markley et al., 2012). Similarly, the visit

intensity studies focused only on heart failure, diabetes, total hip replacement, cardiovascular disease, chronic obstructive lung disease, pneumonia, and orthopedic diagnoses. According to the National Center for Health Statistics (2011), the most common home health diagnoses include: diabetes (10.1%); heart disease (8.8%), including heart failure (4.3%); malignant neoplasm (3.9%); chronic obstructive pulmonary diseases and allied conditions (3.4%); essential hypertension (3.3%); and cerebrovascular disease (3.3%). While focusing initial efforts on the select patient populations were appropriate, more studies are needed to test frontloading and visit intensity among diagnoses that are more inclusive of the skilled home health population and to determine which diagnoses best respond to each intervention.

The small number of published articles underscores the need for rigorous studies with larger samples more representative of the home health population to support the practice of frontloading and visit intensity among skilled home health patients. Researchers must determine the patient characteristics and diagnoses that are most likely to benefit from these interventions. It is possible that frontloading or visit intensity is not effective for some home health populations as was found with frontloading and the diabetic population (Rogers et al., 2007).

Clearly the absence of a universally accepted definition of frontloading presents some challenges as does the varying calculations of visit intensity. In order to refine the definitions of frontloading and visit intensity, future research must include larger, more rigorous studies testing their effectiveness while building upon current knowledge. For instance, there may be a subpopulation of home health patients (e.g., Class III and IV heart failure patients) that require admission to home health within 24 hours of hospital discharge (Briggs Corporation, 2006), followed by frontloaded visits in order to avoid a 30-day readmission. Future research must test these varying visit patterns and include other home health disciplines as well. Furthering our understanding of this already widely disseminated home health best practice could be essential to reducing hospital readmissions and improving outcomes for skilled home health patients.

CONCLUSION

Research indicates that the many rehospitalizations among skilled home health patients are potentially avoidable (Madigan et al., 2012). Findings from this review of the literature suggest that frontloading and possibly visit intensity have the potential to reduce hospitalization and better meet the needs of skilled home health patients. However, our knowledge of these two interventions is limited due to the small number of research studies, a lack of national and randomized samples, limited analytic methods, the diverse outcomes and disease populations studied, as well as the absence of a universally accepted, clear definition of frontloading. Also, the data employed in the visit intensity studies was collected between 1994 and 2005, limiting the application to current home health practice. Moreover, the calculation of visit intensity differed in all five studies making comparison across studies difficult.

Further research is required to define frontloading and visit intensity, identify patients most likely to benefit, and to provide a better understanding of how home health agencies can best implement these strategies. Future research employing a rigorous statistical correction method such as propensity score analysis or instrumental variables is required to address endogeneity. Also, prospective studies using larger randomized samples which include additional diagnoses are needed to increase our understanding of the impact frontloading and visit intensity have on the need for rehospitalization among skilled home health patients.

Acknowledgments

FUNDING

This project was supported by Grant Numbers R01HS020257 and K99HS022406 from the Agency for Healthcare Research and Quality and also supported by the National Institute for Nursing Research, Individualized Care for At-Risk Older Adults (T32-NR009356). The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality or the National Institute for Nursing Research.

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FIGURE 1.
Summary of Evidence Search and Selection.

TABLE 1

Table of Evidence

Citation	Purpose	Design	Sample size	Findings	Level of evidence *
<i>Frontloading</i>					
Markley et al., 2012	To reduce 30-day, all-cause hospital readmission by a minimum of 2% through a comprehensive community-wide effort Strategies: frontloading, red flag teaching, medication reconciliation/self-management, situation background assessment (SBAR) communication	Prospective cohort design Centers for Medicare & Medicaid Services Texas Quality Improvement Organization Care Transitions project August 1, 2008–July 31, 2011 Percentages	$N = 29$ home health agencies; $N = 5$ community hospitals; $N = 2$ inpatient rehabilitation facilities; $N = 11$ skilled nursing facilities; $N = 1$ physician clinic Number of patients not reported	88% of home health agencies who implemented frontloading reported an improvement 30-day hospital readmission rates. The quality improvement organization was unable to identify any one intervention that affected readmissions the most.	Level VI: Evidence from a single descriptive or qualitative study
Rogers et al., 2007	Explore the impact of frontloading skilled nursing visits on rehospitalization, patient satisfaction, and clinical outcomes	Prospective descriptive study HF and diabetic clinical pathway employed Chi square and t tests	$N = 246$ HF patients $N = 84$ diabetic patients Convenience sample	Fewer rehospitalizations within one 60-day home health episode among HF patients with frontloaded nursing visits (15.8 vs. 39.4%, $p < .001$); fewer rehospitalizations among HF patients within 14 days (28.6 vs. 71.4%, $p = .03$). HF patients with frontloaded nursing visits received fewer visits overall (9.5 vs 15.5 $p < .001$), shorter length of stay (27.5 vs. 49.3 days, $p < .001$), and less visits per week (2.2 vs 2.6, $p = .03$). HF patients who received frontloaded nursing visits had higher satisfaction rates (4.94 vs. 4.69, $p = .02$). No differences in outcomes for diabetic patients.	Level VI: Evidence from a single descriptive or qualitative study
<i>Visit intensity</i>					
Adams et al., 2000	To determine discipline-specific visit intensity (direct care time) of home health care providers (RN, PT, OT, SLP, HHA, MSW) on patients with cardiovascular disease, chronic obstructive lung disease, DM, pneumonia, and orthopedic diagnoses	Convenience sample April 29, 1996–September 30, 1998 Intensity: the average total minutes of care per discipline per episode and the average visit length per discipline were calculated for the total sample and the five most common diagnoses Averages	$N = 2,788$ episodes Four nonprofit, Medicare-certified HHAs in Washington	Discipline-specific time requirements varied by patient diagnosis. Substantial variations in resource use occurred among the different diagnoses studied. Home health providers cannot rely on data from total patient samples to plan resource requirements for specific diagnosis groups. Average total amount of time per episode each patient received: 445 minutes of RN care, 449 minutes of home health aide care, 341 minutes of PT care, 235 minutes of OT care, and 142 minutes of SW care. DM patients received the most RN time (558 minutes), and pneumonia patients received the least (314 minutes). RNs averaged the shortest visits (49 minutes/episode); MSWs the longest (average = 61 minutes/episode).	Level VI: Evidence from a single descriptive or qualitative study
Brega et al., 2003	To examine the impact of patient, provider (RN, PT, OT, SLP, HHA, MSW), agency,	Prospective Four states were selected from each of the highest and	$N = 732$ home health episodes among 684 HF or DM patients from 44 home health agencies	Patients received a mean of 0.4 RN visits per day with a mean of 0.6 overall visit per day from all disciplines combined.	Level VI: Evidence from a single

Citation	Purpose	Design	Sample size	Findings	Level of evidence *
Madigan et al., 2012	To determine patient, home health care agency (SN, PT, OT, SLP, HHA, MSW) and geographic factors related to 30-day rehospitalization in a national population of HF patients and to describe the extent to which rehospitalizations were potentially avoidable	Retrospective cohort design using data from Medicare's 2005 Chronic Conditions Warehouse data system Visit intensity rate per week was constructed by dividing the total number of visits by the length of stay in days; multiplied by 7 of visits/home health length of stay) * 7 Multilevel model (GLIMMIX procedure) and Cox proportional hazards model	N = 74,580 HF patients Visit intensity categories: < 1 visit/week, 1–2 visits/week, 3–4 visits/ week and > 4 visits/week	Significant findings ($p < .05$): Lower visit intensity among older patients (coefficient -0.006) Higher visit intensity among patients who: – lived alone (coefficient 0.121) – needed HHA services (coefficient 0.253) – required complex management (coefficient 0.063) – were discharged from a nursing home or rehab facility 14 days prior to home health (coefficient 0.121) – were functionally disabled (coefficient 0.567) – had at least one stage 1–4 ulcer (coefficient 0.235) – had physician involvement (coefficient 0.124) – were serviced by a proprietary agency (coefficient 0.172) Lower visit intensity was associated with the decreased probability of rehospitalization, OR = 0.50–0.59, 95% CI [0.470, .626]; lower visit intensity was associated with a shorter time to rehospitalization, HR = 0.50–0.61, 95% CI [0.481, 0.643]; these associations were nonlinear (1–1.99 visits/week associated with best outcomes); the estimates were not adjusted for patient's clinical severity or level of functional impairment. 26% were rehospitalized within 30 days. 42% of rehospitalizations were associated with a cardiac-related diagnoses. 34% of HF rehospitalizations were considered avoidable.	Level IV: Evidence from well-designed case-control and cohort studies
O'Sullivan & Volcser, 1997	To determine if patient characteristics known at home health start of care are predictive of utilization of home health services (SN, PT, OT, SLP, HHA, MSW) and/or the likelihood of meeting goals for home care established at the time of certification of care among HF and THR patients	Retrospective analysis of discharges for CHF and THR for the period January 1994–March 1995 Visit intensity: total number of all visit-types divided by the length of stay in days; multiplied by seven Stepwise multiple regression	N = 314 (N = 200 CHF; N = 114 THR) from 6 Medicare certified home health agencies in New Hampshire	Odds of terminating with goals met increased with increasing intensity of visits for THR patients (coefficient 1.9447), but decreased with increasing intensity of visits for CHF patients (coefficient -0.02201). THR patients were more likely to be discharged from home health with goals met than CHF patients (82 vs. 44%, $p < .001$). Overall, the variability in likelihood of meeting goals for care was better predicted by patient characteristics than by utilization of home care services.	Level VI: Evidence from a single descriptive or qualitative study
Riggs et al., 2011	Explore the impact of patient characteristics and SN visit intensity on change in ADL status and IADL status and improvement/stabilization of dyspnea among HF patients	Secondary analysis 1999–2001 A nursing visit intensity rate per week was constructed by dividing the total number of nursing visits by the length of stay in days; multiplied by 7 Multiple and logistic regression	N = 107 HF patients 29 home health agencies in Ohio	Patients with a prior hospital stay were more likely to have improvement in ADL status ($\beta = .38$, $p = .001$). Patients who received lower nursing intensity were more likely to have improvement in ADL status ($\beta = -.39$, $p = .001$). The model for change in IADL status was not significant. Patients with more than two comorbidities (OR = 6.5, $p = .04$) and those who received higher nursing visit intensity (OR = 7.0, $p = .04$) were more likely to have improved/stabilized dyspnea upon home care discharge.	Level IV: Evidence from well-designed case-control and cohort studies

Note. ADL = activities of daily living; CHF = congestive heart failure; DM = diabetes mellitus; HF = heart failure; HHA = home health aide; IADL = instrumental activities of daily living; MSW = medical social worker; OT = occupational therapist; PT = physical therapist; RN = registered nurse; SLP = speech-language pathologist; SN = skilled nurse; SW = social worker; THR = total hip replacement.

Level I: Evidence from a systematic review of randomized controlled trials (RCTs) or evidence-based clinical practice guidelines based on systematic reviews of RCTs.

Level II: Evidence obtained from at least one well-designed RCT.

Level III: Evidence obtained from well-designed controlled trials without randomization, quasi-experimental.

Level IV: Evidence from well-designed case-control and cohort studies.

Level V: Evidence from systematic review of descriptive and qualitative studies.

Level VI: Evidence from a single descriptive or qualitative study.

Level VII: Evidence from the opinion of authorities and/or reports of expert committees.

* Levels of evidence as described by Melnyk and Fineout-Overholt (2011):