Home Telehealth for Reduction of Heart Failure Patient Hospital Readmissions

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Heart Failure (HF):
- Affects 6.5 million Americans (AHA, 2017)
- 960,000 new cases/year (AHA, 2017)
- 50% will die within 5 years of diagnosis (AHA, 2017)
- 23% are readmitted to the hospital within 30-days of discharge (Hospitals Compare, 2014)

Additional challenges:
- Older patient population/Numerous comorbidities (Hawkins, et. al., 2016)
- Patient education & self care practices are often inadequate (Evangelista, et. al., 2015)
Projected costs to manage HF patients are $69.8 billion in 2030 (AHA, 2017)

Patient Protection & Affordable Care Act (2010)
Home Telehealth (TH)

- Transfer of physiologic data from the home setting to a healthcare site
- Data are viewed and responded to by trained healthcare professionals utilizing treatment protocols
- Home TH has gained increased importance in healthcare (Hawkins et al., 2016)
- Historically, research has been from large academic settings (Nakamura, Koga, & Iseki, 2014)

Goals: improve symptom monitoring, treatment adherence, early detection of problems & decrease hospital readmissions
Need for TH Patient “Adoption” Research

- Home telehealth use continues to rise (Evangelista, et. al., 2015)

- Compliance/adherence with recommended device(s) use varies among patients (Nakamura, Koga, & Iseki, 2014)

- Telehealth adoption requires:
  - incorporation of the device into daily routine
  - correlation and appraisal of the biometric data with symptoms
  - commitment to utilizing the device to improve self-care management (Thomason, et. al., 2015)

- Healthcare providers will benefit from increased knowledge of the key attributes which influence telehealth adoption, and thereby compliance with use
Purpose of Study

Study Purpose:
Examine for differences between HF patients participating in a nurse-led home TH program compared to HF patients who received usual home nursing care services (no home TH).

Data Source:
Existing database from a home care agency in Southern California. IRB approvals obtained.
Research Aims

1. Examine for differences among HF patients enrolled in a home TH program compared to non-TH HF patients receiving (usual care) home health nursing services with a focus on **socioeconomic variables** (e.g., age, gender, ethnicity, living situation) and **cognitive/physiologic variables** (e.g., ability to bathe self, administer self-medications, risk of falling, vision, shortness-of-breath).

2. Examine for differences among HF patients enrolled in a home TH program compared to HF patients who receive usual care home health nursing services regarding **30-day all-cause hospital readmissions**.
Population

- De-identified HF patients who received home care nursing services from one home care agency between January 1, 2011 through October 21, 2012
- Primary or secondary medical diagnosis of HF with recent discharge from the hospital
- Medicare as the primary payer
- Patient agreement to participate with home TH program
- Home landline telephone
- Ability to read and communicate in English
# Monitoring Device: Daily Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Expected Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you experiencing more difficulty breathing today?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Have your feet, ankles or legs been swollen more than usual?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Did you take all your medications as prescribed?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Are you more fatigued today compared to a normal day?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Are you having difficulty following a low salt diet?</td>
<td>Yes or No</td>
</tr>
<tr>
<td>To sleep comfortably last night, did you need:</td>
<td>Select One:</td>
</tr>
<tr>
<td></td>
<td>1. Extra Pillows?</td>
</tr>
<tr>
<td></td>
<td>2. To sit in a chair</td>
</tr>
<tr>
<td></td>
<td>3. No extra assistance needed</td>
</tr>
</tbody>
</table>
TH Alerts With Nursing Follow-Up

**Green Alerts:** No response needed

**Yellow Alerts:** Patient data may be incomplete (e.g., blood pressure, heart rate, weight, answers to questions). Call the patient to determine reason(s) for omission of data. Ask the patient to retest.

**Red Alerts:** Call the patient and ask:

**Weight Gain:**
- Do you have increased difficulty in breathing and/or swelling in your feet/legs?
- Did you dress differently today?
- Are there any recent medication changes?
- Has the scale been moved or loss of calibration?

**Blood Pressure:**
- Did you take your medications today? If no, have the patient take medications and retest in 1 hour.
- What kind of activity were you doing prior to taking your vital signs?
- Were you sitting still or moving, talking, or coughing during the test?
- Have you had any medication changes?

**Heart Rate:**
- Are you having shortness of breath?
- Are you feeling weak or dizzy today?
- Have you taken your medications?
- What kind of activity were you doing prior to taking your vital signs?

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**Home Telehealth and Hospital Readmissions: A Retrospective OASIS-C Data Analysis**

Thomason, Tanna R.; Hawkins, Shelley Y.; Perkins, Katherine E.; Hamilton, Elissa; Nelson, Betty

Outcome and Assessment Information data Set-C (OASIS-C) is a required database used to document all home care nursing assessments, per the Centers for Medicare/Medicaid Services (CMS)

- Forms the basis for measuring patient outcomes for purposes of outcome-based quality improvement (OBQI)
- Measures changes in a patient’s health status between two or more time points
Each variable has a standardized definition & coding elements

Data are:

- bivariate & categorical
- consist of numerous cognitive & physiologic variables
- collected at these time intervals:
  - Initial admission to home care services
  - Each 30-day cycle of care services
  - Discharge from care services
OASIS-C Data Variables

- Gender
- Age
- Ethnicity
- New or previous patient
- Zip Code
- Living Situation
- Insurance
- Cognitive Function
- Confusion
- Anxiety
- Memory Deficit
- Cognitive/Psyche Behaviors
- Disrupt Behavior Frequency
- DC from SNF in past 14-days
- Fall Risk in past 12 months
- Medication Complexity > 5 meds/day
- Fragility Risk
- Vision
- Hearing
- Understand Verbal
- Communication
- Oral Expression
- Urinary Incontinence
- Timing of Urinary Incontinence
- Oxygen or Ventilator
- UTI in past 14 days
- Bowel Incontinence
- Grooming
- Dressing Upper & Lower Body
- Bathing Self
- Toilet Transferring
- Toileting Hygiene
- Bed to Chair Transfer
- Ambulation
- Cooking
- Telephone abilities
- Fall Risk Assessment
- Drug Regimen Review
- Self Management of Oral Meds
- Frequency of Assistance w/ADLs
- Pain Levels
- Pain Interferes w/Movement
- Risk of Pressure Ulcer
- Unhealed Pressure Ulcer(s) & Staging
- Dyspnea/SOB
Research Methodology

- Export data from Excel into SPSS
- Data codes per precise definitions provided by CMS
- Original database contained 8,885 OASIS-C entries during this 22-month timeframe
- Data sorted and reduced to include only primary or secondary diagnostic related grouping ICD-9 Code of 428, indicating a diagnosis of HF
- Final data analysis: 1,434 HF entries (TH and non-TH combined)
- Analyze aggregate HF patient data
- Analyze TH compared to non-TH HF patient data
Data Collection

Telehealth Monitoring Framework – Patient Selection, Screening and Monitoring

If YES to all

Home Care Services
Install Home Telehealth Monitor
Home Care Services

Patient Performs Daily Biometrics & Q&A Response:
- Weight
- B/P
- Oximetry
- Yes/No Q&A, 6-Questions

If NO to any question

OASIS Database

Data Extraction and Analyses

OASIS Database

Without Telehealth

With Telehealth

Extract

Compare

Relevant Data
- SOB
- Fall Risk
- Self-Care
- Smoking
- Hospital Readmission
- D/C from SNF in past 14-days
# Research Aims

1. Examine for differences between HF patients enrolled in a home TH program compared to non-TH HF patients receiving usual home health nursing services regarding socioeconomic variables and cognition/physiologic variables.

   **Variables**: age, gender, ethnicity, zip code, and living arrangements. 38 cognitive & physiologic variables analyzed.

   **Analysis**:
   - Descriptive statistics and measures of central tendency, percentiles
   - Chi-square & Fisher’s exact

2. Examine for differences between the two HF groups on 30-day all-cause hospital readmission rates.

   **Variable**: Hospital Readmission

   **Analysis**:
   - Measures of central tendency, percentiles
   - Chi-square & Fisher’s exact
## Study Results
### Demographic Data

<table>
<thead>
<tr>
<th>OASIS-C Variables</th>
<th>No Tele Health (n, %)</th>
<th>Tele Health (n, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tele-Health (TH)</td>
<td>No TH 93%</td>
<td>TH 7%</td>
</tr>
<tr>
<td>Age (Mean, Standard Deviation)</td>
<td>81.97 (SD 10.55)</td>
<td>83.75 (SD 8.61)</td>
</tr>
<tr>
<td>Gender</td>
<td>Female 768 (60.2%)</td>
<td>Female 48 (60%)</td>
</tr>
<tr>
<td></td>
<td>Male 508 (39.8%)</td>
<td>Male 32 (40%)</td>
</tr>
<tr>
<td>American Indian</td>
<td>6 (0.5%)</td>
<td>1 (1.2%)</td>
</tr>
<tr>
<td>Asian</td>
<td>51 (4%)</td>
<td>5 (6.2%)</td>
</tr>
<tr>
<td>African American</td>
<td>28 (2.2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>120 (9.4%)</td>
<td>10 (12.3%)</td>
</tr>
<tr>
<td>Hawaiian/Pacific Islander</td>
<td>11 (0.9%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>1066 (83.3%)</td>
<td>65 (80.3%)</td>
</tr>
<tr>
<td>Mean # Days on TH</td>
<td>NA</td>
<td>57 days (SD 51, Range 4-270)</td>
</tr>
</tbody>
</table>
### Study Results

#### Clinical Data

<table>
<thead>
<tr>
<th>OASIS-C Variables</th>
<th>No Tele Health (N, %)</th>
<th>Tele Health (N, %)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharged from SNF in past 14-days</td>
<td>315 (24.7%)</td>
<td>4 (4.9%)</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>Fall Risk</td>
<td>867 (67.9%)</td>
<td>42 (51.9%)</td>
<td>p=.009</td>
</tr>
<tr>
<td>&gt; 2 Falls in past 12mos</td>
<td>343 (26.9%)</td>
<td>13 (16%)</td>
<td>p=.032</td>
</tr>
<tr>
<td>Smokes Cigarettes</td>
<td>250 (19.6%)</td>
<td>4 (4.9%)</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>Shortness-of-Breath</td>
<td>1095 (79.9%)</td>
<td>75 (92.5%)</td>
<td>p=.043</td>
</tr>
<tr>
<td>Partially or Severely Impaired Vision</td>
<td>208 (15.6%)</td>
<td>9 (10.1%)</td>
<td>p=.038</td>
</tr>
<tr>
<td>Able to Bathe Self</td>
<td>299 (23.5%)</td>
<td>25 (30.9%)</td>
<td>p=.022</td>
</tr>
<tr>
<td>Able take Oral Meds if Reminded by Person</td>
<td>231 (18.1%)</td>
<td>23 (28.4%)</td>
<td>p=.041</td>
</tr>
<tr>
<td>All-Cause Hospital Readmission during HC Services</td>
<td>264 (20.7%)</td>
<td>7 (10%)</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>Hospital Readmission for CHF during HC Services</td>
<td>No Data</td>
<td>3 (4.2%)</td>
<td></td>
</tr>
</tbody>
</table>
Summary of Results

- No significant differences in sociodemographics (age, gender, zip code & living situation) between the two study groups.
- Non-TH patients smoked more, had worse vision & greater risk of falling, and more likely to be discharged from hospital to SNF.
- TH patients had greater ability to take medications when reminded, perform ADLs, and experience more SOB.
- TH patients had reduced (all-cause) hospital readmissions.
Limitations of Study

- Secondary data analysis
- Unable to match subjects
- English/Spanish speaking populations
- Medicare insurance
- Northern SD: not generalizable
Conclusions

- Heart failure management requires a high level of patient involvement and self-care

- HF patients often find improved symptom recognition/control, knowledge, self-care practices and quality of life when utilizing home TH monitoring

- Telehealth adoption can influence decreased mortality and hospital admissions

- Home care agencies must evaluate outcome data, modify program elements, and align resources to achieve the largest impact

- TH has the potential to reduce the emotional and fiscal burdens associated with repeated HF hospitalizations.
Nursing Implications

- Nurses play an integral role in the process of TH adoption (education, implementation, evaluation)
- Nurses should continue to increase their knowledge and skills with home TH monitoring devices
- Nurses must continue to conduct community-based TH research and program evaluation in order to build an evidence-base for TH HF patient care
- Nurses can significantly contribute to the initiative of expanded TH reimbursement through conducting and publishing research
References


Questions??
Reflections??