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Clinical Practice Guideline Adherence Before and After Implementation of the HEARTFELT (HEART Failure Effectiveness & Leadership Team) Intervention

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Abstract

HEART Failure Effectiveness & Leadership Team (HEARTFELT) is a multifaceted intervention designed to improve adherence with the American College of Cardiology/American Heart Association practice guidelines for heart failure (HF). The purpose of this study was to assess differences in clinician adherence with clinical practice guidelines before and after implementation of HEARTFELT. A quasi-experimental, untreated control group design with separate pretest/posttest samples was employed at a community hospital in Connecticut. The untreated historical control group included patients aged 65 years or older with HF and a nonequivalent comparison

group of patients with stroke. The posttest samples included patients with the diagnosis of HF and stroke admitted after implementation of the HEARTFELT intervention. The HEARTFELT intervention included automated pathway in electronic medical record (order sets, interdisciplinary plan of care, self-management plan), access to evidence for clinicians and patients, HF self-management education tools, and ongoing discipline-specific feedback regarding adherence. Data were analyzed using parametric and nonparametric methods. The HEARTFELT intervention significantly improved clinician adherence with addressing all self-management categories in the electronic medical record ($P = .000$) and adherence with self-management education given to the patient in writing at discharge ($P = .000$). There were no significant differences in adherence with medical interventions ($P = .39$). While guideline adherence is associated with less practice variation and improved processes, methods of integration into practice in community hospital settings have been largely unexplored. The multifaceted HEARTFELT intervention is promising for its potential to integrate evidence at the point of care, to reduce unwarranted variation in practice, and ultimately to improve the outcomes of individuals with HF.

Keywords

adherence; clinical pathway; clinical practice guidelines; heart failure; practice variation

Heart failure (HF) is a major public health problem in the United States. It affects 4.9 million Americans and is the primary cause of hospitalization in Medicare beneficiaries. In 1998, \$3.6 billion (\$5471 per discharge) was paid to Medicare beneficiaries for treatments related to HF.¹ Research over the past decade has identified interventions, medications, and treatments with efficacy for this population. However, prognosis after the diagnosis of HF remains poor and the costs associated with it, in terms of human suffering and medical resources, continue to rise as the population ages.

It is clear from the literature that practice variability precludes many individuals with HF from securing necessary treatments within episodes of acute illness or over the long term²⁻⁵ and that standardization of care using evidence-based interventions is associated with improved outcomes.⁶⁻¹¹ Implementation of clinical practice guidelines (CPG) has been identified as one means of reducing practice variation and ultimately improving the quality of care and outcomes of cardiac patients.¹²⁻¹⁴ *Clinical practice guidelines* are defined by the Institute of Medicine as “statements to assist practitioner and patient decisions about health care for specific circumstances.”¹⁵ The *ACC/AHA Guidelines for the Evaluation and Management of Heart Failure* in 2001 were developed to reduce practice variation and to improve outcomes of patients diagnosed with HF through early recognition and evidence-based treatment.

Clinical pathways are an additional strategy that has been adopted by many healthcare institutions to improve outcomes of patients with HF. Clinical pathways are interdisciplinary plans of care that describe the sequence or timing of key interventions designed to promote desired patient outcomes.¹⁶ Also referred to as care maps, care pathways, or critical pathways, clinical pathways are often employed to reduce local practice variation, curb associated costs, and address the complex needs of HF patients across levels of care.¹⁷⁻²³

While published research supports the use of CPGs and clinical pathways to decrease practice variation, barriers to implementation and adherence have been well documented.^{13,22,24,25} Because clinical pathways and CPGs require integration of knowledge from many sources and are typically developed separately as paper-based tools, assimilation into the workflow can be arduous. In addition, paper format precludes the ability to effectively and efficiently evaluate variance and to empirically link clinical

processes with patient outcomes. These deficits limit the usefulness of clinical pathways and CPGs as documentation and data-collection tools and prevent achievement of real time benefits.^{26–28}

Research on practice guidelines, clinical decision making, and disease management has demonstrated that organizational and work flow barriers are sensitive to informatics solutions.^{29–31} However, to date there is a paucity of published research that explores differences in CPG adherence when recommendations are incorporated into an automated clinical pathway and integrated into the workflow using an interdisciplinary performance improvement team approach. Furthermore, while CPG adherence is associated with less practice variation and improved processes, methods of integration into practice in community hospital settings has been largely unexplored.

Study Aims

The aims of this quasi-experimental study were to examine interdisciplinary knowledge and adherence to core recommendations of the ACC/AHA CPG and patient outcomes before and after implementation of the HEART Failure Effectiveness & Leadership Team (HEARTFELT) intervention. Study findings related to interdisciplinary adherence including medical interventions, clinician documentation of patient education addressing self-management skills in the electronic medical record (EMR), and self-management education given to patients in writing at discharge are reported here.

Conceptual Underpinnings

The conceptual underpinnings of the HEARTFELT study is the Informatics Infrastructure for Evidence-based Practice (IIEBP).³² The IIEBP and its 8 building blocks provide the supporting framework from which the automated clinical pathway integrated with CPGs emerges. It is from this rich base of support that decision support tools such as prompts and reminders, automated standard orders, and evidence-based patient education and self-management tools flow from the infrastructure.³² Central to the theoretical model is the relationship between clinician access to evidence and their ability to make evidence available to patients in the form of guideline-based tools to support self-management. According to the HEARTFELT model, sustained access to evidence for patients and clinicians is associated with improved CPG adherence in the short term and linked to improved patient outcomes over time (Fig 1).

Methods

Research Design and Participants

A quasi-experimental, untreated control group design with separate pretest/posttest samples³³ was employed at a community hospital in Connecticut. The untreated historical control group included consecutive patients aged 65 and more with the diagnosis of HF ($n = 90$) and a nonequivalent comparison group of patients with the diagnosis of stroke ($n = 55$) discharged between September 1, 2002, and February 28, 2003. The posttest samples included consecutive patients with the diagnosis of HF ($n = 96$) and stroke ($n = 75$) discharged between September 1, 2003, and February 29, 2004, after implementation of HEARTFELT. Patients were included in the sample if they were aged 65 or older and were coded with a primary diagnosis of DRG (Diagnosis Related Group) 127 (HF) or DRG 14 (Stroke). Stroke patients were selected as the nonequivalent comparison group because they have many of the same risk factors and self-management education needs as those with HF and the American Stroke Association (ASA) has a practice guideline with specific recommendations that facilitate objective evaluation of treatment.

An a priori sample size calculation estimated that the sample size required to be sensitive to a 20% improvement in adherence with CPG recommendations was 76 (baseline compliance 71.5% [composite score]; Greenwich Hospital Internal Quality Report July 2001). The desired level of improvement was based on improved CPG adherence after similar interventions in cardiac populations.^{34,35} Approval by the appropriate internal review boards was obtained prior to study implementation.

The HEARTFELT Intervention

The HEARTFELT intervention consisted of 4 components that were implemented simultaneously: (1) automated pathway in EMR (included order sets, interdisciplinary plan of care, and self-management plan); (2) access to evidence for clinicians and patients; (3) HF self-management education tool; (4) ongoing discipline-specific feedback regarding adherence. The HEARTFELT intervention is summarized in Table 1.

To support implementation of the HEARTFELT intervention, a core team of nurses, physicians, case managers, dietitians, information systems specialists, pharmacist, and a medical librarian was established to assist in planning and implementation. The team was co-led by a nurse (investigator) and a physician (cardiologist). Key responsibilities of team members included serving as opinion leaders, evaluating and refining the HEARTFELT intervention and associated tools, and implementing the program throughout the hospital.

The multifaceted HEARTFELT intervention was developed by the investigator, on the basis of current literature and presented for discussion at the initial HF performance team meeting. The literature regarding the use of similar tools in other settings was shared. Team members were encouraged to provide feedback, including potential barriers and possible methods of overcoming them.

The team was divided into subcommittees to refine the HEARTFELT tools. Refined tools were brought back to the larger committee for discussion and approval. Careful attention was given to workflow issues that could impact adoption. Subcommittee members focused on the ultimate goal of dissemination of evidence through the use of point-of-care tools derived from published research and refined to accommodate local practices and workflow. Automated tools (pathway, order sets, interdisciplinary plan of care) were developed where the established workflow permitted. Where paper forms were already in use for regulatory reasons (eg, discharge instructions must be given to patients on State of Connecticut W-10 form) or where the team believed that automation would present unreasonable challenges, paper tools were used.

In an attempt to limit investigator bias and to facilitate integration of the intervention into the workflow, a large group of interdisciplinary clinicians was involved in revising and implementing the HEARTFELT intervention. This required that a careful balance by the investigator between team member participation in tool refinement and preservation of the integrity of the global evidence contained within specific tools.

Education and Training

Prior to implementation of the HEARTFELT intervention, a 45-minute training session was completed for all clinicians caring for patients with HF—69 nurses, 19 resident physicians, 2 physical therapists, 1 pharmacist, and 2 dietitians. Training sessions of a ½-hour didactic and 15 minutes of discussion/demonstration of changes in EMR were scheduled on all shifts over a 1-month period. For medical resident staff, orientation to the HF standard order sets and the clinical pathway was completed during initial hospital orientation. The *ACC/AHA Pocket Guidelines for the Evaluation and Management of Chronic Heart Failure* and laminated cards that summarize the guideline recommendations (discipline-specific) were

distributed and reviewed as part of training. Baseline performance on the CMS/JCAHO HF measures was reviewed and clinicians were involved in setting unit goals for improvement. In addition, the nurse and physician HEARTFELT team leaders presented an overview of the study, including baseline adherence measures and goals, to attending physicians at a medical staff meeting. Physician order sets and patient education tools were presented and suggestions for improvement and integration into the workflow were solicited at that time.

To allow for a period of implementation, evaluation, and refinement, all tools were finalized in July 2003, 2 months before commencement of the HEARTFELT study. A variety of educational methods were used to disseminate tools. In-service education specific to the tools was provided to appropriate staff and automated and paper tools were made available on all patient care units. Focus groups were held to elicit clinician feedback. Communications related to the tools were sent out via electronic mail, which is routinely monitored by all clinical staff. Additional workflow issues were identified and addressed.

One major challenge for the HEARTFELT team was identifying patients with HF while they were in the hospital so they could be placed on the clinical pathway and appropriate interventions could be implemented. Patient diagnosis is coded after discharge, so team members were concerned that HF patients might not be identified until then. To promote identification of patients, a chart audit was completed on a sample of 20 patients who were coded after discharge as HF patients. Common characteristics of these patients were identified on the admission assessment screen. An algorithm was integrated into the EMR to identify patients with these characteristics and pull data from key fields onto a text report that was set to “auto print” on each medical unit at 7 AM. A special training session was held for the unit secretaries where they were given some general information about the HEARTFELT team and the importance of patients receiving detailed instructions at discharge and their potential role in making this happen. The secretaries were trained to pick up the text report (with other orders that were routinely picked up from the printer at that same time each day) and put the HF tools on the front of the chart. The presence of this paperwork on a patient chart alerted clinical staff to the likelihood that the patient had a diagnosis of HF. If not done previously, appropriate action was then taken to place the patient on the clinical pathway.

Data Collection

Data were collected preintervention and postintervention on HF and stroke patients. Demographic data (gender, age, length of stay, and discharge disposition) were collected to compare and identify differences between HF and nonequivalent control groups.

Performance on the CMS/JCAHO HF measures was used to evaluate progress with CPG adherence. Preintervention and postintervention data were collected on adherence measures and entered into the American Heart Association/Outcome Sciences Get With The Guidelines Patient Management Tools (PMT) for Coronary Artery Disease, which includes HF. The ASA measures (also integrated into the PMT) were used to evaluate adherence in the nonequivalent comparison group of stroke patients. The PMT provides an objective means to track patient-specific guideline information and the ability for institutions to track CPG adherence individually against national benchmarks over time. The PMT served as a standardized data-collection tool for the HEARTFELT study. Because the algorithm of inclusion/exclusion criteria from CMS/JCAHO HF measures and ASA measures are built into the PMT tool, data generated were viewed as more “objective” and accurate than data abstracted using traditional approaches. In addition, the PMT included a report function component, which generated up-to-minute reports related to performance at multiple levels of granularity. Individualized reports were used to provide real-time domain-specific feedback and facilitated generation of detailed action plans.

Data Analysis

The analysis for the HEARTFELT study was conducted using SPSS for Windows, Version 11.5. Analyses of the data were performed using descriptive and inferential statistics. Because the data for the CMS/JCAHO adherence measures showed a significant skew even after square root and log transformation, data were recoded into adherence categories (nonadherence, partial adherence, or adherence) and nonparametric techniques (chi-square) were used for analysis. Patient records with no documentation of adherence with guideline-based interventions (as specified by CMS/JCAHO measures) were coded as “nonadherence.” Records with documentation of adherence with 1 or more (but not all) guideline-based interventions were coded as “partial adherence.” Records with documentation of all adherence categories were coded as “adherence.” For medical interventions, the nonadherence and partial adherence categories were collapsed because there were insufficient values in each cell to meet the assumptions of the chi-square test when 3 adherence groups were used. Group comparisons were completed to analyze differences in adherence across the preintervention and postintervention HF and prestroke and poststroke groups. The significance level for all statistical tests was set at $P < .05$ (2-tailed).

Results

Patient Characteristics

The HEARTFELT study examined outcomes in relation to 4 groups of patients. Two groups were discharged with a diagnosis of HF: preintervention (historical control) and postintervention. A separate untreated comparison group of patients discharged with a diagnosis of stroke was examined: preintervention (historical control) and postintervention (also untreated). In total, discharge records of 314 patients were examined (Table 2). The mean age of the study sample was 82.1 years (range, 65–98). Gender distribution was approximately even with 43.9% male. The racial mix was similar to that of Greenwich, Conn (the area in which the study was completed); most patients were Caucasian (96.27%). The majority of patients (64.3%) were discharged home after hospitalization. Patient groups were similar except the patients in the stroke group were significantly younger than the patients with HF ($P = .001$).

Study Power

On the basis of a 2-sided alpha of .05 and the sample size obtained, we had 43% power to detect a 12.4% difference (small effect) in adherence with medical interventions—an effect size smaller than predicted in the a priori analysis. Therefore, the sample size was not large enough to demonstrate an effect with this measure. The other 2 adherence measures, EMR self-management education and self-management education given to patients in writing at discharge, had power of more than 99% to detect differences of 30% and 50%, respectively.

Documentation of Patient Education Addressing Self-management Skills in the EMR

Adherence with guideline recommendations for patient education addressing self-management skills documented in the EMR increased from 12.1% in the untreated HF group to 25.8% in the HEARTFELT group. However, partial compliance scores decreased and noncompliance scores increased in the HF group ($P = .000$). Differences in the untreated comparison group of stroke patients were not significant ($P = .445$).

Self-management Education Given to Patients in Writing at Discharge

The percentage of patients who had documentation of full clinician adherence to guideline recommendations related to written self-management education given at discharge improved

significantly ($P = .000$) in the HF group (1.1%–66.0%). The percentage of patients with no documentation of written self-management recommendations decreased from 24.2% to 3.1% in the HF group. Differences in the untreated comparison group of stroke patients were not significant ($P = .354$).

Clinician Adherence With Medical Interventions

Results from the chi-square analysis (Table 3) demonstrated that while the percentage of patients with documentation of full adherence with guideline-based medical interventions increased from the pretreatment HF group to the HEARTFELT group (48.4% untreated to 54.6% post-HEARTFELT), the differences were not statistically significant ($P = .389$). Differences in the untreated comparison group of stroke patients also were not significant ($P = .076$).

Discussion

Differences in effect size for adherence with medical interventions from what has been reported previously and what was noted here are possibly related to the short duration of the HEARTFELT study. Previous studies that demonstrated moderate to large effect sizes each had durations of 1 year or longer.^{37,38} The HEARTFELT study was conducted over a 6-month period. This may be too short a period of time with a goal as complex as behavior change. Quarterly reports of adherence were sent to all physicians who discharged patients with HF from the research setting. As a result, they had received only 2 reports (baseline and 1 follow-up report) designed to highlight their practice and encourage adherence during the study period. A longer study period also would have generated a larger sample size and increased statistical power.

These data support improvements in patient education related to self-management documented in the EMR. Adherence was noted specifically when the patient pathway educational plan was used to document educational interventions. When other standard educational screens were used for documentation, adherence scores were lower. These findings are consistent with those in the Guidelines Applied in Practice acute myocardial infarction study,³⁶ where the authors observed that evidence of tool use was associated with higher levels of adherence with quality indicators. In the HEARTFELT study, the automated clinical pathway included a structured educational plan that was attached to the interdisciplinary treatment plan of all patients identified as having a diagnosis of HF. However, none of the fields on the education screen were “required fields.” Therefore clinicians could choose to document on the plan or to document on another standard educational plan. Where clinicians used the HEARTFELT educational plan, statistically significant improvements were noted in adherence.

The presence of the HEARTFELT patient discharge form in the medical record was associated with significant improvement in adherence with the CMS/JCAHO measures for HF education given to the patient in writing at discharge. The patient discharge form was implemented by the HEARTFELT team and served as physician discharge orders, patient discharge instructions, and an addendum to the State of Connecticut W-10 form (required when patients are transferred to another facility). The goal was to incorporate core guideline recommendations into a form that already had a place in the unit-level workflow and to prevent an additional documentation burden on clinicians. The results of the data analysis suggest that these goals were met. However, it appears that the improved discharge documentation may have been related to the decrease in partial adherence scores and the increase in nonadherence scores noted in EMR documentation of self-management education. The HF discharge form is scanned and placed in the patient record after discharge. Qualitative feedback from nurses indicated that it was believed that if educational

interventions were fully documented on the paper form, additional documentation in EMR was redundant.

The major limitation in this study was the possibility that external events occurred during the course of the study. Therefore, a nonequivalent comparison group of stroke patients was used to control for historical threats to internal validity. The study was based on data collected at a single community hospital in the northeastern United States, thus limiting the geographic generalizability of the results.

Implications for Practice

These results suggest that integration of evidence at the point of care is associated with improved clinician outcomes including adherence to guideline recommendations related to patient self-management education. Guideline adherence reduces treatment variability and improves patient access to evidence-based care. An important contribution of this study was its multifaceted approach to integration of guideline evidence into the workflow of a busy community hospital. The automated pathway provided a practical approach to augmenting evidence-based practice.

This study highlights the difficulties that clinicians face at the point of care with regard to documentation and duplication of documentation. Findings of this study suggest that sustained adherence with CPG recommendations will require documentation systems that are streamlined and make use of the informatics infrastructure to reuse data documented in the EMR by mapping it to discharge forms so that documentation duplication is avoided and clinicians have more time to care for patients.

When relationships within the HEARTFELT model were tested, adherence to CPG recommendations related to written self-management education support the HEARTFELT model. The presence of evidence-based clinician tools, in this case the patient discharge form, improved clinician access to evidence at the point of care. The patient discharge form also served as a patient tool and improved patient access to evidence related to self-management of HF. These findings support a basic tenet of the HEARTFELT model, which holds that sustained access to evidence at the point of care is associated with improved short-term CPG adherence. Additional research is needed to investigate other tenets of the model, such as the impact of access to evidence over sustained periods on clinician adherence and patient outcomes.

While guideline adherence is associated with less practice variation and improved processes, methods of integration into practice in community hospital settings has been largely unexplored. The multifaceted HEARTFELT intervention shows promise toward use of informatics processes to integrate evidence at the point of care, to reduce unwarranted variation in practice, and ultimately to improve the outcomes of persons with HF. Studies of larger scope and longer duration are needed to more fully evaluate the impact of sustained guideline adherence on both clinician adherence and patient outcomes in acute care settings and across the continuum of care. Further work is needed to investigate methods of maintaining the types of workflow changes that were implemented in the HEARTFELT study.

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FIGURE 1.
HEARTFELT model. LOS indicates length of stay; ED, emergency department.

TABLE 1
HEARTFELT Intervention: Components, Preliminary Testing, and Ongoing Evaluation*

HEARTFELT Components	Pilot Work/Preliminary Testing	Ongoing Evaluation
Automated pathway: EMR	<ul style="list-style-type: none"> Modeled after AHA Get with the Guidelines “sample” order set. 	<ul style="list-style-type: none"> All records of discharged patients evaluated to track adherence with guidelines, barriers to adherence, including structure of pathway tools.
<ul style="list-style-type: none"> Order sets 	<ul style="list-style-type: none"> Placed in EMR 2 months prior to initiation of study. 	
<ul style="list-style-type: none"> Interdisciplinary plan of care 	<ul style="list-style-type: none"> Record review on all heart failure patients' records to evaluate documentation. 	<ul style="list-style-type: none"> Documentation issues are an ongoing action item at performance improvement team meetings.
<ul style="list-style-type: none"> Self-management education plan 	<ul style="list-style-type: none"> Issues identified and discussed in performance improvement team. 	
Access to evidence	<ul style="list-style-type: none"> Pathway components modified to address identified issues. 	<ul style="list-style-type: none"> Message conveyed to clinicians and team members that tools are “evolving” rather than static.
<ul style="list-style-type: none"> Pocket guidelines 	<ul style="list-style-type: none"> Focus groups of clinicians formed to evaluate ACC/AHA guidelines/pocket guidelines. 	<ul style="list-style-type: none"> Feedback regarding cards solicited at staff meetings and via electronic mail.
<ul style="list-style-type: none"> Infocard 		
<ul style="list-style-type: none"> EMR prompts 	<ul style="list-style-type: none"> Suggestion made to create laminated 3×5 discipline-specific “Infocard” so clinicians would have access to evidence in a useful format at the point of care. 	<ul style="list-style-type: none"> Feedback regarding handout is solicited quarterly with dissemination of unit-specific performance report on adherence.
Self-management education	<ul style="list-style-type: none"> Developed initially in home care department and piloted on home care patients. 	<ul style="list-style-type: none"> Form tracked for presence/ completeness in all records of discharged patients.
<ul style="list-style-type: none"> Heart Failure Patient Education Handout 	<ul style="list-style-type: none"> Clinician and patient feedback incorporated into form. 	<ul style="list-style-type: none"> Documentation issues related to this form are an ongoing action item at performance improvement team meetings.
<ul style="list-style-type: none"> Discharge Form/ W-10/Patient Discharge Instructions 	<ul style="list-style-type: none"> Reviewed/revised by GH Patient Education Committee. 	<ul style="list-style-type: none"> Message conveyed to clinicians and team members that tools are “evolving” rather than static.
	<ul style="list-style-type: none"> Finalized in heart failure performance improvement team. 	
	<ul style="list-style-type: none"> Based on form employed with AMI patients in Mehta study.³⁶ 	
<ul style="list-style-type: none"> Ongoing discipline-specific feedback regarding adherence 	<ul style="list-style-type: none"> Adapted to CHF using ACC/AHA guidelines and performance measures. 	<ul style="list-style-type: none"> Domain specific feedback regarding adherence.
	<ul style="list-style-type: none"> Unit staff/residents involved in development. 	<ul style="list-style-type: none"> Nurses: Self-management education
	<ul style="list-style-type: none"> Evaluated by GH Patient Education and Staff Education Committees, Cardiac Section Meeting (cardiologists), and Cardiac Service line Committee. 	<ul style="list-style-type: none"> Physicians: EF documentation and ACE-I prescription at DC
	<ul style="list-style-type: none"> Based on AHA “Get with the Guidelines” model. 	

* HEARTFELT indicates HEART Failure Effectiveness & Leadership Team; EMR, electronic medical record; AHA, American Heart Association; ACC, American College of Cardiology; AMI, acute myocardial infarction; and CHF, congestive heart failure.

TABLE 2

Univariate Analysis of Diagnostic Group (Heart Failure vs Stroke) in Relation to Sociodemographic Variables

	All Patients (<i>n</i> = 314)	Heart Failure (<i>n</i> = 188)	Stroke (<i>n</i> = 126)	<i>P</i>
Age, mean, y	82.09	83.3	80.3	.001
Gender, male, %	43.9	42.6	46	.543
Length of stay, d	5.16	5.3	4.9	.404
Discharge status, %				
Home	64.3	67.0	60.3	.137
Other facility	29.9	26.6	34.9	.114
Expired	5.7	6.4	4.8	.545

TABLE 3

Heart Failure/Stroke Group Cross Tabulation (Chi-square): Adherence Measures*

	Heart Failure (n = 188)				Stroke (n = 126)			
	Pre		Post		Pre		Post	
	n	%	n	%	n	%	n	%
Adherence								
Medical intervention	44	48.4	53	54.6	4	7.7	14	18.9
EMR Doc	11	12.1	25	25.8	1	1.9	5	6.8
DC Doc	1	1.1	64	66.0	1	1.9	0	0
Partial adherence								
EMR Doc	56	61.5	28	28.9	40	76.9	53	71.6
DC Doc	68	74.7	30	34.9	43	82.7	66	89.2
Nonadherence								
Medical interventions	47	51.6	44	45.4	48	92.3	60	81.1
EMR Doc	24	26.4	44	45.4	11	21.2	16	21.6
DC Doc	22	24.2	3	3.1	8	15.4	8	10.8

* Pre indicates pre-HEARTFELT intervention; Post, post-HEARTFELT intervention; EMR Doc, adherence with self-management education in electronic medical record; and DC Doc, adherence with self-management education given to patients in writing at discharge.