

Information Needs of Skilled Nursing Facility Staff to Support Heart Failure Disease Management

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Abstract

Objectives: Characterize key tasks and information needs for heart failure disease management (HF-DM) in the distinct care setting of skilled nursing facility (SNF) staff in partnership with community-based clinical stakeholders. Develop design recommendations contextualized to the SNF setting for informatics interventions for improved HF-DM in the SNF setting. *Methods:* Semi-structured interviews with fifteen participants (registered nurses, licensed practical nurses, certified nursing aides and physicians) from 8 Denver-metro SNFs. Data coded using a data-driven, inductive approach. *Results:* Key tasks of HF-DM: symptom assessment, communicating change in condition, using equipment, documentation of daily weights, and monitoring patients. *Themes:* 1) HF-DM is challenged by a culture of verbal communication; 2) staff face knowledge barriers in HF-DM that are partially attributed to unmet information needs. *HF-DM information needs:* identification of HF patients, HF signs and symptoms, purpose of daily weights, indicators of worsening HF, purpose of sodium restricted diet, and materials to improve patients' understanding of HF. *Discussion and Conclusions:* HF-DM information needs are not fully supported by current SNF information systems.

Background and Significance

Despite the high health care spending on patients with heart failure (HF), patients remain at high risk of hospitalization, activity-limiting symptoms including chest pain and shortness of breath, and death.¹ In the United States, the mean cost of a HF-related hospitalization exceeds \$20,000 and risk of death within 5 years is approximately half.¹ Heart failure disease management (HF-DM) practices -- monitoring body weight and HF-related signs and symptoms, administering medications, and a sodium restricted diet -- are recommended by the American Heart Association and the Heart Failure Society of American to detect worsening HF, improve symptom management, and improve outcomes of patients with HF in skilled nursing facilities (SNF)^{1,2}. Evidence shows that performing HF-DM practices as described by clinical guidelines can decrease mortality rates, decrease hospital admission rates, and improve quality of life for HF patients by relieving symptoms¹⁻³. However, within the SNF, quality of HF care is highly variable and HF-DM practices are applied inconsistently^{4,5}. This may be due in part due to high variability in information systems in SNFs, which represent a unique clinical context that is distinct from other care settings⁶.

Heart Failure Disease Management in Skilled Nursing Facilities

Clinical practice guidelines recommend monitoring for changes in body weight and changes in symptoms because these early warning signs can alert staff and physicians to worsening HF, prompt early intervention, and may help patients avoid hospitalization^{2,7,8}. Signs and symptoms helpful in detecting worsening HF are shortness breath, chest pain, lower extremity edema, paroxysmal nocturnal dyspnea (PND), orthopnea (shortness of breath while lying flat), and jugular vein distention (JVD). However, among SNF patients, frequency of monitoring body weight and HF-related signs and symptoms are below recommended guidelines⁹. SNF staff and physicians face a unique set of barriers in striving to improve HF care: patients are older and more medically complex often with cognitive impairment with frequent and challenging transitions of care with documentation deficits, and the clinical

environment lacks specific disease management programs and protocols to follow.⁸ By self-report, SNFs indicate low frequency and highly variable adherence to recommended monitoring HF-DM practices with wide variation between facilities⁴. Quinn et al. found that, of 50 surveyed facilities, only 15% reported measuring weights of HF patients daily⁴. SNF staff also report a lack of processes and protocols to help track and monitor patients with HF, including weight monitoring¹⁰.

SNF settings are characterized by highly variable technology use, accessibility, and integration of technology surrounding care activities¹¹. As a result, many SNFs face low information technology sophistication which can negatively impact efforts to improve HF-DM practices^{11,12}. Orr et al. identified barriers to HF care in SNFs and several would be improved with an informatics approach: communication deficits, especially around transitions of care, lack of staff training in communicating change in condition, lack of disease management programs and protocols, and finally, a need for standardized monitoring to capture and alert staff to worsening HF.⁸ Clinical guidelines that are well-integrated into an information system as a CDS feature can prompt care practices and support clinical decision-making¹³. However, many nursing home information systems primarily focus on administrative rather than clinical decision support features¹⁴. For example, only a small percentage of all SNF information systems support documentation features for monitoring exercise intolerance, helpful for clinical decision support and a key symptom of HF¹⁵.

SNFs do not have sufficient information resources and technology to support evidence-based HF-DM practices to improve patient outcomes. Therefore, the objective of this qualitative descriptive study¹⁶ was to identify the HF-DM information needs of SNF staff and physicians to inform design requirements for SNF information technology that supports HF-DM practices. For purposes of this work, we define an information need as information that a person needs in order to know, learn, or do something better, which is unsupported by current information systems¹⁷.

Materials and Methods

Design

We employed a community-based approach and qualitative descriptive study design¹⁶ to engage clinicians about their information needs for heart failure management in the SNF setting. Community partnership contextualized and tailored our approach to the SNF setting to optimize utility of our findings^{18,19}. Interview data were analyzed by multiple coders using a data-driven, inductive analytic approach²⁰. Design recommendations were identified by participants and the research team based on information needs and participant-identified problems.

Community Engagement

Two mechanisms of community-engagement were used in this study. One mechanism was a community-academic partnership between the Colorado Medical Directors Association and the University of Colorado School of Medicine; the other was the Post-Acute and Long-Term Care Stakeholder Advisory Board²¹. The community partners of the community-academic partnership provided their expertise during weekly meetings throughout the study period. The Stakeholder Advisory Board is a group of nursing home community stakeholders—providers, nursing staff, activity directors, social workers, patient advocates, regulators, ethicists, researchers, family and friends of residents, and residents themselves—helping post-acute and long-term care researches improve the feasibility of their protocols and usefulness and value of their results. Stakeholders were critical in the development of the interview guide and the discussion of results.

Setting

A convenience sample of SNF staff and physicians were recruited via the community-academic partnership. Each were employed at facilities with both long-term care and skilled nursing care. Eligibility criteria were: current employment at a facility caring for patients who required skilled nursing care, at least 18 years of age, and English-speaking.

Procedure

We conducted interviews with fifteen SNF staff and physicians from eight facilities located in the Denver-metro area of Colorado. The sample consisted of certified nursing aides (CNA), registered nurses (RN), licensed practical nurses (LPN) and physicians. The interview guide was developed in collaboration with the community-academic partnership and reviewed with the Stakeholder Advisory Board to finalize phrasing of questions. Community partners and stakeholders served as pilot-testers to refine the interview guide prior to field interviews with interviews. Interview questions were grouped into three categories: 1) clinical care paths specific to HF, which

included questions on the step-by-step tasks related to HF-DM; 2) how HF-related information is stored and accessed; and 3) how SNF staff and physicians monitor patients' weights and signs and symptoms of HF (Table 1). Interview questions explored HF-DM tasks to identify information needs related to patients who receive skilled rehabilitation care after hospitalization.(e.g. Can you describe--step-by-step--what care you provide for patients with heart failure?) and how information systems do or do not assist in these tasks (e.g. When you're taking care of someone with HF, how do you know what to do?) Questions also explored where HF-related information is recorded, stored, and accessed (e.g. in lab folders, notebooks, or the electronic health record). Lastly, SNF staff and physicians were asked about how they monitor trends in body weight and HF-related signs and symptoms, and what supportive tools are available to them (e.g. How difficult is it to identify patients that are starting to get into trouble?)

All interviews were conducted by the primary author, at the time a PhD student in public health with 2 years of experience in qualitative research in SNFs. She was mentored throughout data collection and analysis by her dissertation committee that included a PhD-trained informatics researcher who specializes in design-based inquiry using qualitative methods (BR) and a geriatrician highly experienced in HF-DM research in the SNF setting (RB).

Interviews were primarily conducted at SNFs in a private space. Two interviews were conducted by phone due to scheduling conflicts that prevented in-person data collection. Participants granted verbal consent and were offered a \$10 gift card for their participation. Interviews were audio-recorded and transcribed verbatim by a professional transcription service. Interview transcripts were analyzed using an inductive, data-driven approach^{20,22,23} with NVivo software version 11²⁴. All study procedures were approved by the Colorado Multiple Institutional Review Board (COMIRB).

Analysis

Transcribed interviews were analyzed to identify HF-DM tasks, information needs, themes related to HF-DM, and design recommendations. Two coders independently coded two randomly selected transcripts using a data-driven, inductive approach²⁰ to develop the initial codebook. Differences in applied coding concepts and labels were minor and resolved through discussion. The codebook was reviewed by two PhD-trained researchers with technology design and qualitative analysis experience to reconcile codebook labels with informatics and human factors terminology. The primary author coded the remaining transcripts and results were member-checked by SNF staff as described below.

HF-DM tasks were coded and compiled into a list. The code *information need* was used when a participant described information required to complete a HF-DM task and then cross-coded with specific tasks where applicable. These cross-coded sections were used to compile the full list of information needs. Codes were then grouped into major themes^{20,22,23}. Task list results were member-checked^{25,26} with three participants who confirmed identified tasks and the frequency of task performance. Additionally, a member of the Stakeholder Advisory Board who met study inclusion criteria performed the same review of the results.

Results

The sample (n=15) consisted of CNAs (n=3), RNs (n=5), LPNs (n=5) and physicians (n=2) from eight SNFs. Of the five RNs, two were Directors of Nursing (DON) and one was an Assistant DON. Average years of experience was 10 years (ranged from 1.5 years to 16 years). We identified 10 key tasks and corresponding information needs for HF-DM in SNFs (Table 3). In addition, we identified two major themes related to HF-DM: 1) SNF staff and physicians rely on verbal communication without tools to assist or track communication, and 2) SNF staff and physicians lack access to HF-DM education materials which limits their HF knowledge when caring for patients with HF.

Key Tasks and Information Needs in SNF Heart Failure Care

We identified 10 key tasks of HF-DM. (See Table 1). These tasks were member-checked by SNF staff (n=4).²⁷ During member-checking, all tasks were rated with a performance frequency of "always", "often", and "occasionally"; no task was rated as "never" being performed.

Tasks specific to HF care correspond to information needs identified in the data organized into three categories. (See Table 1.)

Table 1: Tasks of Heart Failure Disease Management (HF-DM) and Information Needs to Complete Tasks

HF-DM* Tasks	Information Needs to Complete Tasks
Tasks of HF-DM and Information Needs to Prompt HF-DM Tasks	
Encourage patient to participate in HF care (i.e. getting on a scale for a daily weight or following a sodium restricted diet) Assess a patient Documentation (e.g. daily weights)	Which patients have HF?
	What are the signs and symptoms of HF?
	What is the difference between weighing to evaluate nutrition and weighing to evaluate fluid retention?
	What is the purpose of daily weights?
	What is the purpose of a sodium restricted diet?
Tasks of Monitoring Patients and Information Needs to Prompt Intervention	
Identify that there is a problem (e.g. a patient's HF is worsening) Look at documentation of previous assessments of HF related signs and symptoms Look at the results of labs and use the lab values or assessment information (signs and symptoms of HF) in care	What is a sign of worsening HF?
	What do patients complain of when HF is worsening?
	What vital signs indicate that HF is worsening?
Tasks of Communication and Information Needs to Improve Communication	
Receive verbal HF-DM orders Receive HF-DM orders documented in the health record Coordinate care with another team member Request an order for medicine or supplies pertaining to HF from another team member of through the health record	Need to capture the verbal communication of team members
	Need to capture the verbal orders of providers
*HF-DM practices included here are non-pharmacological: monitoring body weight, assessment and monitoring HF-related symptoms, and encouraging a sodium restricted diet.	

Themes

Theme 1: SNF staff and physicians rely on verbal communication without tools to assist or track communication.

Physicians and DONs reported relaying HF-DM instructions verbally to floor nurses and CNAs, without the support of communication aids or documentation. Documentation may be underutilized intentionally for fear of penalty by state health inspectors if a request is documented but the response is not (e.g. a DON records a request for daily weights into her notes, but then the CNA is not able to get the weight, or does not record the weight, during her shift).

SNF staff and physicians did not report use of visual aids or educational material in discussions with co-workers, patients, or patient families, with the exception of one physician. The majority of HF communication appears to be verbal (n=10) and lacks support of tools to improve documentation or learning. For example, one nurse noted: "I think because the nurses are passing it [information] on from person-to-person—again, I'm so careful to put stuff in orders. Orders shouldn't be used for as much as I put it in there, but I feel like it's the best way to communicate if everybody sees it versus a progress note that gets buried." All CNAs reported getting verbal instruction from the nurse to take daily weights, but only 1 mentions immediately recording the weight.

Theme 2: SNF staff lack access to HF-DM education materials which limits their HF knowledge when caring for patients with heart failure

Information needs are primarily related to lack of available HF educational content that subsequently impeded HF knowledge within the SNFs. Use of care plans, care paths, protocols, and guidelines to support in HF-DM practices is inconsistent. A majority of participants (n=8) reported that materials and resources reminding them of best practice are not readily available or that more alerts would be helpful in their practice. This lack of resources leads to information gaps that interfere with HF-DM, such as lack of familiarity with heart failure symptoms that can prevent identification of worsening HF.

Design Recommendations

HF-DM information needs are not fully supported by current SNF information systems. To close this gap, we propose a HF-specific module for SNF clinical decision support that provides: 1) nurse-facing education materials, 2) patient-facing education materials to prompt patient self-efficacy in care, 3) charting features to monitor longitudinal HF trends, 4) personal, informal HF notetaking space for SNF staff and physicians.

Design recommendations were either identified by participants themselves, or were formulated by the research team to address problems identified by the participants. For an example, one DON noted that she did not have any materials readily available when educating patients on HF-DM, and that materials may be helpful:

“I think the average nurse has a general knowledge base on the subject, but I think, playing the devil's advocate here, a brochure that comes from some institution or whatever that we can hand families would be better received than coming from my mouth. Only because they don't know what my knowledge is...it's not just my opinion [it's] actual published material. It's something for them to take home.”

This participant identified patient-facing education materials to prompt patient self-efficacy in care as a design recommendation.

In another interview, a physician identified a problem that can be addressed by a design recommendation put forth by the research team. The research team proposed person notetaking space, integrated into the electronic health record, in response to this challenge described by the physician:

“... nurses have to be all over the place. I mean they have to pass medications, they have to address the vitals, they deal with scheduling appointments. [To follow regulations, the nurse needs to write down the physician's order and have him or her sign it.] So the nurse really has to kind of write it down or she has to remember it and multitask...When you have good nurses and they are organized, they can cope with this. But I think it's part of the communication breakdown in medical care.”

Discussion

The main tasks SNF staff and physicians must perform HF-DM relate to obtaining and documenting body weight and HF-related symptoms, identifying worsening HF by consulting documentation and labs, using this information in care, and communicating HF-DM orders among other members of the care team. SNF staff and physicians rely on verbal communication and are unsupported by tools to track communication or remind them of communicated orders and lack access to educational materials on HF-DM. In addition, there are unmet information needs as result of the features of current information systems in use. These unmet information needs fall into the following broad categories: information needed to prompt HF-DM practices, information needed to prompt intervention, and tools/resources and information needed to improve communication. To prompt HF-DM tasks, SNF staff need to know which patients have HF, the signs and symptoms of HF, and understand the purpose and potential value of HF-DM practices. To prompt intervention, SNF staff need to know the signs of worsening HF and what patients typically complain of when HF is worsening. For optimized communication, and documentation of HF-DM orders and data obtained from HF-DM practices, SNF staff need to capture verbal communication from all team members, including providers.

We framed each unmet information need as a question that could be answered through design recommendations for improved information system support. We then developed design recommendations that directly address identified information needs. Design recommendations are both responsive to the list of information needs and themes, as well as the educational content recommendations of the 2015 scientific statement on HF-DM in SNFs from the American Heart Association and the Heart Failure Society of America².

Our findings identified the need for a HF-specific module embedded into the electronic health record that provides nurse educational content, printable materials to prompt patient self-efficacy in care, a charting feature to monitor longitudinal HF trends, and personal notetaking space. The module should first identify which patients have HF and then include educational materials for both SNF staff and patients to improve understanding of HF-DM practices. The personal notetaking space should provide for temporary documentation (that does not become part of the permanent electronic health record) and voice-to-text operability for notes on-the-go that serves as a communication aid in the highly verbal SNF setting. Because nursing facilities have highly variable levels of information technology sophistication in performing tasks of clinical support, administrative activities, and direct patient care^{12,14}, future work is needed to evaluate the feasibility and usefulness of such a proposed HF-specific module.

Research have shown the need for improved standards, protocols, and educational materials to improve HF care²⁸⁻³⁰. Educational components should include identification of signs and symptoms, information on how to monitor and respond to changes in weight, managing medication, the purpose of a sodium restricted diet². However, efforts to improve HF-DM care are undermined by a historical and continuing lack educational tools available to those working in SNFs^{15,28}. Our HF-specific module design bridges this gap as identified by the American Heart Association and the Heart Failure Society of America³. Specifically, the proposed module provides HF-specific educational content needed to improve knowledge of HF-DM practices and to improve patients' understanding of their disease and treatment within the SNF².

This study has limitations related to recruitment and member-checking. The convenience sample was recruited through a community-academic partnership from SNFs in one metropolitan area. Thus, results may not transfer to facilities outside the community-academic partnership or to other metropolitan areas. In addition, member-checking was performed by staff drawn from a single SNF.

Conclusion

Our results improve understanding of barriers that block application of evidence-based care within SNFs. We found that SNFs lack tools to support HF communications and appropriate educational materials to improve HF knowledge when caring for patients with HF. Unmet information needs identified in this study correspond to educational content recommendations of the American Heart Association and the Heart Failure Society of American and should be addressed with a HF-specific module integrated into Skilled Nursing Facility information systems.

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