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Adapting heart failure guidelines for nursing care in home health settings: challenges and solutions

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Introduction

Heart failure (HF) continues to be one of the most expensive chronic diseases among the elderly due to the high cost of HF management and readmission rates.^{1,2} As nurses are key healthcare professionals who provide home health services for patients with HF, they are expected to be proficient in managing this complex chronic condition.³ However, this is not the current clinical reality. Alarming results of recent studies show that home health nurses often lack knowledge of best practices for treating patients with HF.³⁻⁵ Such deficiencies in nurses' HF management skills can influence patient outcomes, especially outcomes related to patients' self-care.⁴⁻⁶ It is challenging for nurses to remain current on the frequently updated evidence-based knowledge required for managing HF. To address this problem, evidence-based clinical practice guidelines (CPGs) need to be incorporated into home health agencies' electronic health records for clinician decision support at the point of care. Before this can be done, researchers must identify the CPGs that are specifically relevant to home health nursing, in order to adapt HF CPGs for home health nursing expectations and scope of practice. This article describes specific challenges that our team faced in determining the relevance of guidelines from HF CPGs for home health nursing practice and in reconciling those guidelines from HF CPGs with home health nursing scope of practice. We propose possible solutions for overcoming such challenges.

Background

Today there is an increasing emphasis on outpatient settings, and particularly on home health care, especially in light of current efforts to reduce healthcare costs and improve patients' quality of care.⁷ At present, home health nurses provide care for approximately 11 million patients across the US,⁸ and these nurses are expected to be adept at implementing evidence-based HF management strategies and care. However, recent reports have suggested that home health nurses lack adequate knowledge for managing HF. In two studies, for

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example, home health nurses scored less than 30% on questions related to knowledge about common HF nursing interventions for asymptomatic hypotension, daily weight monitoring, and dizziness.^{4,5} Widely available HF CPGs such as those published by the Heart Failure Society of America (HFSA)⁹ and the American College of Cardiology/American Heart Association¹⁰ (ACC/AHA) have not been well integrated into home health nursing practice with HF patients.

Available HF guidelines for home health nursing

The ACC/AHA and HFSA have developed comprehensive HF CPGs that suggest extensive nursing application. These HF CPGs include assessment of HF-related symptoms; managing and recognizing side effects of common HF medications; nonpharmacologic strategies for management of HF, such as diet, physical activity, routine healthcare maintenance, respiratory therapies; and end-of-life care for patients with HF.^{9,10} However, understanding the implications of these HF CPGs for home health nursing is complicated. Many of the guidelines are targeted at practitioners with prescriptive authority, and in many states scope-of-practice statutes restrict advanced practice nurses from fully implementing HF CPGs.¹¹ In some states, advanced practice nurses cannot certify home health care visits or stays in skilled nursing facilities or hospice; order durable equipment; admit patients to hospitals; or prescribe medications without a physician's supervision or oversight.¹²

Explicit, prescriptive CPGs are critically needed for home healthcare because U.S. healthcare is rapidly transitioning from paper charting to electronic health records. In 2010, 41% of home health agencies used electronic health records,¹³ and the uptake of electronic health records is projected to increase.¹⁴ One of the core capabilities of electronic health records is the ability to provide clinicians with computerized decision support at the point of care.¹⁵ To enable the integration of HF CPGs into home health agencies' electronic health records and decision support, the guidelines adapted from HF CPGs must be clear, explicit, and relevant to nurses.¹⁶

Currently, no nursing-relevant HF CPGs have been published by nursing organizations for the care of HF patients in emergency, clinic, acute, or home/hospice care settings.⁵ Application of nursing-relevant HF CPGs adapted from available HF CPGs has been advocated to enable nurses to be key partners in the delivery of effective care of patients with HF.⁵ The lack of readily available nursing-relevant HF CPGs suitable to home health nursing practice could contribute to home health nurses' lack of knowledge of HF best practices. Many of the currently available HF CPGs address issues outside of home health nurses' scope of practice, so there is a risk of liability for following their recommended actions. Nursing-relevant HF CPGs should contain guidelines specific for home health nurses' actions and knowledge about the treatment of patients with HF.

Aims

This project was undertaken to (1) extract home health nursing-relevant guidelines from current established HF CPGs, (2) adapt the extracted guidelines for use in home health nursing, and (3) validate the relevance of the adapted guidelines for home health nursing by obtaining expert consensus.

Methods

Due to the lack of home health nursing-relevant HF CPGs, we modified the existing HFSA and AHA HF CPGs^{9,10} to fit home health nursing scope of practice. These two sets of HF CPGs were chosen because they are the most comprehensive, up-to-date sources of evidence-based HF care guidelines in the US. We proceeded as follows:

Step 1

Our research team of three PhD students and a postdoctoral fellow in nursing (all of whom had expertise in HF care) extracted guidelines from HF CPGs that were relevant to home health nursing and entered them on a Microsoft® Excel spreadsheet. To enable easy guideline interpretation by nurses, members of the research team also categorized the extracted guidelines according to what (1) *Nurses Must Do*, (2) *Nurses Must Know*, and (3) *Nurses May Know*. The *Nurses Must Do* category contained the highest priority interventions for home health nursing practice; these must be implemented by home health nurses (examples are provided in the Results section). The second category, *Nurses Must Know*, included guidelines that provide HF-related information necessary for home health nurses to know, but not necessarily to apply, in practice. The final category, *Nurses May Know*, included optional guidelines that are useful but not essential for HF-related home health nursing practice.

Step 2

The research team from Step 1 employed the Delphi methodology, an expert consensus technique used in the biomedical field to assess the content validity of new instruments and tools.^{17,18} We evaluated the content validity of the nursing-relevant guidelines adapted from HF CPGs by using clinical expert consensus. Four experts were chosen by purposive sampling. The experts were selected on the basis of their clinical and research expertise with HF patients; they were not members of the research team. Two were academics from an East Coast School of Nursing who had established international research expertise in home health care and HF for clinician decision support at the point of care; two were home health practice experts from New England home health agencies, with more than 15 years of clinical experience with HF home health patients. They were asked to indicate whether the guidelines extracted from the HF CPGs were relevant or nonrelevant to home health nursing. In addition, they were asked to review the guidelines' categorization (conducted in Step 1) and to comment on their decisions regarding relevance. The decisions and comments were then anonymously shared between the Delphi rounds, which continued until the majority (at least 75%) of the experts agreed on each of the guidelines from the HF CPGs.

Due to disagreements between the practice and academic experts during the first Delphi round, we invited an additional practice expert to review the guidelines extracted from the HF CPGs and to determine whether the disagreements were related to high expectations of academic experts as opposed to the real-world demands of practice experts. The Delphi round, however, was unlikely to produce biased results because it required discussion and collaboration among all four experts, especially in cases where two agreed and two others disagreed (majority agreement of three experts was needed to accept the guidelines from HF

CPGs). Following the four experts' discussions, comments, and suggestions from the first Delphi round, we decided to simplify the consensus process in the second round. For consensus attainment in the second round, we dichotomized the guidelines as being either relevant or not relevant to home health nursing.

Results

Step 1 (Extraction of guidelines from HF CPGs)

We identified 172 guidelines from HF CPGs that were relevant to home health nursing, about 55% of the total nonduplicate guidelines from the AHA and HFSA HF CPGs. The guidelines from the HF CPGs that we excluded (38%) included those that required prescriptive authority and were clearly outside the scope of practice of home health nursing. The guidelines included from the HF CPGs were divided into five groups, each of which had several subgroups based on the categories presented in the original HF CPGs (AHA/HFSA). See Table 1 for detailed descriptions of the groups and subgroups. We also generated a recommended categorization for each of the guidelines extracted from the HF CPGs: for example, the guideline suggesting "Assess ability of a patient with HF to perform routine and desired activities of daily living (at each visit)" was categorized as *Nurses Must Do*, since it is a routine and necessary assessment that must be performed by home health nurses. "Anabolic steroids are not recommended for cachexic patients" was categorized as *Nurses Must Know*, because nurses do not usually have drug prescriptive authority but need to know that their cachexic HF patients are not supposed to receive anabolic steroids. "Review electrocardiogram to assess cardiac rhythm and conduction" was categorized as *Nurses May Know*, because this is not essential to providing quality nursing home care for HF patients.

Step 2 (review by HF experts)

There was a general agreement among the experts on whether the guidelines extracted from the HF CPGs were relevant to home health nursing; however, the experts could not agree on which of these guidelines qualified as *Nurses Must Do*/*Nurses Must Know*/*Nurses May Know*. For example, one guideline from the AHA HF CPG on the initial assessment for HF patients suggested as follows: "Review initial laboratory evaluation of patients presenting with HF. It should include complete blood count, urinalysis, serum electrolytes (including calcium and magnesium), blood urea nitrogen, serum creatinine, fasting blood glucose (glycohemoglobin), lipid profile, liver function tests, and thyroid-stimulating hormone."¹⁰ The two academic experts categorized this guideline as *Nurses Must Do* and commented that reviewing the laboratory tests is a necessary evaluation to be conducted by home health nurses. One practice expert categorized it as an optional evaluation (*Nurses May Know*) and suggested that "this information would not be available for nurses."

After the first Delphi round, the majority (at least 75%) of experts agreed on the relevance of 87% (n = 150) of the guidelines extracted from HF CPGs for home health HF care (see Figure 1). An example of a guideline from the AHA HF CPGs considered relevant to home health nursing by all experts was the following: "In patients presenting with HF, initial assessment should be made of the patient's ability to perform routine and desired activities

of daily living.” Experts also agreed that 6% (n = 10) of the guidelines extracted from the HF CPGs were not relevant for home health nursing. For example, experts unanimously considered the guideline from the HFSA HF CPGs “If blood pressure remains > 130/80 mm Hg, then the addition of a thiazide diuretic is recommended, followed by a dihydropyridine calcium antagonist (eg, amlodipine or felodipine) or other antihypertensive drugs” as not relevant, or “too specialized for home health nurses.”

For the remaining 7% (n = 12) of the suggestions, experts’ opinions were evenly split, so we conducted a second Delphi round in which the experts were asked to provide a detailed rationale for their decisions on the relevance of the guidelines extracted from the HF CPGs to home health nursing. For example, in the first Delphi round there was divided opinion on the relevance of the guideline from the AHA HF CPGs that “treatment with warfarin (goal international normalized ratio [INR] 2.0-3.0) is recommended for all patients with a history of systemic or pulmonary emboli, including stroke or transient ischemic attack unless contraindicated.” During the second Delphi round, experts agreed to retain this guideline because “INR’s are done by skilled nurses and patients/families comfortable enough to do this,” as one expert commented. Finally, majority (at least 75%) agreement among experts was achieved for three of the disputed guidelines from HF CPGs, which were then included in the final nursing-relevant HF CPGs. The finalized nursing-relevant HF CPGs included 153 guidelines from the AHA and HFSA HF CPGs. Overall, implementation of the Delphi rounds took over 8 months, with 6 months for the first round and 2 months for the second.

Discussion

Although nurses make up one of the largest sectors of home healthcare providers, very few projects have addressed nursing-relevant guideline extraction for outpatient settings such as home health care.¹⁹ Our study is one of the first attempts to generate standardized HF CPGs applicable to home health nursing. Historically, HF researchers have lamented that there is a huge gap between evidence-based practice and day-to-day patient care in the home health setting. They have advocated bridging that gap by creating nursing-relevant guidelines grounded in available, updated CPGs.⁵ The unique challenges that we faced in extracting the guidelines, adapting them to home health nursing, and building expert consensus are widely applicable to anyone interested in developing home health nursing-relevant CPGs for other diseases.

The primary source of concern among the experts was that the amount and quality of patient clinical information available to home health nurses would be inadequate and insufficient to provide CPG-based treatments. In response, we suggest that similar nursing-relevant CPG integration projects include a broad range of scope-of-practice guidelines. In the future, each home health agency can revise and customize the guidelines to fit available information and nurses’ scope of practice in accordance with state and agency regulations.

During the first Delphi round, experts’ opinions on the relevance of some of the guidelines extracted from the HF CPGs differed notably. Unanimous experts’ consensus was achieved in the first Delphi round on guidelines from HF CPGs related to the subgroups of (1) Nonpharmacologic Management and (2) Advanced Directives and End-of-Life Care, as well

as on most of the Initial Evaluation guidelines. Guidelines from HF CPGs such as “Provide dietary instruction on low-sodium intake for all patients with HF” or “Discuss treatment options for sexual dysfunction openly with both male and female patients with HF” are clearly within the boundaries of nursing scope of practice.

Experts’ opinions varied significantly on the following groups of guidelines from the HF CPGs:

Guidelines on HF medication prescription

The amount of details from guidelines from HF CPGs on medication prescription that could be relevant to home health nursing was not clear. On one hand, the scope of practice of registered home health nurses clearly restricts them from prescribing drugs. On the other hand, it is required that home health nurses have knowledge of necessary HF medications so that they can appropriately advocate for their patients and intervene to prevent medication errors. To elicit experts’ opinions on HF medication prescription guidelines from HF CPGs, we initially included *Must Do/Must Know/May Know* categories in the consensus table. For example, a guideline suggesting that “Routine use of aspirin is not recommended in patients with HF without atherosclerotic vascular disease” was classified as either *Nurses Must Do* or *Nurses Must Know* by different experts. However, in our follow-up conversation with the experts, all agreed that nurses must possess knowledge about HF medications and must communicate it to either the patients or their primary care providers. The experts designated guidelines from HF CPGs on HF medications as relevant to home health nursing practice, yet reported difficulty in classifying such guidelines as *Must Do* or *Must Know*.

Guidelines on HF patient assessment

Certain guidelines from the HF CPGs (e.g., “Assess cardiac structure and function”) had varying levels of consensus. The amount and quality of patient clinical information available to home health nurses was one of the significant reasons for disagreement; some of these assessments may need to be based on prior information or cardiac history. However, such information is often unavailable to the home health nurse. Guidelines from the HF CPGs based on HF classification were another example related to lack of prior available patient clinical information in home healthcare. Varying levels of consensus were observed on guidelines based on HF classification, such as low Left Ventricular Ejection Fraction (LVEF < 40%). Most of the experts agreed on the relevance of these guidelines for home health nursing, but one disagreed on the need to *Must Know* or *Must Do* guidelines for patients with low LVEF. According to this expert, home health nurses are often unaware of classifications of HF such as LVEF or others. Often the only information received during patient admission to the agency is the diagnosis of HF.

Guidelines that might require ordering labs were an additional source of disagreement among the experts. For instance, the guideline to review an electrocardiogram (ECG) to assess heart conduction and rhythm was considered beyond home health nursing scope of practice by the practice experts but not by the academic experts. Clearly this information is relevant to home health, but it is not clear how this guideline should be incorporated into everyday home health nursing practice.

For the purposes of this project, we decided to retain all the guidelines from the HF CPGs on HF medication prescription, labs, and patient assessment that were assessed as relevant in the final nursing-relevant HF CPGs (even if they required a significant amount of patients' background information), because we hope that such information will become available to more providers with ongoing federal efforts to implement electronic health records and data sharing between settings.²⁰

After the second Delphi round, the guidelines selected from the HF CPGs that the experts did not find relevant were mostly related to the detailed descriptions of complex pharmacological interventions for HF, such as the following: "Routine use of Amiodarone therapy for asymptomatic arrhythmias that are not felt to contribute to HF or ventricular dysfunction is not recommended."²¹ Such guidelines were considered outside the scope of practice of home health nurses, even from a knowledge perspective. The experts concluded that those guidelines are not relevant to home health nurses because of their complexity and sometimes a low level of evidence (as defined in HF CPGs where Level of evidence C indicates that very limited populations were evaluated) to support their inclusion.¹⁰

Lessons learned/Solutions

One limitation of the study was the only partially retained version of the consensus process from the first to the second Delphi round. In agreement with one common approach presented in the biomedical informatics literature,^{22,23} we decided to remove the *Nurses Must Do/Must Know/May Know* categories from the guideline classification because the expert reviewers found the boundaries between the categories unclear and therefore confusing. Instead, we sought expert opinion only on whether or not the guidelines from the HF CPGs were relevant to home health nursing. Our evolving discussions about the home health nurses' scope of practice and clinical responsibilities showed that each particular user of guidelines from home health nursing-relevant HF CPGs will need to review and customize the guidelines according to their state and agency nursing practice regulations. For instance, following the guideline "Routine use of aspirin is not recommended in patients with HF without atherosclerotic vascular disease," some agencies might decide that their nurses should communicate this information to the patient, whereas others might want to establish a direct linkage to the patient's primary care physician (preferably electronic reminder or alarm) to communicate the issue.

The next steps of our project will include the integration of our adapted HF home health nursing-relevant HF CPGs into a computer-interpretable format and the mapping of these guidelines to one of the standardized nursing terminologies, such as the Omaha system. The mapped guidelines would once again go through Delphi rounds for validation. The final product will be a computer-interpretable evidence-based set of HF CPGs to guide and support nurses' decisions on relevant care for HF patients.

Conclusions

Standardized CPGs are developed to bridge the long existing gap between research findings and practice.²⁴ Federal authorities and other healthcare stakeholders recognize that the fastest, most efficient way to overcome this disparity is to use medical information

technologies such as electronic health records and clinical decision support systems.^{7,20,25,26} Our project shows that the current state of clinical informatics for the biggest and fastest growing segment of home health, patients with HF,⁸ is far from perfect. To create comprehensive electronic health record systems providing patient-specific care recommendations at the point of care, there is an urgent need for home health nursing-relevant CPGs. In this article, we have described our efforts to derive home health nursing-relevant HF CPGs through the process of expert consensus. Our results suggest that professional organizations and societies developing guidelines should pay more attention to creating guidelines consistent with available information and the scope of practice of practitioners who are providing direct patient care.

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Figure 1.
Heart Failure guideline adaptation process for home health nursing.

Table 1

Groups of home health relevant HF guideline recommendations extracted from AHA and HFSA guidelines

<p>1. Generic HF guidelines included 4 subgroups (50 recommendations):</p> <ol style="list-style-type: none"> 1) Non-pharmacologic Management and Health Care Maintenance in Patients With Chronic HF (21 recommendations) 2) Initial Evaluation (19 recommendations) 3) Serial Clinical Assessment of Patients with HF (6 recommendations) 4) Advanced Directives and End-of-Life Care in HF (4 recommendations) <p>2. HF in special populations included 4 subgroups (13 recommendations):</p> <ol style="list-style-type: none"> 1) HF African Americans (6 recommendations) 2) HF elderly patients (4 recommendations) 3) HF female patients (3 recommendations) <p>3. HF with normal Ejection Fraction (12 recommendations)</p> <p>4. HF with reduced Ejection Fraction (LVEF*$\leq$40%) included 11 subgroups (63 recommendations):</p> <ol style="list-style-type: none"> 1) Pharmacology: Diuretics (11 recommendations) 2) Pharmacology: Beta blockers (9 recommendations) 3) Pharmacology: Anticoagulation and Antiplatelet Drugs (7 recommendations) 4) Pharmacology: Angiotensin II Receptor Blockers (ARBs) (7 recommendations) 5) Pharmacology: Aldosterone Antagonists (6 recommendations) 6) Pharmacology: Digitalis (6 recommendations) 7) Pharmacology: Optimal Use of Multi-Drug Therapy (6 recommendations) 8) Pharmacology: Amiodarone (5 recommendations) 9) Pharmacology: Drugs contra-indicated for HF (4 recommendations) 10) Pharmacology: Angiotensin-converting-enzyme inhibitor (ACE) (1 recommendation) 11) Pharmacology: Oral Nitrates and Hydralazine (1 recommendation) <p>5. HF with concomitant disorders included 6 subgroups (24 recommendations):</p> <ol style="list-style-type: none"> 1) HF with Coronary Artery Disease (11 recommendations) 2) HF with low left ventricular ejection fraction (LVEF) + Hypertension (HTN) (4 recommendations) 3) HF with Atrial Fibrillation (4 recommendations) 4) HF with Arrhythmia (3 recommendations) 5) HF with preserved LVEF + HTN (1 recommendation) 6) HF with Anemia (1 recommendation)