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Decreasing Heart Failure Revisits

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Abstract Heart failure (HF) is a complex medical condition that is associated with a high rate of HF-related revisits (emergency department and HF hospitalization). Heart failure revisits are associated with worse clinical outcomes and are under scrutiny because of rules imposed by the US Patient Protection and Affordable Care Act and the Hospital Value Based Purchasing program. Many program models and individual strategies have been tested as methods to decrease HF revisits. Many models use similar themes; however, interventions are not always well described in the literature, care providers vary and most programs used a bundled intervention approach, making it difficult to determine the value of specific interventions. Since many program models and strategies did not have strong evidence of effectiveness, more research is needed to decrease HF-related revisits. In this article, programs and strategies designed to decrease HF revisits will be described and discussed from a global perspective.

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Introduction

Approximately 1 million Americans with a primary diagnosis of heart failure (HF) are seen in emergency departments (ED) annually, with 70–80 % ultimately being admitted to the hospital [1, 2]. For many patients, hospitalization for acute decompensated HF created a vicious cycle of HF "revisits" back to the ED and hospital [3]. The cost for HF care in the US is exorbitant, with projections that direct and indirect costs will double from $31 billion in 2012 to $70 billion in 2030 [4]. Even though HF inpatient mortality rates declined by 40 % and mean length of stay declined by 30 % in the past decade, HF rehospitalization rates remained stable, with approximately 25 % of patients being readmitted within 30 days and 50 % within 6 months [5]. Moreover, following hospitalization, 30-day mortality rates were unacceptably high at 11 % [5], and rehospitalization was associated with very high short- and long-term mortality rates [6, 7]. Thus, decompensated HF places a tremendous burden on patients, families, caregivers, hospitals, society and the entire health care system. The focus of this article is to provide outcomes of studies of HF-based programs and strategies aimed at reducing HF revisits. Based on results from a review of the literature, implications for clinical practice and future research will be discussed.

Economic Consequences of Heart Failure Revisits

Improving outcomes of care is important to patients, clinicians, hospitals, and insurers. Leadership of the Centers

for Medicare & Medicaid Services (CMS) believed that facilities providing high-quality HF care during hospitalization, in conjunction with quality transitions to outpatient environments, would have improved patient outcomes, including reduced readmissions and mortality, as well as improved functional ability and quality of life. Thus, CMS began publicly reporting select outcome measures to increase transparency of care, aid in consumer selection of care and assist hospitals in quality initiatives [8]. Public reporting of risk-adjusted mortality rates in patients with HF began in 2007 and expanded to include 30-day, all-cause risk-adjusted HF readmission rates in 2008, using claims and administrative data [9]. Both outcome measures were endorsed by the National Quality Forum and have been incorporated into Hospital Value Based Purchasing (HVBP) scores used to determine value-based incentive payment adjustments.

The HVBP payment methodology links reimbursement more directly to quality of care delivered by acute care hospitals. Stemming from the Deficit Reduction Act of 2005, HVBP was developed by CMS to provide an ongoing process for assessing quality and efficiency in hospital inpatient settings [10]. In May 2011, CMS issued the HVBP final rule, linking Medicare reimbursement to quality performance in acute care hospitals. In fiscal year 2013 (patient discharges as of October 1, 2012), HF was one of three initial conditions selected for HVBP. Acute care hospitals participating in HVBP had their base diagnosis-related group (DRG) HF payments reduced by 1 % in fiscal year 2013; the reduction increased to 1.25 % in fiscal year 2014 (began October 1, 2013). Annual reductions of 0.25 % are scheduled, with a maximum of 2 % slated for fiscal year 2017 and beyond [10]. Although an inability to meet or improve baseline HVBP scores will result in DRG payment reductions, it is possible for hospitals to offset or "earn back" fees charged for HVBP with demonstrated improvement in quality scores.

The pervasiveness of HF revisits may be related to subquality care during the index hospitalization and self-care deficits at home [11]. The Hospital Readmission Reduction Program, as part of the Affordable Care Act to improve quality of care delivered, was implemented in fiscal year 2013. The program reduced payment to acute care hospitals with excessive readmissions [12]. Reductions are calculated based on a hospital's actual 30-day readmission rate compared to the national average; a ratio greater than 1 has financial consequences for the facility. In fiscal year 2013, facilities that had higher ratios received a 1 % reduction penalty, and the penalty increased to 2 % on October 1, 2013 (fiscal year 2014). Over 2,200 hospitals will receive the full 2 % reduction this year, equating to approximately $227 million in penalties [12].

Programs and Strategies to Decrease Heart Failure Revisits

Revisits in HF are compounded by the progressive nature of HF and multifactorial issues, such as social, psychological, financial or medical needs. Revisits for decompensated HF create challenges for patients, families, health care providers and hospitals. Challenges include care related to care transitions, knowledge deficits about HF and management, medication reconciliation, higher intensity outpatient care and support, and ED clinical processes and services aimed at preventing hospital admission. Further, research targeted at reducing HF revisits did not have comparable findings, primarily due to a lack of homogeneity in the interventions assessed, creating difficulties in translating findings clinically. See the supplement, which provides a broad-based review of research findings of programs or strategies aimed at reducing ED or hospital revisits. No matter the program or strategy employed, one universal theme of care is to ensure adherence to guideline-directed medical and cardiac device therapies known to improve outcomes in patients with stage C and D HF [13••, 14].

Inpatient-Based Strategies

Delivery of comprehensive patient education prior to discharge is recommended in all major HF guidelines [13, 14] and is a quality performance measure for hospitals [15, 16]. Required topics are activity, diet, understanding medications and follow-up care, daily weight monitoring, and what to do with worsening signs or symptoms of HF. Although only a few randomized controlled trials (RCT) were available, HF education is one of only a few management strategies that, even when unbundled and applied as a single intervention, was effective in reducing 6- and 12-month HF revisits [17, 18]. However, education on HF self-care may not be a strong enough strategy to decrease HF revisits at 30 days [19], and no evidence was available about outcomes associated with ED-delivered education strategies. A non-intervention per se, longer hospital length of stay, may provide greater opportunities to stabilize and educate patients, but that did not always translate into decreased HF hospital revisits (see supplement) [20–23].

Care transitions, especially from hospital to home, have become important strategies for hospitals in reducing HF revisit rates. Interventions can be singular or bundled, involve actions by one health care provider or multidisciplinary providers, be short or long term in duration, and be focused on the hospital, the community or start in the hospital and continue into the community (see supplement) [24–27]. Although frequently used, there was marked heterogeneity in published programs and strategies, making it difficult to identify what really worked (see supplement

legend, which contains hospital-to-home transitional care program websites that provide interventional components and other details of transitional care used clinically or in clinical research). Since utilization of multiple, resource-intensive bundled interventions is costly, it will be important to determine the effect size of different combinations of care coordination, medication reconciliation, patient education, early post-discharge follow-up communication and other interventions that make up care transition strategies. To incentivize physicians and hospital administrators to improve coordination among care settings and reduce revisits, CMS implemented a transitional care code in January 2013 that supports compensation for work associated with transitioning a patient into the community after hospital discharge [28].

Outpatient-Based Strategies

Early follow-up post-discharge is recommended, since it theoretically improves communication between patients and care providers, promotes patient re-assessment and facilitates early identification of post-discharge medical and socioeconomic problems, yet little evidence is available to support this recommendation. Other outpatient-based strategies, such as frequent outpatient HF clinic visits, reduced revisits by nearly 50 % at 1 year in a systematic review and meta-analysis of RCT evidence [29]. Outpatient surveillance of daily weights or other signs and symptoms of worsening HF, whether human to human or human to machine in nature, failed to consistently reduce hospitalization, and little is known about the impact on ED revisits. Well-designed RCTs that examine the effects of home care on HF hospital and ED revisits are missing (see supplement). Self-care management interventions did not always meet the desired endpoints [19, 30, 31]; however, exercise capacity, when evaluated by 6-min walk test or home exercise frequency [32–34], was associated with reduced HF hospital revisits.

When delivering outpatient care, the best model is uncertain. A review of the literature on HF disease management (HFDM) supported a chronic care model, but there were no single, specific HF delivery models or interventions with superior efficacy [35]. Studies that reported improved morbidity, mortality or both typically utilized a "multimodal" approach, including some or all of the following: frequent assessments, inclusion of family or caregivers in the treatment plan, proactive education, discharge planning with established follow-up plan of care, ongoing medication review and monitoring for potential side effects, and adherence to evidence-based guidelines [36••]. In a Cochrane meta-analysis of the types of professionals delivering interventions, RNs with specialty training in HF were successful in reducing revisits; community-based nurses and multidisciplinary teams with pharmacists or social workers were not [37••].

HF Observation Care

Observation medicine is emerging as a strategy aimed at reducing HF revisits. It is geared toward patients who do not require the length or level of services provided by inpatient care but require management beyond traditional ED care [38]. Descriptive studies demonstrated the efficacy of the observation medicine approach (see supplement) [39–41]; however, there are no RCTs that examined 30-day revisit rates. Identification of the right patients, right services, right therapies, right length of treatment and right level of care providers that lead to optimal patient safety and best outcomes are needed.

Other Strategies and Issues Potentially Related to Heart Failure Revisits

Many other programs or services were assessed with the goal of reducing hospital revisits. Home care programs that involved telemonitoring or other forms of remote monitoring had inconsistent findings [42•, 43–45], and home-based programs that did not involve telemonitoring had a high [46] or no difference [47] in 30-day or longer term rehospitalization rates, even though patients who were re-hospitalized had a shorter length of stay in one report [47]. When home care nurses' knowledge of HF self-care principles was assessed, researchers found gaps in knowledge [48–50]. It is unknown if improvement in nurses' knowledge of HF self-care (and possibly other aspects of HF) would promote higher intensity or accuracy of home health care delivery that might result in a decrease in HF revisits. For some patients, assessing and revising the programming of cardiac resynchronization therapy may improve cardiac function and reduce HF revisits [51]. Patient factors that might be difficult to modify, such as chronic kidney disease, muscle weakness, slow gait, depression, diabetes and advanced HF, were associated with HF rehospitalization in long-term follow-up [52]. Medicaid enrollment status was also associated with higher 30-day rehospitalization rates [21]. Of note, research on ED revisits for decompensated HF is more limited. An ED may be selected over being treated in an office setting for multiple reasons. More research is needed to learn whether assessment of risk factors and initiation of preventive interventions would decrease HF revisits. Finally, variation in the delivery of transitional care programs and other HF services [53, 54] could affect outcomes and must be addressed. Continuous quality monitoring of all services, no matter the environment of care or health care provider delivering care, might

improve adherence to programs aimed at decreasing HF revisits.

Conclusion

Many research studies and some systematic reviews and meta-analyses are available on HF-based programs and strategies aimed at reducing early or longer term HF rehospitalization or ED revisits after hospital discharge. Unfortunately, many programs that utilized similar themes (for example, disease management or transitional care) had bundled interventions or research methods or interventions that were heterogeneous, making it difficult to determine best practices and their overall effectiveness in reducing HF revisits. Some HF strategies thought to be important in decreasing HF revisits did not meet expected endpoint outcomes (for example, telemonitoring and self-care behavior adherence). It was difficult to determine whether lack of program or strategy efficacy was due to a lack of differences in the intensity of the usual- and intervention-care strategies or other factors surrounding usual care or the intervention (such as inclusion and exclusion criteria, qualifications of the people completing the intervention, quality assessment of the intervention to determine study fidelity, changing patient preferences over time, and general patient adherence to trial interventions or established core HF therapies). Research regarding programs and strategies that may reduce HF ED and hospital revisits are in their infancy, especially related to early revisits. Further, we must be careful not to determine that a program or strategy is ineffective just because 30-day outcomes are not improved. Many core HF drug and device trials had similar between-group results early after randomization; it was 6- and 12-month outcomes—not early outcomes—that provided the benefits of interventions. Finally, as bundled interventions can be time consuming and costly to implement, it may be important to unbundle interventions whenever possible to lower cost of care without interrupting or compromising quality of care. As value-based care moves forward, it is inevitable that new programs and strategies will emerge that allow us to deliver better care with optimal clinical revisit outcomes. Innovative research approaches are needed to assess the effectiveness of previously understudied and unstudied factors that could decrease HF revisits.

Compliance with Ethics Guidelines

Conflict of Interest Nancy Albert and Robin Trupp report no conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

References

Recently published papers of particular interest have been highlighted as:

- • Of importance
- •• Of major importance

1. Ferman GJ, Collins SP. Observation units in the management of acute heart failure syndrome. Curr Heart Fail Rpts. 2010;7:125–33.
2. Weintraub NL, Collins SP, Pang PS, Levy PD, Anderson AS, Arslanian-Engoren C, et al; American Heart Association Council on Clinical Cardiology and Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation. Acute heart failure syndromes: emergency department presentation, treatment, and disposition: current approaches and future aims: a scientific statement from the American Heart Association. Circ. 2010;122:1975–96.
3. Chun S, Tu JV, Wijeysundera HC, Austin PC, Wang X, Levy D, Lee DS. Lifetime analysis of hospitalizations and survival of patients newly admitted with heart failure. Circ Heart Fail. 2012;5:414–21.
4. Heidenrich P, Albert NM, Allen LA, et al. Forecasting the impact of heart failure in the United States: a policy statement from the American Heart Association. Circ Heart Fail. 2013;6:606–19.
5. Krumholz HM, Lin Z, Keenan PS, Chen J, Ross JS, et al. Relationship between hospital readmission and mortality rates for patients hospitalized with acute myocardial infarction, heart failure, or pneumonia. JAMA. 2013;306:587–93.
6. Lee DS, Austin PC, Stukel TA, Alter DA, Chong A, Parker JD, Tu JV. "Dose-dependent" impact of recurrent cardiac events on mortality in patients with heart failure. Am J Med. 2009;122(162–169):e1.
7. Setoguchi S, Stevenson LW, Schneeweiss S. Repeated hospitalizations predict mortality in the community population with heart failure. Am Heart J. 2007;154:260–6.
8. Centers for Medicare and Medicaid Services. Outcomes measures. CMS.gov. http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/OutcomeMeasures.html. Accessed October 25 2013.
9. Centers for Medicare and Medicaid Services. What is hospital compare? Medicae.gov. http://www.medicare.gov/hospitalcompare/About/What-Is-HOS.html. Accessed October 25 2013.
10. United States Government. Hospital Value-Based Purchasing Program (CMS-3239). Federal Register. www.federalregister.gov/regulations/0938-AQ55/hospital-value-based-purchasing-program-cms-3239-f. Accessed 25 2013.
11. Riegel B, Moser DK, Anker SD. American Association Council on Cardiovascular Nursing; State of the science: promoting self-care in persons with heart failure: Scientific statement from the American Heart Association. Circulation. 2009;120:1141–63.
12. Centers for Medicare and Medicaid. Readmissions Reduction Program. CMS.gov. http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html. Accessed October 25 2013.
13. •• Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE Jr, Drazner MH, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62:e147–239. *This evidence-based guideline provides consensus recommendations for management of adults with acute and chronic heart failure. It includes transitional care and other strategies aimed at reducing HF revisits. Recommendations are stratified by strength*

and quality of available evidence and recently published randomized controlled trials (up to 2013) are included.

14. Lindenfeld J, Albert NM, Boehmer JP, Collins SP, Ezekowitz JA, Givertz MM, et al. HFSA 2010 comprehensive heart failure practice guideline. J Card Fail. 2010;16:e1–194.
15. The Joint Commission. Advanced heart failure certification. The Joint Commission. http://www.jointcommission.org/certification/heart_failure.aspx. Accessed, May 24 2013.
16. Bonow RO, Ganiats TG, Beam CT, Blake K, Casey DE, Goodlin SJ, et al. ACCF/AHA/AMA-PCPI 2011 performance measures for adults with heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Performance Measures and the American Medical Association-Physician Consortium for Performance Improvement. Circulation. 2012;125:2382–401.
17. Koelling TM, Johnson ML, Cody RJ, Aaronson KD. Discharge education improves clinical outcomes in patients with chronic heart failure. Circulation. 2005;111:179–85.
18. Krumholz HM, Amatruda J, Smith GL, Mattera JA, Roumanis SA, Radford MJ, et al. Randomized trial of an education and support intervention to prevent readmission of patients with heart failure. J Am Coll Cardiol. 2002;39:83–9.
19. Jurgens CY, Lee CS, Reitano JM, Riegel B. Heart failure symptom monitoring and response training. Heart Lung. 2013;42:273–80.
20. Eapen ZJ, Reed SD, Li Y, Kociol RD, Armstrong PW, Starling RC, et al. Do countries or hospitals with longer hospital stays for acute heart failure have lower readmission rates? Findings from ASCEND-HF. Circ Heart Fail. 2013;6:727–32.
21. Allen LA, Smoyer Tomic KE, Smith DM, Wilson KL, Agodoa I. Rates and predictors of 30-day readmission among commercially insured and Medicaid-enrolled patients hospitalized with systolic heart failure. Circ Heart Fail. 2012;5:672–9.
22. Jacob L, Poletick EB. Systematic review: predictors of successful transition to community-based care for adults with chronic care needs. Care Manag J. 2008;9:154–65.
23. Unruh MA, Trivedi AN, Grabowski DC, Mor V. Does reducing length of stay increase rehospitalization of Medicare fee-for-service beneficiaries discharged to skilled nursing facilities? J Am Geriatr Soc. 2013;61:1443–8.
24. Boult C, Leff B, Boyd C, Wolff JL, Marsteller JA, Frick KD, et al. A matched-pair cluster-randomized trial of guided care for high-risk older patients. J Gen Intern Med. 2013;28:612–21.
25. Coleman EA, Parry C, Chalmers S, Min S. The care transitions intervention: results of a randomized controlled trial. Arch Intern Med. 2006;166:1822–8.
26. Jack BW, Chetty VK, Anthony D, Greenwald JL, Sanchez GM, Johnson AE, et al. A reengineered hospital discharge program to decrease rehospitalization: a randomized trial. Ann Inter Med. 2009;150:178–87.
27. Naylor MD, Brooten DA, Campbell RL, Maislin G, McCauley KM, Schwartz JS. Transitional care of older adults hospitalized with heart failure: a randomized, controlled trial. J Am Geriatr Soc. 2004;52:675–84.
28. Transitional Care Management. Frequently asked questions about billing Medicare for transitional care management services. Centers for Medicare and Medicaid Services. http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeeSched/Downloads/FAQ-TCMS.pdf. Accessed October 25 2013.
29. Thomas R, Huntley A, Mann M, Huws D, Paranjothy S, Elwyn G, et al. Specialist clinics for reducing emergency admissions in patients with heart failure: a systematic review and meta-analysis of randomised controlled trials. Heart. 2013;99:233–9.
30. Powell LH, Calvin JEJ, Richardson D, Janssen I, Mendes de Leon CF, Flynn KJ, et al. Self-management counseling in patients with heart failure: the heart failure adherence and retention randomized behavioral trial. JAMA. 2010;304:1331–8.
31. Clark AM, Savard LA, Spaling MA, Heath S, Duncan AS, Spiers JA. Understanding help-seeking decisions in people with heart failure: a qualitative systematic review. Int J Nurs Stud. 2012;49:1582–97.
32. Keteyian SJ, Leifer ES, Houston-Miller N, Kraus WE, Brawner CA, O'Connor CM, et al. HF-ACTION Investigators. Relation between volume of exercise and clinical outcomes in patients with heart failure. J Am Coll Cardiol. 2012;60:1899–905.
33. Alahdab MT, Mansour IN, Napan S, Stamos TD. Six minute walk test predicts long-term all-cause mortality and heart failure rehospitalization in African-American patients hospitalized with acute decompensated heart failure. J Card Fail. 2009;15:130–5.
34. Dracup K, Evangelista LS, Hamilton MA, Erickson V, Hage A, Moriguchi J, et al. Effects of a home-based exercise program on clinical outcomes in heart failure. Am Heart J. 2007;154:877–83.
35. Clark AM, Savard LA, Thompson DR. What is the strength of evidence for heart failure disease-management programs? J Am Coll Cardiol. 2009;54:397–401.
36. •• Savard LA, Thompson DR, Clark AM. A meta-review of evidence on heart failure disease management programs: the challenges of describing and synthesizing evidence on complex interventions. Trials. 2011;12:194. *In this meta review, the investigator highlights the variability among HF disease management studies.*
37. •• Takeda A, Taylor SJ, Taylor RS, Khan F, Krum H, Underwood M. Clinical service organisation for heart failure. Cochrane Database Syst Rev. 2012;9:CD002752. *This meta-analysis of HF disease management programs includes case management programs that represent transitional care models. Data are analyzed by caregiver type and program type. Gaps in knowledge and future directions are discussed.*
38. Collins SP, Pang PS, Fonarow GC, Yancy CW, Bonow RO, Gheorghiade M. Is hospital admission for heart failure really necessary? the role of the emergency department and observation unit in preventing hospitalization and rehospitalization. J Am Coll Cardiol. 2013;61:121–6.
39. Peacock WF 4th, Remer EE, Aponte J, Moffa DA, Emerman CE, Albert NM. Effective observation unit treatment of decompensated heart failure. Congest Heart Fail. 2002;8:68–73.
40. Storrow AB, Collins SP, Lyons MS, Wagoner LE, Gibler WB, Lindsell CJ. Emergency department observation of heart failure: preliminary analysis of safety and cost. Congest Heart Fail. 2005;11:68–72.
41. Lazkani M, Ota KS. The role of outpatient intravenous diuretic therapy in a transitional care program for patients with heart failure: a case series. J Clin Med Res. 2012;4:434–8.
42. • Pandor A, Thokala P, Gomersall T, Baalbaki H, Stevens JW, Wang J, Wong R, Brennan A, Fitzgerald P. Home telemonitoring or structured telephone support programmes after recent discharge in patients with heart failure: systematic review and economic evaluation. Health Technol Assess. 2013;17(32):1–207. *This paper provides details of research results of non-implanted remote monitoring services based on type of service. Heterogeneity in the components of both usual care and remote monitoring and variability of monitoring parameters limit the generalizability of findings and implications of remote monitoring and reflect a need for future research.*
43. Takahashi PY, Pecina JL, Upatising B, Chaudhry R, Shah ND, Van Houten H, et al. A randomized controlled trial of telemonitoring in older adults with multiple health issues to prevent hospitalizations and emergency department visits. Arch Intern Med. 2012;172:773–9.
44. Koehler F, Winkler S, Schieber M, Sechtem U, Stangl K, Böhm M, et al. Impact of remote telemedical management on mortality

and hospitalizations in ambulatory patients with chronic heart failure: the telemedical interventional monitoring in heart failure study. Circulation. 2011;123:1873–80.
45. Chaudhry SI, Mattera JA, Curtis JP, Spertus JA, Herrin J, Lin Z, et al. Telemonitoring in patients with heart failure. N Engl J Med. 2010;363:2301–9.
46. Madigan EA, Gordon NH, Fortinsky RH, Koroukian SM, Piña I, Riggs JS. Rehospitalization in a national population of home health care patients with heart failure. Health Serv Res. 2012;47:2316–38.
47. Stewart S, Carrington MJ, Marwick TH, Davidson PM, Macdonald P, Horowitz JD, et al. Impact of home versus clinic-based management of chronic heart failure: the WHICH? (Which Heart Failure Intervention Is most Cost-effective & Consumer friendly in reducing Hospital care) multicenter, randomized trial. J Am Coll Cardiol. 2012;60:1239–48.
48. Albert NM, Collier S, Sumodi V, Wilkinson S, Hammel JP, Vopat L, Willis C, Bittel B. Nurses's knowledge of heart failure education principles. Heart Lung. 2002;31:102–12.
49. Fowler S. Improving community health nurses' knowledge of heart failure education principles: a descriptive study. Home Healthc Nurse. 2012;30:91–9.
50. Delaney C, Apostolidis B, Lachapelle L, Fortinsky R. Home care nurses' knowledge of evidence-based education topics for management of heart failure. Heart Lung. 2011;40:285–92.
51. Tang WH, Boehmer J, Gras D. Multispecialty approach: the need for heart failure disease management for refining cardiac resynchronization therapy. Heart Rhythm. 2012;9:S45–50.
52. Chaudhry SI, McAvay G, Chen S, Whitson H, Newman AB, Krumholz HM, et al. Risk factors for hospital admission among older persons with newly diagnosed heart failure: findings from the Cardiovascular Health Study. J Am Coll Cardiol. 2013;61:635–42.
53. Horwitz LI, Moriarty JP, Chen C, Fogerty RL, Brewster UC, Kanade S, et al. Quality of discharge practices and patient understanding at an academic medical center. JAMA Intern Med. 2013. doi:10.1001/jamainternmed.2013.9318.
54. Howlett JG, Ezekowitz JA, Podder M, Hernandez AF, Diaz R, Dickstein K, et al. Global variation in quality of care among patients hospitalized with acute heart failure in an international trial: findings from the Acute Study Clinical Effectiveness of Nesiritide in Decompensated Heart Failure Trial (ASCEND-HF). Circ Cardiovasc Qual Outcomes. 2013;6:534–42.
55. Johnson MB, Laderman M, Coleman EA. Enhancing the effectiveness of follow-up phone calls to improve transitions in care: three decision points. Jt Comm J Qual Patient Saf. 2013;39:221–7.
56. Lee CS, Moser DK, Lennie TA, Riegel B. Event-free survival in adults with heart failure who engage in self-care management. Heart Lung. 2011;40:12–20.